Music Technology in Education CHANNELING AND CHALLENGING PERSPECTIVES Øyvind Johan Eiksund, Elin Angelo & Jens Knigge (Eds.) Music Technology in Education CHANNELING AND CHALLENGING PERSPECTIVES This book has been made possible with support from Norwegian University of Technology and Science, Nord University, Royal College of Music in Stockholm, Inland Norway University of Applied Sciences, De Montfort University, Queen Maud University College of Early Childhood Education, and University of Agder. ISSN: 2703-7843 ISBN PDF: 978-82-02-65225-8 ISBN EPUB: 978-82-02-69689-4 ISBN HTML: 978-82-02-69690-0 ISBN XML: 978-82-02-69691-7 ISBN Print Edition: 978-82-02-68474-7 DOI: https://doi.org/10.23865/noasp.108 This is a peer-reviewed anthology. Cover Design: Cappelen Damm AS Cappelen Damm Akademisk/NOASP www.noasp.no noasp@cappelendamm.no 5 Contents

Musikkpedagogisk forskning – en møteplass Elin Angelo Norges teknisk-naturvitenskapelige universitet Velkommen til denne aller første utgivelsen i skriftserien MusPed:Research. I denne teksten presenteres forskningsnettverket Musikkpedagogikk i utvikling (MiU), som denne skriftserien utgår fra, samt refleksjoner bak og intensjoner for MusPed:Research. Det musikkpedagogiske forsknings-, utdannings- og praksisfeltet er et mangfoldig landskap. Blant annet foregår musikkundervisning i Norge i grunnskolen, i kulturskolen, i videregående skole, ved høyere musikkutdanning, i det frivillige musikkliv og som musikkaktiviteter i barnehage og SFO. Musikk er i 2020 et obligatorisk fag i barnehagelærerutdanningen, et valgt fag i grunnskolelærerutdanningen, mulig bakgrunn for praktisk-pedagogiske utdanninger som kvalifiserer til grunnskole og videregående skole, samt mange fag i faglærerutdanning i musikk. Lærerutdanningene til det mangespektrede musikkpedagogiske praksisfeltet foregår ved universiteter og høyskoler – og uten akkreditering også gjennom kursordninger i regi av organisasjoner knyttet til blant annet korps og kor. Kunnskapsutvikling i, for, med og om dette mangeartede landskapet foregår blant annet som tradisjonell vitenskapelig forskning og som skapende, kunstnerisk utviklingsarbeid. Sitering av dette kapitlet: Angelo, E. (2020). Musikkpedagogisk forskning – en møteplass. I Ø. J. Eiksund, E. Angelo & J. Knigge (Red.), Music technology in education – Channeling and challenging perspectives (s. 7–14). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.108.ch0 Lisens: CC BY-NC-ND 4.0. 8 m u s i k k p e da g o g i s k f o r s k n i n g – e n m ø t e p l a s s Forskningsnettverket MiU – bakgrunn for skriftserien Bakgrunnen for denne skriftserien er forskningsnettverket MiU1 som ble etablert våren 2018 i samarbeid mellom fire musikkpedagoger (Elin Angelo, Jens Knigge, Wenche Waagen og Morten Sæther) ved de fire utdanningsinstitusjonene i Midt-Norge som kvalifiserer til dette brede musikkpedagogiske landskapet. Disse fire institusjonene er Institutt for lærerutdanning (ILU) og Institutt for musikk (IMU) ved Norges teknisk-naturvitenskapelige universitet (NTNU), Nord universitet (Nord) og Dronning Mauds Minne Høgskole for barnehagelærerutdanning (DMMH). Til sammen utdanner disse institusjonene lærere til grunnskole, kulturskole, barnehage, videregående skole, høyere utdanning og det frivillige musikkliv gjennom utdanninger på bachelor-, masterog ph.d.-nivå. De fire MiU-institusjonene skiller seg fra hverandre gjennom ulike historiske bakgrunner, kunnskapstradisjoner og profesjonsorienteringer. For eksempel omfatter nåværende Institutt for musikk ved NTNU blant annet det tidligere Trøndelag musikkonservatorium og det tidligere Musikkvitenskapelige Institutt, hvorav sistnevnte ble opprettet i 1962 som del av Norges Lærerhøgskole. Disse delene bygger på kontrasterende kunnskapstradisjoner med fokus på (i) skapende og utøvende musikerutdanning, og (ii) en mer akademisk orientert utdanning av musikkvitere. De fire institusjonene bak MiU har imidlertid også mange likheter med tanke på de ansattes bakgrunner og kvalifiseringsveier, utdanningenes form og innhold og det hybride yrkesfeltet som de ferdigutdannede studentene møter. En intensjon med forskningsnettverket MiU var å skape en møteplass på tvers av disse ulikhetene, styrke dialogene og bidra til felles kunnskapsutvikling i og om musikkpedagogisk utdanning. En annen intensjon med å danne nettverket var å styrke musikkpedagogisk forskning i regionen, blant annet realisert med en felles antologi. Gjennom arbeidet mot denne antologien ble skriftserien MusPed:Research dannet. Pr juni 2020 er i alt fem 1 MiU: https://www.ntnu.no/ilu/musikkpedagogikk-utvikling 9 m u s i k k p e da g o g i s k f o r s k n i n g – e n m ø t e p l a s s antologier i prosess i denne skriftserien.2 Fire av disse har utspring i MiU; Music Technology in Education – Channeling and Challenging Perspectives (Eiksund et al., 2020), MusPed: Higher Education as Context for Music Pedagogy Research (Angelo et al., 2021b),

Arts Education: Collaboration, Quality and Tensions (Bandlien et al., 2021), Samsang gjennom livsløpet (Strøm & Eiksund, 2022), og én antologi har utspring i forskningsgruppen Reconfiguring Early Modern Performance, (REMP) ved Universitetet i Agder;3 MusPed: Views on Early Music as Representation – Invitations, Congruity, Performance (Rolfhamre & Angelo, 2021). Et sentralt tema i etableringsfasen var nettverkets navn. Ved oppstart høsten 2018 sto MiU for Musikklærerutdanning i utvikling – en formulering som insisterte på å samle det mangfoldige fellesskapet av musikk- og lærerutdanninger i regionen under begrepet «musikklærerutdanning». Etter et år med seminarer, workshoper og arbeid i mindre forskningsgrupper ble nettverkets navn endret i 2019 til Musikkpedagogikk i utvikling. Ethvert begrep er problematisk når intensjonen er å være både presis og inkluderende, og når begrepet også handler om noens identitet. Barnehagelærerutdanning er for eksempel ikke det samme som musikklærerutdanning, selv om utdanningen inneholder faget musikk, musikklærere er ansatt, og flere i og fra utdanningen arbeider med musikk i barnehage, kulturskole, frivillig og profesjonelt kulturliv. En musikkvitenskapelig eller musikkutøvende utdanning er heller ikke nødvendigvis en musikklærerutdanning, selv om de fleste studentene får musikklærerjobber etterpå, og selv om alle ansatte per definisjon underviser i musikk. Heller ikke grunnskolelærerutdanning er nødvendigvis musikklærerutdanning, selv om lærerstudentene kan velge musikk som fag. Løsningen med tanke på nettverkets navn ble å beholde det da etablerte akronymet MiU og presentere nettverket på følgende vis på nettsiden: Forskningsnettverket MiU er opptatt av musikkpedagogisk utdanning og forskning, i bred forstand. Akronymet MiU står for Musikkpedagogikk i utvikling, men kan like gjerne leses som musikklærerutdanning i utvikling, 2 Antologier i prosess i MusPed:Research: https://press.nordicopenaccess.no/index.php/noasp/ musped_cfp 3 REMP: https://www.uia.no/en/research/kunstfag/remp-reconfiguring-early-modern-performance 10 m u s i k k p e da g o g i s k f o r s k n i n g – e n m ø t e p l a s s musikerutdanning med pedagogisk vinkling i utvikling/musikkvitenskapelig utdanning med didaktisk profil i utvikling, eller rett og slett som musikk i utdanning. Denne uklarheten fungerer åpnende for MiU's samarbeider, relasjoner og prosjekter. (MiUs nettside, juni 2020) I årene 2018 og 2019 organiserte MiU i alt 20 seminarer med til sammen 15 gjesteforelesere og etter hvert rundt 40 individuelle og kollektive forskningsprosjekter. Seminarene var organisert som workshoper, som minikonferanser, som lesesirkler og som rene diskusjonsgrupper. Blant annet hadde MiU i desember 2018 og februar 2019 seminarer om musikk, teknologi og didaktikk, med Jan-Olof Gullö (Kungliga Musikhögskolan) og Petter Dyndahl (Høgskolen i Innlandet) som gjesteforelesere og respondenter. I mars 2019 arrangerte MiU i samarbeid med en forskergruppe ved DMMH et seminar om profesjon, kunst og håndverk, med Øivind Varkøy (Norges musikkhøgskole) som gjesteforeleser og respondent på forskningsprosjekter og artikler i prosess. På samme vis gjennomførte nettverket i september 2019 et seminar med kulturskole og utdanning som tema, med Monica Lindgren (Göteborgs universitet) som gjesteforeleser og respondent, og i oktober 2019 et seminar om musikalitet med Jens Knigge (Nord) som foreleser og responsgiver. I desember 2019 gjestet Helene Illeris (Universitetet i Agder) et MiU-seminar med søkelys på estetiske læreprosesser og bærekraftig didaktikk, og ved et seminar om temaet kunstnerisk forskning og kunstnerisk utviklingsarbeid var Karin Johansson (Lunds universitet) gjesteforeleser og respondent. Innimellom disse seminarene har nettverket arrangert en lesesirkel om veiledning av kunstnerisk forskning og en workshop om forskningsgjennomgang, deltatt på konferanser, gjennomført en workshop om performativ publisering i fagfellevurderte journaler og tatt del i ph.d-stipendiaters midtveisseminarer, sluttseminarer og disputaser. De ulike prosjektene og artikkelprosessene i MiU ble i løpet av 2019 fordelt i fire grupper, hvorav to er etablert som egne forskningsgrupper: MusTed: Musikkteknologi i didaktisk praksis4 og KiS: Kunstutdanning i samarbeid.5 I løpet av høsten 2020 og våren 2021 gir disse fire gruppene ut egne antologier i

MusPed:Research. 4 MusTed: https://www.ntnu.no/ilu/musted 5 KiS: https://www.ntnu.no/ilu/kis-kunstutdanning-i-samarbeid 11 m u s i k k p e da g o g i s k f o r s k n i n g – e n m ø t e p l a s s MusPed:Research – dialoger i et spenningsfylt utdannings- og forskningsfelt MusPed:Research er en skriftserie i skjæringsfeltet mellom disipliner, fagog forskningsområder som ofte er atskilt i musikkfaglige utdanningssammenhenger. For eksempel utøvende musikk, musikologi, musikk i flerfaglig arbeid, musikkteknologi, musikkpedagogikk, musikkfilosofi og musikkfagdidaktikker knyttet til spesifikke instrumenter eller hørelære. Skriftserien vil tilby en møteplass der institusjonaliserte og kulturelt betingede kunnskapsgrunnlag, identitetsforståelser og maktreguleringer kan tematiseres, brynes mot og speiles i hverandre. I denne første antologien handler kapitlene om temaet musikk, didaktikk og teknologi. Forskere og utdannere fra ulikartede institusjoner og fagmiljøer har bidratt som forfattere, og tatt del i diskusjonene om dette temaet gjennom seminarer, presentasjoner og responsarbeid. I skandinavisk sammenheng har musikkpedagogikk vært konstituert som fag- og forskningsfelt gjennom egne studietilbud i musikkpedagogikk på alle nivåer i svensk, dansk og norsk høyere utdanning samt gjennom en rekke vitenskapelige stillinger i musikkpedagogikk på lektor, førsteog toppnivå ved læresteder i disse landene fra 1990-årene og fremover. Musikkpedagogikk er videre konstituert gjennom Nordisk nettverk for musikkpedagogisk forskning (NNMPF)6 (etablert i 1992) og gjennom den vitenskapelige journalen NNMPF Årbok (NNMRE Yearbook), utgitt årlig fra 1995. Tyskland har en enda lengre tradisjon for musikkpedagogikk som fag og forskningsfelt, blant annet markert gjennom Abel-Struths bok Grundriss der Musikpädagogik (1985) og flere musikkpedagogiske forskningsnettverk og skriftserier. I angloamerikansk sammenheng anvendes både begrepene «music education» og «music teacher education» om den typen vitensutvikling som i skandinavisk og tysk sammenheng gjerne refereres til som integrert musikkpedagogisk. En utfordring i oversettelse mellom engelsk og skandinavisk eller tysk i denne sammenhengen er at «music education» ikke nødvendigvis handler om et pedagogisk metanivå, altså om det å undervise i å undervise i musikk, mens «music 6 Fra 2020 ble konferansespråket engelsk, og det engelske akronymet for nettverket anvendes: NNRME (Nordic Network for Research in Music Education): https://nnmpf.org/nb/sample-page/ 12 m u s i k k p e da g o g i s k f o r s k n i n g – e n m ø t e p l a s s teacher education» fokuserer dette nivået, men først og fremst peker mot didaktisk og formalisert musikkundervisning. Musikkpedagogikk, slik området er konstituert i Skandinavia og Tyskland, kretser rundt et integrert, musikkpedagogisk metanivå og er knyttet til både formaliserte og uformaliserte undervisningskontekster. P-en i MusPed:Research påpeker skriftseriens orientering mot musikkutdanningsforskning som også omfatter et dette metanivået. Musikkpedagogikk kan sies å handle om viten knyttet til det å undervise i å undervise i musikk, og om musikkundervisning og musikalsk læring i et mangfold av formaliserte og uformaliserte kontekster (Johansen, 2006; Ruud, 2016; Vea & Leren, 1972). Musikkpedagogikk kan videre ses som et relasjonsfelt mellom allmennpedagogiske, musikkvitenskapelige og skapende og utøvende musikkdidaktiske kunnskapskulturer som møtes i musikkpedagogiske virksomheter i praksisfeltet (Johansen, 2006; Nielsen, 2001). Institusjonene bak MiU eksemplifiserer disse tre kunnskapskulturene, på den måten at ILU og DMMH bærer en allmennpedagogisk tradisjon, mens Nord universitet og særlig IMU er tradisjonsbærere for skapende, utøvende og musikkvitenskapelige kulturer (Angelo et al., 2021a). Nielsen (2001) og Holgersen & Holst (2020) beskriver hvordan musikkpedagogisk utdanning i Danmark tradisjonelt har fulgt tre veier, slik at konservatoriene utdannet for musikkskolene, lærerhøgskolene til grunnskolen og musikkvitenskapelige utdanningsinstitusjoner til videregående skole. Tilsvarende tradisjon finnes til dels også i Norge, selv om de mange sammenslåingene og fusjonene i høyere utdanning fra rundt år 2021 har gjort skillene mindre tydelige (Aglen & Karlsen, 2017; Eidsvaag & Angelo, 2021)

Utdanning og forskning knyttet til det musikkpedagogiske praksisfeltet kan dermed være mer eller mindre orientert mot musikk; som utøving, kultur eller vitenskap – eller også mer eller mindre orientert mot pedagogikk, didaktikk og elevkunnskap. En hensikt med skriftserien MusPed:Research er å kunne tydeliggjøre og tematisere slike ulikheter og i dialog mellom ulike musikkpedagogiske vitensmiljøer styrke ny kunnskapsutvikling, både substansielt, metodologisk og teoretisk. En utfordring med «møteplass»-metaforen anvendt i tittelen på dette kapitlet, er at denne kan indikere alle praksiser, syn, hierarkier og 13 m u s i k k p e da g o g i s k f o r s k n i n g – e n m ø t e p l a s s tenkemåter som like riktige og like gode. MusPed:Research sikter imidlertid også mot kritisk refleksjon, og om vilje, mot og innsikt til å diskutere kvalitet i det mangesidige musikkpedagogiske feltet. Innenfor dette feltet henger ofte fag, person, profesjon og liv tett sammen. Spørsmål om kvalitet kan derfor være krevende fordi de ikke bare handler om fag og praksiser, men også om personers verdier, livssyn og holdninger. Denne skriftserien sikter likevel mot å artikulere slike problemstillinger og styrke dialoger og kunnskapsutvikling på tvers av ulike musikkpedagogiske fagfellesskap. De forskjellige behovene for musikkundervisning i skole og samfunn forutsetter et bredt spekter av musikkpedagogiske utdanninger. Dette igjen forutsetter ulike typer forsknings- og utviklingsarbeid som for eksempel kan inkludere verbal refleksjon, systematiske studier, kunstbaserte og performative tilnærminger. Det er neppe verken mulig eller ønskelig å bli «enig» om hva kunnskapsgrunnlaget i musikkpedagogiske praksiser er eller bør være. MusPed:Research har imidlertid som intensjon å bidra til åpne diskusjoner mellom ulike grupperinger og tradisjoner, trekke veksler på mangfold og ulikheter og styrke kunnskapsutvikling som er rik og bred og samtidig nyansert og presis. Til sammen sikter MusPed:Research mot å danne et relasjonsfelt der ulike tradisjoner, ulike syn på musikk, menneske, samfunn, læring, undervisning og utvikling kan artikuleres og bidra til kvalifisert kunnskap i, om og for et mangespektret musikkpedagogisk fag- og forskningsfelt. God lesning! Referanser Abel-Struth, S. (1985). Grundriss der Musikpädogogik. Schott Music. Angelo, E., Knigge, J., Sæther, M. & Waagen, W. (2021a). The discursive terms of music/teacher education at four higher educational institutions. I E. Angelo, J. Knigge, M. Sæther & W. Waagen (Red.), Higher Education as Context for Music Pedagogy Research [Under utgivelse]. Cappelen Damm Akademisk. Angelo E., Knigge, J., Sæther, M. & Waagen, W. (Red.). (2021b). Higher Education as Context for Music Pedagogy Research [Under utgivelse]. Cappelen Damm Akademisk. 14 m u s i k k p e da g o g i s k f o r s k n i n g – e n m ø t e p l a s s Aglen, G. S. & Karlsen, S. (2017). Jeg vil bli kulturskolelærer når jeg blir stor – hva innebærer det? En undersøkelse av kvalifiseringsveier innenfor musikkfeltet. I E. Angelo, A. Rønningen & R. J. Rønning (Red.), Forskning og utvikling i kulturskolefeltet. IRIS – den doble regnbuen (s. 157–184). Cappelen Damm Akademisk. Bandlien, B. T., Angelo, E., Olaussen, I. & Letnes, M. A. (Red.). (2021). Arts education: Collaboration, quality and tensions [Under utgivelse]. Cappelen Damm Akademisk. Eidsvaag, F. F. & Angelo, E. (2021). The craftsmanship that disappeared? Investigating the role of the principal instrument in music teacher education programs. I E. Angelo, J. Knigge, M. Sæther & W. Waagen (Red.), Higher Education as Context for Music Pedagogy Research [Under utgivelse]. Cappelen Damm Akademisk. Eiksund, Ø. J., Angelo, E. & Knigge, J. (Eds.). (2020). Music technology in education – Channeling and challenging perspectives. Cappelen Damm Akademisk. Holgersen, S-E. & Holst, F. (Red.). (2020). Musikfaget i undervisning og uddannelse. Status og perspektiv 2020. Musikpædagogiske Studier – DPU. https://edu.au.dk/fileadmin/edu/Udgivelser/Rapporter/Rapport_-_Musikfaget_i_undervisning_og_uddannelse_2020.pdf Johansen, G. (2006). Fagdidaktikk som basis- og undervisningsfag. Bidrag til et teoretisk grunnlag for studier av utdanningskvalitet. I F. V. Nielsen & S. G. Nielsen (Red.), Nordic Research in Music Education (Vol. 8, s.115–136). Norges musikkhøgskole. Nielsen, F. V. (2001). Musiklæreruddannelse i et integrativt relationsfelt:

Indhold, struktur og opgaver. I F. V. Nielsen & H. Jørgensen (Red.), Nordic Research in Music Education (Vol 5, s. 159–176). Norges musikkhøgskole. Nielsen, F. V. (2003). Didaktik på tværs af fag. Aspekter i fagdidaktikkens kernefaglighed. I M. B. Nielsen, R. Tønnesen & S. M. Wiland (Red.), Fagdidaktikk på offensiven (s. 12–36). Høyskoleforlaget. Rolfhamre, R. & Angelo, E. (Eds.). (2021) MusPed: Views on early music as representation – Invitations, congruity, performance [Under utgivelse]. Cappelen Damm Akademisk. Ruud, E. (2016). Musikkvitenskap. Oslo: Universitetsforlaget. Strøm, R. V. & Eiksund, Ø. J. (Red.). (2022). Samsang gjennom livsløpet [Under utgivelse]. Cappelen Damm Akademisk. Vea, K. & Leren, O. (1972). Musikkpedagogisk grunnbok. Norsk Musikforlag. 15 Music Technology in Education – Channeling and Challenging Perspectives Øyvind Johan Eiksund Norwegian University of Science and Technology Elin Angelo Norwegian University of Science and Technology Jens Knigge Nord University Welcome to the anthology Music Technology in Education – Channeling and Challenging Perspectives. This anthology presents research projects that explore intersections between music, technology and education from varying perspectives, and is the result of the efforts organized through the research group Music Technology in Education (MusTed)1 based at the Norwegian University of Science and Technology (NTNU). The researchers in the anthology come from a range of educational programs, including traditional preschool, primary and secondary teacher education programs, as well as music performance and music technology education programs. Data has been collected not only from these respective 1 See https://www.ntnu.no/ilu/musted (accessed August 5 2020). Citation of this chapter: Eiksund, Ø. J., Angelo, E., & Knigge, J. (2020). Music technology in education – Channeling and challenging perspectives. I Ø. J. Eiksund, E. Angelo & J. Knigge (Eds.), Music technology in education – Channeling and challenging perspectives (pp. 15–22). Cappelen Damm Akademisk. https:// doi.org/10.23865/noasp.108.ch00 Lisens: CC BY-NC-ND 4.0. 16 m u s i c t e c h n o lo g y i n e d u c at i o n programs, but from primary and lower secondary schools and informal learning environments as well. The anthology consists of ten chapters, arranged under the topics: (i) background perspectives, (ii) music technology channeling music education, and (iii) music technology challenging music education. The chapters in the first part are written in Swedish and Norwegian, while the remaining chapters are written in English. Before describing the anthology's topics and corresponding chapters, we will present how the global COVID-192 pandemic created by SARSCoV-23 in the year 2020 and its impact on music education came to create a special context for this anthology. Music Education in the Time of Global Pandemics When the work on this anthology started in 2018, we did not know that digitalization of the subject music and education in general would become relevant to such a degree. During the spring of 2020, the world started to grasp the scope and gravity of the global COVID-19 pandemic, and drastic measures were taken in country after country. As Norwegian society closed down to prevent the spread of the virus, so too did the kindergartens, schools and universities, compelling teachers, students, pupils and parents alike to abandon plans and normal procedures.4 For the educational field, this posed (and at present still poses) great challenges, including complex considerations concerning subject content, curricula, communication forms, assessment, examinations and grading. The big question was how to facilitate learning experiences for pupils and students without the opportunity to meet up physically. An obvious part of the answer was rapid digital transformation, a process described as "crash digitalization" 2 See https://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-mediabriefing-on-2019-ncov-on-11-february-2020 (accessed August 19 2020). 3 See https://www.nature.com/articles/s41564-020-0695-z (accessed August 19 2020). 4 See https://www.nrk.no/norge/alle-landets-skoler-og-barnehager-stenges-1.14940262 (accessed July 16 2020). 17 m u s i c t e c h n o lo g y i n e d u c at i o n in Norwegian higher education.5 Online teaching was something few

teachers had any experience of prior to the pandemic, even though the willingness to cope as online practitioners was present (Gudmundsdottir & Hathaway, 2020). For the subject music, traditionally characterized by social and practical components such as singing and playing music together, digitalization poses special challenges. One of these challenges is how to convey important social and practical aspects of the subject music through digital platforms. Another challenge is directed at the subject music itself: what is lost by going digital, and what possibilities arise? What kind of subject can be carried out in music education that is purely digital? In some sense, the national response to the pandemic took the form of a giant educational experiment, forcing institutions to think in new ways. Without going deeper into the consequences and repercussions of this "experiment", the comprehensive need for updated and relevant research on music technology in education suddenly became abundantly clear. However, this is not an anthology on COVID-19 or music education in the time of global pandemics. The research projects presented in this anthology were all conducted before the pandemic started. Still, this anthology provides updated and relevant insights into important topics that all levels of the educational system need to consider, actualized through the current situation. In this anthology these insights are, in addition to background perspectives, presented through the two perspectives of music technology as both "channeling" and "challenging" music education. These last two perspectives will be elaborated on in connection with the presentation of the chapters. Background Perspectives The first part of the anthology contains two chapters that contribute to the understanding of the background for music technology in education. In Chapter One, "I en snårskog av traditioner – musikproduktion och 5 See https://www.fpol.no/bjorn-stensaker-om-krasj-digitaliseringen-i-norsk-hoyere-utdanning/? (accessed July 16 2020). 18 m u s i c t e c h n o lo g y i n e d u c at i o n musikteknik i den högre musikutbildningen utifrån ett svenskt perspektiv" [In a Maze of Traditions – Music Production and Music Technology in Higher Music Education From a Swedish Perspective], Jan-Olof Gullö identifies traditions of importance in Swedish higher education directed at music production and audio and music technique. He asks what characterizes these traditions and what do they mean for the students pursuing a career in this area? Previous research and literature concerning music production and traditions within higher education are analyzed using a knowledge-critical approach, pointing towards challenges for students and teachers alike. In the second chapter, Eirik Askerøi addresses technological development as a driving force of musical development throughout the history of recorded music, with the overall aim of providing an inroad to understanding the concept of sound in a historic perspective. This chapter is called "Sound i historisk perspektiv: oppdagelse, naturalisering, kanonisering" [Sound in a Historic Perspective: Discovery, Naturalization, Canonization]. These chapters provide insights from two different angles into how music technology has affected music and music education historically, giving a historical "sound board" to the following two parts. Music Technology Channeling Music Education Music technology may function as a way of conveying music education through a channel. How can music technology help create and communicate "genuine" music experiences? What are the limits of digital music education, and what kind of music educational approaches can be fruitful in a digitalized music subject? Questions like these form the starting point for the second part of the anthology, as well as for the third chapter, called "The Notion of Presence in a Telematic Cross-Disciplinary Program for Music, Communication and Technology". In this chapter, Robin Støckert, Andreas Bergsland and Anna Xambó examine how students in a two-campus, cross-disciplinary program in Music, Communication and Technology (MCT) experience the sense of presence of peer students and teachers, some physically co-localized, while others are present via an 19 m u s i c t e c h n o lo g y i n e d u c at i o n audiovisual communications system. Music technology may also convey music education through the "channeling" of elements known from the

students' everyday life. In the fourth chapter, "Gamification and Formal Practice: A Pilot Study on Gamification's Contributions on Early Childhood Student Teachers' Musical Practice", Thomas Nguyen explores how incorporating game elements, like reward systems, level gaining, competition, cooperation, storytelling, and goals, into a ukulele and song course can potentially contribute to formal practice and song acquisition in a group of early childhood student teachers. Another way of understanding music technology as "channeling" music education is by its ability to "form a channel" in existing practices. How can music technology shed new light on established music educational methods? In the fifth chapter, Ola Buan Øien investigates live looping as a style of ensemble conducting, asking what perspectives relevant to conducting this approach offer. This chapter is called "Loop Station Conducting (LSC): A Study on Live Looping as an Ensemble Conducting Approach". The sixth chapter, "Making Music, Finishing Music – An Inquiry Into the Music-Making Practice of Popular Electronic Music Students in the 'Laptop-era'", rounds off the second part of the anthology. In this chapter, Andreas Waaler Røshol and Eirik Sørbø present a description of how Bachelor's and Master's degree students in popular electronic music experience making original music in their chosen Digital Audio Workstation (DAW), arguing that the students need to develop individual creative strategies suited to their unique music-making practice. In this way, music technology may "channel" or direct music education towards new pedagogical strategies suited to the "laptop-era". Music Technology Challenging Music Education In one way or another, all contributions to this anthology challenge the understanding of the relationship between music technology and music education. The third part of this anthology contains chapters that, in different ways, thematize how these challenges may affect how we understand educational practices in schools and higher education, the goals 20 m u s i c t e c h n o lo g y i n e d u c at i o n and content of music education, and the understanding of music and music creation in itself. Concerns about these challenges are not new. In 1990, Graftås and Klempe described two risks as (digital) music technology found its way into music education. The first risk was connected to the lack of technological knowledge, making it difficult for people with music knowledge to critically assess modern music technology. It was equally dangerous if one possessed music-technological skills but lacked the ability to assess them in light of the subject of music and music pedagogy (p. 9). Thirty years later, questions concerning music teacher knowledge in connection to music technology are still highly relevant. Øyvind Johan Eiksund and Egil Reistadbakk examine how musictechnological expertise can inform teaching in summer school workshops for young students. In Chapter Seven, "Knowledge for the Future Music Teacher: Authentic Learning Spaces for Teaching Songwriting and Production Using Music Technology", they describe the knowledge at play in music technology instructors' efforts to create authentic learning spaces for pupils from the age of 11 to 16. The eighth chapter is entitled "Balancing Educational Purposes Within Higher Electronic Music Education – A Biestaian Perspective". In this chapter, Eirik Sørbø addresses challenges to the teachers regarding what the expected knowledge base is for the students entering the programs, how to maintain a balanced program, and how to relate to ever-evolving technologies. Based on Biesta's educational purposes, Sørbø proposes that educators in higher electronic music education should emphasize subjectification, in addition to qualification and socialization. Another chapter applying a Biestaian perspective is Bjørn-Terje Bandlien's "Composing on iPad as Middle Ground Education". Using the term "middle ground" as a theoretical basis, Chapter Nine investigates music teaching where the students' creative productions are part of their learning activities, identifying inhibitory and promotional challenges in the encounters between students' desires and the world. Returning to the challenge posed by new ways of informal learning and a different and diverse knowledge base for students, Eirik Sørbø and Andreas Waaler Røshol present a case study of the practice of a teacher at the University of

Agder (Norway) who teaches electronics in one-to-one tuition. The authors discuss how this approach accommodates 21 m u s i c t e c h n o lo g y i n e d u c at i o n challenges and, at the same time, promotes subjectivity in higher music education. This tenth chapter is entitled "Teaching Aesthetics – A Case Study of one-to-one Tuition in Popular Electronic Music in Higher Education", and is the final one of the third part and the anthology as a whole. The growing interest in and relevance of technology in music education may be illustrated by the fact that both Routledge and Oxford University Press have recently released major publications on this topic. The Routledge Companion to Music, Technology, and Education (King et al., 2017) is a comprehensive resource that "draws together burgeoning research on the use of technology in music education around the world" (Introductory text), with 37 chapters addressing major aspects of the use of technology in music education. The Oxford Handbook of Technology and Music Education (Ruthmann & Mantie, 2017) is described as a landmark publication in the way it critically examines "the uses of technology in the ways we teach music in elementary, secondary, and tertiary settings from a multinational, global perspective" (Foreword), emphasizing diversity and forward-facing discussion, promoting perspectives and conversational voices rather than reinforcing traditional narratives and prevailing discourses. Between them, these two publications draw together contributions from 16 countries all around the world, underlining the ambitions of presenting global perspectives on technology in music education. The current anthology takes a different approach. It provides a deep dive into a particular educational reality, giving the reader a range of possible perspectives on how music technology may "channel" and "challenge" music education from a Norwegian point of view. By being dedicated to music technology in education, this publication is unique in a Norwegian context and represents, at the same time, an important contribution to a growing international field. We hope you enjoy reading it. References Graftås, N., & Klempe, H. (1990). Ny musikkteknologi: En nøkkel til forståelse [New music technology: A key to understanding]. Spartacus. Gudmundsdottir, G. B., & Hathaway, D. M. (2020). "We always make it work": Teachers' agency in the time of crisis. Journal of Technology and Teacher Education, 28(2), 239–250. https://www.learntechlib.org/primary/p/216242/ 22 m u s i c t e c h n o lo g y i n e d u c at i o n King, A., Himonides, E., & Ruthmann, S. A. (Eds.). (2017). The Routledge companion to music, technology, and education. Routledge. https://doi.org/10.4324/9781315686431 Ruthmann, S. A., & Mantie, R. (Eds.). (2017). The Oxford handbook of technology and music education. Oxford University Press. Part 1 Background Perspectives 25 Sitering av dette kapitlet: Gullö, J.-O. (2020). I en snårskog av traditioner – musikproduktion och musikteknik i den högre musikutbildningen utifrån ett svenskt perspektiv. I Ø. J. Eiksund, E. Angelo & J. Knigge (Red.), Music technology in education – Channeling and challenging perspectives (s. 25–52). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.108.ch1 Lisens: CC BY-NC-ND 4.0. chapter 1 I en snårskog av traditioner – musikproduktion och musikteknik i den högre musikutbildningen utifrån ett svenskt perspektiv Jan-Olof Gullö Kungliga Musikhögskolan i Stockholm Abstract: The purpose of this study is to identify traditions that can be valued as important in Swedish higher education in music production and music technology, to explore what characterizes such traditions and how they can be important for students in music production education. The research material consists of a selection of previous research and other literature that concerns music production and traditions in higher education. A knowledge-critical analysis method and a pedagogical model for higher education with a focus on what the students do and how they relate to teaching and education have been used to analyse the research material. The analysis shows that there are many different traditions in higher music education. Some traditions are very old, and some are also difficult to interpret and therefore the understanding of such traditions can be challenging for both students and teachers in higher education in music production and music technology.

Keywords: students, learning, traditions, music production, music technology
Utbildningsprogram i musikproduktion, ljud- och musikteknik finns i svensk högre utbildning sedan början på 1980-talet (Gullö & Thyrén, 2019). Sedan dess har stora förändringar skett i det omgivande samhället samtidigt som den högre utbildningen också har förändrats mycket c h a p t e r 1 26 genom olika reformer, som till exempel anpassningen till Bolognadeklarationen (1999). I all utbildning finns olika traditioner, alltså idéer om seder och bruk, olika synsätt, språk och värderingar, för hur utbildningen ska genomföras och vilka värden som ingår i det kulturella och sociala arv som medvetet eller omedvetet lämnas över till nya generationer elever och studenter. Sådana traditioner kan direkt knytas till centrala ämnesdidaktiska frågor. Dock är den svenska forskningen begränsad kring detta och även om mycket av den internationella litteraturen ofta kan vara fullt giltig i svensk och nordisk utbildningskontext är musikproduktion, ljud- och musikteknik än så länge i hög grad outforskade ämnen när det gäller centrala ämnesdidaktiska frågor. I likhet med mycket annan konstnärlig forskning i musik har forskningen i musikproduktion, ljudoch musikteknik tenderat att snarare riktas mot frågor om det konkreta ämnesinnehållet än om lärande. Några exempel på svenska avhandlingar med direkt relevans för musikproduktion, ljud- och musikteknik, varav flera inom musikpedagogik, är: Folkestad (1996), Berg (2002), Gullberg, (2002), Nilson (2002), Ahlbäck, (2004), Burlin (2008), Frisk (2008), Wingstedt (2008), Florén (2010), Gullö (2010), Einarsson (2017), Elowsson (2018), Leijonhufvud (2018), Allan (2019), Jonasson (2020) och Malm (2020). Dessutom finns många liknande arbeten internationellt. Utöver detta finns många handböcker och annan relevant litteratur om musikproduktion och närliggande ämnen varav några har upphovspersoner med omfattande erfarenhet från svensk högre utbildning i musikproduktion, ljud- och musikteknik, som till exempel: Dykhoff (2002), Lilliestam (2009), Ternhag och Wingstedt (2012), Björnberg och Bossius (2017) och Gullö (2017a). Dock har frågor om vilka traditioner som går att identifiera som bärande eller i varje fall betydelsefulla i svensk högre utbildning i musik med inriktning mot musikproduktion, ljud- och musikteknik ännu inte undersökts ordentligt i samtida svensk forskning. Inte heller internationella studier ger säkra svar på sådana frågor. Syfte och forskningsfrågor Denna studie har därför genomförts i syfte att spåra och identifiera traditioner som kan värderas som betydelsefulla i svensk högre utbildning i i e n s n å r s ko g av t r a d i t i o n e r 27 musik med inriktning mot musikproduktion, ljud- och musikteknik med utgångspunkt i följande forskningsfrågor: – Vilka traditioner går att identifiera i tidigare forskning och andra relevanta källor som kan ha betydelse för förståelsen av utbildning i musik med inriktning mot musikproduktion, ljud- och musikteknik? – Vad kännetecknar sådana traditioner? – Hur kan sådana traditioner ha betydelse för studenter som antingen deltar eller planerar att delta i utbildning i musik med inriktning mot musikproduktion, ljud- och musikteknik? Undersökningens resultat förväntas bidra till ökad kunskap om olika traditioner som kan ha betydelse för svensk högre utbildning i musik med inriktning mot musikproduktion, ljud- och musikteknik. Några teoretiska och metodologiska överväganden På ett övergripande plan kan syftet med undervisning i den högre musikutbildningen, såväl som i många andra utbildningssammanhang, beskrivas som att den ska leda till genuin kunskapsutveckling hos den lärande. Detta kan ske på många olika sätt, som till exempel att förändra den lärandes uppfattningar och hjälpa den lärande att se nya perspektiv. I konstnärlig utbildning ingår ofta färdighetsträning moment där omfattande övning krävs innan den lärande uppnår genuin kunskapsutveckling och förmågan att se nya perspektiv (Holgersson, 2011). Därför kan det vara utmanande att med stöd i aktuell högskolepedagogisk litteratur, som ofta främst utvecklats för utbildning som bygger på vetenskaplig grund (Pettersen, 2008; Norberg Brorsson & Ekberg, 2012; Elmgren & Henriksson, 2016), finna teoretiska modeller som kan användas för att analysera utbildning som bygger på konstnärlig grund. I detta arbete har en analysmodell använts som är mycket

grundläggande och utgår från tre huvudsakliga sätt att se på undervisning i högre utbildning (Biggs & Tang, 2011, s. 18 ff.). Det första sättet innebär att lägga c h a p t e r 1 28 fokus på vilka studenterna är och undersöka om de är duktiga eller inte. Pedagogiken präglas med detta synsätt av förmedling av kunskap och information och av att värdera hur duktiga studenterna är på att ta till sig kunskapen. Det andra sättet innebär att lägga fokus på vad lärarna gör. Då finns, enligt Biggs och Tang, en risk att väl mycket uppmärksamhet läggs på vilka metoder som används i undervisningen samtidigt som läraren då blir ensamt ansvarig för om undervisningen verkligen fungerar eller inte. Ett tredje sätt kan istället vara att lägga fokus på vad studenterna gör och hur de förhåller sig till undervisningen. Med ett sådant arbetssätt blir lärarens uppgift att stödja studenterna i deras lärande och det är just därför som detta steg i Biggs och Tangs modell har varit särskilt värdefullt i analysen av undersökningsmaterialet i denna studie. Centrala frågor för lärare som fokuserar på studenternas lärande är, för det första, att reflektera över vad det innebär för studenterna att förstå det kunskapsinnehåll som beskrivs i kurs- och läroplaner och som utgör de lärandemål som studenterna ska nå. För det andra krävs att lärarna funderar över vad för slags undervisning som krävs för att studenterna ska nå de uppsatta målen. För det tredje kan lärares kunskap om vilka traditioner som är gällande i den undervisningssituation och utbildningskontext som studenternas lärande sker, och hur sådana traditioner kan ha betydelse för studenternas lärande, ge läraren utökade möjligheter att bedriva sin undervisning och för studenterna förbättrade möjligheter nå utsatta mål. Denna analysmodell har använts i kombination med en kunskapskritisk analysmetod (Hellspong, 2001, s. 142–146) som syftar till att identifiera vad det är för slags fråga eller frågor som den analyserade texten tar upp, värdera om frågorna är viktiga i relation till egna övergripande forskningsfrågor, vad för slags kunskaper som texten kan ge, om det är nya kunskaper eller nya fakta eller om det är allmän eller enskild kunskap samt vilka metoder som ligger bakom kunskapen och inte minst att pröva kunskapens giltighet och värdera om det handlar om värdefull kunskap. Vidare syftar denna analysmetod även till att pröva om den kunskap som framställs i en text är apodiktisk och alltså helt säker och omöjlig att betvivla, assertorisk och alltså ett resultat av en eller flera verklighetsiakttagelser och därför kan diskuteras eller problematisk och i e n s n å r s ko g av t r a d i t i o n e r 29 därmed öppen för argumentation, tolkning och diskussion. Ett viktigt led i denna analysmetod är att pröva det texten säger och ställa de iakttagelser som texten redovisar mot andra möjliga sakförhållanden, tolkningar, förklaringar eller teorier. Sammantaget ger dessa frågor en grund för att värdera om texten är värdefull kunskap och i så fall: på vilket sätt? En viktig utgångspunkt för den kritiska ansatsen har varit att sträva efter att tänka systematiskt och att vara öppen för nya kunskaper och perspektiv för att nå en ökad förståelse och för att kunna utveckla såväl nya som gamla tankemodeller. Undersökningsmaterialet utgörs av ett urval av tidigare forskning och annan litteratur om musikproduktion och traditioner inom högre utbildning samt andra relevanta källor som till exempel statliga utredningar, lagtexter och publikationer från olika aktörer i musikbranschen. Urvalet har gjorts så att de texter som ingår främst ska vara relevanta för nå förståelse för och kunskap om utvecklingen av traditioner i svensk högre utbildning och i utbildning i musik med inriktning mot musikproduktion, ljud- och musikteknik. Alla texter som ingår i analysen är publicerade och refereras i enlighet med god publicistisk sed och ett viktigt forskningsetiskt övervägande har för mig varit att särskilt sträva efter att vara rättvis vid bedömningen av andras forskning (Vetenskapsrådet, 2017, s. 8). Vidare har jag valt att inte inkludera källmaterial som jag bedömt som problematiskt och öppet för argumentation, tolkning och diskussion. Istället har jag strävat efter att så långt som möjligt använda källmaterial som jag bedömt som apodiktisk och även kompletterat detta med material av assertorisk karaktär (Hellspong, 2001, s. 145). Även om denna text uttalat fokuserar på den svenska högre utbildningen och hur utbildning i musikproduktion, ljud- och musikteknik där

har utvecklats har jag strävat efter att utforma texten så att den kan vara giltig även för läsare från andra ämnesområden och andra utbildningskontexter än just den svenska. Den text som härefter följer är tematiskt disponerad, och efter denna inledning följer en översiktlig beskrivning av traditionernas betydelse för vår tids musikutbildning inklusive beskrivningar av centrala historiska skeenden i svenskt musikliv och undervisningsmetodernas traditioner i högre musikutbildning. Sedan följer en närmare beskrivning av traditioner, i vid bemärkelse, i c h a p t e r 1 30 musikproduktion, ljud- och musikteknik. Avslutningsvis sammanfattas undersökningens viktigaste erfarenheter. Traditionernas betydelse för vår tids musikutbildning Den högre musikutbildningens traditioner i Sverige sträcker sig långt tillbaka. KMH (Kungl. Musikhögskolan i Stockholm) firar sitt 250- årsjubileum under 2021 och även om vissa traditioner är starka så har också mycket hänt under dessa år. 1947 års musikutredning inleds under rubriken Samhället, människan och musiken med en framåtblick: Föränderlighet är ett av det nutida samhällslivets mest framträdande drag. Tekniska uppfinningar, upptäckter, vetenskapens enorma framsteg på alla områden under de sista århundradena har mäktigt bidragit till att omgestalta både samhällenas och människornas liv i västerlandet. Denna process är ingalunda avslutad. Tvärtom pågar ständiga förändringar, förskjutningar, omvärderingar och omprövningar, och det förefaller, som om tempot i dessa förändringar på många områden inte skulle minska utan snarare öka. (SOU 1954:2, s.18) Förändringar har alltså i hög grad påverkat musiklivets utveckling och även hur musikutbildningen går till. Även om KMH under 2021 firar sitt 250-årsjubileum så var det egentligen Kungl. Musikaliska Akademien som var huvudansvarig för den högre musikutbildningen i Sverige från 1771 till 1971 och försåg operor och orkestrar, kyrkan, skolan och militären med professionella musiker av olika slag. Kungl. Musikaliska Akademien hade dessutom funktionen som remissinstans, utredare, statlig musikmyndighet och även en form av smakdomare. Den högre musikutbildningen i Sverige har alltså haft ett tydligt utbildningsideal snarare än ett bildningsideal och målet med utbildningen har varit att förse samhället med kompetenta musiker och musiklärare (Karlsson, 2003). Förutsättningarna för den högre musikutbildningen förändrades mycket i och med OMUS-reformen 1978 som kom några år efter att staten hade tagit över som huvudman för den högre musikutbildningen (Olsson, 1993). Vid sidan av målet att fler genrer än den västerländska i e n s n å r s ko g av t r a d i t i o n e r 31 konstmusiken skulle finnas i den högre musikutbildningen var ett viktigt mål att de blivande musiklärarna skulle utveckla en modern musikundervisning genom att möta elevernas behov, musikintresse och förutsättningar. Undervisningen skulle präglas av musik- och ungdomskultur, kreativa arbetssätt och ett aktivt musicerande. I en sammanställning av forskning om musiklärarutbildning menar dock Ralf Sandberg att: ”Musiklärarutbildningen kan ses som en ’traditionsficka’ som är relativt opåverkad av yttre samhällsinflytande” (Sandberg, 2006, s. 43–44). Att förändra traditioner i högre musikutbildning verkar alltså vara förenat med vissa utmaningar och när det gäller genrebreddningen så breddades musikhögskoleutbildningen efter OMUS-reformen till att även folkmusik och jazz, genrer som beskrevs som eftersatta, inkluderades i utbildningsutbudet. Dock hade den rådande ungdomskulturen, som olika former av populärmusik, länge en mycket nedtonad ställning i utbildningsutbudet. En förklaring till detta kan vara att ett av de kulturpolitiska mål som svenska riksdagen år 1974 enhälligt antog var: ”att motverka kommersialismens negativa verkningar på kulturområdet” (KrU 1974:15). Det är en ödets ironi att just detta riksdagsbeslut togs samma år som ABBA vann Eurovision Song Contest i Brighton och Björn Skifs & Blåblus [Blue Swede] toppade den amerikanska singellistan med Hooked on a Feeling. Dessa två händelser har återkommande bedömts ha stor betydelse för framväxten av den framgångsrika svenska musikexporten (Norberg &Wiberg, 2019). Emellertid var det nog så att riksdagsbeslutet om att motverka kommersialismens negativa verkningar på kulturområdet låg i tiden och under åren som

följde efter 1974 fram till OMUS-reformen 1978 utvecklades även andra mer ideologiskt grundade traditioner i det svenska musiklivet genom den progressiva musikrörelsen (Thyrén, 2009). Proggen, som musikrörelsen också kallas, kan ha haft betydelse för hur den högre musikutbildningens traditioner utvecklades eftersom musikrörelsen på många sätt tog avstånd från den professionella musikkulturen och istället hyllade ideal som nyskapande, amatörism och antikommersialism. Därför kan proggen ha bidragit till en motreaktion som ledde till att de traditioner inom den högre musikutbildningen, som mer handlade om kunskapsreproduktion än kunskapsproduktion, blev allt starkare och än mer viktiga att bevara. De som kämpar emot och vill c h a p t e r 1 32 bevara traditionerna kan i fall som detta upplevas som bakåtsträvande traditionalister av dem som står bredvid och gärna vill utveckla och förnya. Just begreppet traditionalister använder Jennifer Lena och Richard Peterson (2008) i sin fyrstegsmodell för att beskriva hur olika musikaliska genrer utvecklas över tid. Initialt utvecklas en genre, som till exempel Be-bop, Bluegrass eller Chicago Jazz, i en liten kontext där ofta ett fåtal personer är initiativtagare, ofta som en motreaktion mot en annan dominerande genre. Denna fas beskrivs av Lena och Peterson som AvantGarde. Under nästa utvecklingsfas skapas en scen för den aktuella genren och scenbaserade genrer beskrivs ha en lös organisatorisk form som kännetecknas av att de som driver genren framåt delar ett engagemang för genreidealet. Mer eller mindre tydliga konventioner växer snabbt fram i scenbaserade genrer genom en strävan efter att hitta det bästa sättet att uttrycka nya musikaliska idéer, men sådana koder kan sätta artister i direkt konflikt med utövare av andra genrer som har sina scener med sina konventioner. Det tredje steget beskrivs som sin en industrialisering av genren. Det är då som större skivbolag och andra branschföretag gör allt vad som står i deras makt för att skapa nya produktioner i genren och utveckla den så att den tilltalar en masspublik. Det sista och fjärde steget i modellen beskrivs som det traditionella där de som verkar i genren har som mål att bevara en genres musikaliska arv. Såväl organisationer som de enskilda som värnar genren kan lägga stor ansträngning vid att lyfta fram genrens historia och utveckla och hylla en kanon av goda exempel som visar den utvalda genrens höga kulturella värde. När en genres utvecklingsbana kommit till denna fas har de som är traditionalister mest att förlora på förändring eftersom förändring kan leda till att de riskerar att tappa sitt tolkningsföreträde. Därför kan Lenas och Petersons modell förklara hur det kommer sig att vissa genrer kan överleva och deras traditioner värnas i högre musikutbildning även om samhällsintresset för dem överlag är lågt, åtminstone i hur många som väljer att lyssna på eller i varje fall är villiga att betala för att få lyssna på musiken (Werner, 2018; Östman, 2018). Den föränderlighet som lyftes fram som ”ett av det nutida samhällslivets mest framträdande drag” (SOU 1954:2, s. 18) sker alltså inte utan motstånd i traditionsrika miljöer. i e n s n å r s ko g av t r a d i t i o n e r 33 Även om musikutbildningens traditioner i Sverige sträcker sig långt tillbaka så regleras den högre utbildningen i musik, liksom annan svensk högskoleutbildning, i lagar och förordningar. I inledningen av högskolelagens första kapitel framgår att staten som huvudman ska ”anordna högskolor för [1.] utbildning som vilar på vetenskaplig eller konstnärlig grund samt på beprövad erfarenhet, och [2.] forskning och konstnärlig forskning samt utvecklingsarbete” (SFS 1992:1434). Denna paragraf indikerar alltså att utbildningen antingen ska vila på vetenskaplig grund eller på konstnärlig grund, inte både och! Dessutom ska utbildningen uttalat även vila på beprövad erfarenhet. Dock framgår varken i lagtexten eller i dess förarbeten hur erfarenheten blir beprövad (El Gaidi, 2007, s. 34). Även om begreppet beprövad erfarenhet återkommande har problematiserats (Franck, 2001; Josefson, 2005; Persson & Persson, 2017; Kroksmark, 2019) har det en svag teoretisk förankring och kan uppfattas som diffust (Popov, 2019). En övergripande förståelse kan dock vara att lärares beprövade erfarenhet utgår från såväl egen som kollegial erfarenhetsbaserad kunskap samt från gällande traditioner.1 Samtidigt beskrivs konst- och kulturutbildningar, som högre musikutbildning, i tidigare forskning ibland som

närmast tyngd av traditionsbetingade konventioner (Melin, 2005; Sandberg, 2006; Dahlstedt, 2007; Gullö, 2010; Holgersson, 2011). Sådana konventioner har ofta vuxit fram under lång tid och är likhet med den beprövade erfarenheten knappast något resultat av direkt forskningsverksamhet. Till skillnad mot vetenskaplig forskning är den konstnärliga forskningen ett ungt forskningsområde i den högre utbildningen. Konstnärlig forskning beskrivs vara i stark utveckling (Vetenskapsrådet, 2019, s. 4) och inrymmer ett stort antal ämnen som bildkonst, film, fotografi, musik, dans, teater, litterär gestaltning/kreativt skrivande, design, konsthantverk med mera och inom alla dessa ämnen finns såväl gemensamma som särskiljande traditioner. Det har under senare år publicerats mycket intressanta arbeten i och 1 Beprövad erfarenhet [eng: proven experience], ska ej förväxlas med evidensbaserad dito, beskrivs som ett föränderligt ”kontextbundet praxisbegrepp” (Kroksmark, 2019, s. 42) som kan förändras när lokala kontextuella förutsättningar förändras. Den beprövade erfarenheten beskrivs också kunna vara omedveten eller medveten och även som subjektiv professionell handling som inkluderar inarbetade rutiner och vanor som fungerar väl i praktiken (Popov, 2019). c h a p t e r 1 34 om konstnärlig forskning, såväl i Sverige (Jullander, 2013; Vetenskapsrådet, 2013, 2015, 2019) som internationellt (Biggs & Karlsson, 2010; Borgdorff, 2012; Borgdorff, Peters & Pinch, 2020), som, om än perifert eller implicit, berör de traditioner som kan finnas i svensk högre utbildning i musik med inriktning mot musikproduktion, ljud- och musikteknik. Trots detta så finns goda skäl att även söka efter andra källor till kunskap. Detta är särskilt giltigt då den konstnärliga forskningen också tydligt beskrivs kunna bedrivas i dialog med kritisk teori eller andra forskningsområden samt att konstnärliga forskare anpassar kvalitativa metoder hämtade från forskning på vetenskaplig grund såsom fenomenologi, hermeneutik, etnografi, narrativa metoder och aktionsforskning varvid gränsen mellan forskning på konstnärlig respektive vetenskaplig grund kan beskrivas som flytande (Vetenskapsrådet, 2013, s. 5). Dock finns samtidshistoriska belägg för att undervisningen i musik, kanske främst på musikhögskolenivå, inte verkar ha påverkats särskilt mycket av vare sig forskningsverksamhet eller yttre samhällspåverkan, då mycket gamla traditioner för såväl undervisningens innehåll som vilka undervisningsmetoder som används återkommande har traderats. Musikutbildningarna hade i Sverige sedan 1780-talet stått under Kungliga Musikaliska Akademiens överinseende. Länge utgjorde de knappast några föredömen med avseende på bildningssträvanden, snarare representerade de länge, med sin betoning av mästare/lärling–relationen, i hög grad en förmodern uppfattning om utbildning. Mot detta kan naturligtvis med fog invändas att musik knappast kan undervisas på så många andra sätt. Ingen människa har exempelvis lärt sig spela oboe genom att studera en handbok. (Dahlstedt, 2007, s. 198) Även om andra undervisningsformer har prövats, som till exempel gruppundervisning under Sämustiden på 1970-talet (Olsson, 1993) samt seminarieundervisning och masterclasses så har den enskilda undervisningen, ofta i en mästarlära där läraren är mästare och studenten lärling, fortsatt att vara en mycket vanlig undervisningsmodell i den högre musikutbildningen (Nielsen & Kvale, 2000; Holgersson, 2011). Mästarläran är form för undervisning med traditioner som sträcker sig mycket långt tillbaka i tiden. Alma Mater Studiorum räknas som det första i e n s n å r s ko g av t r a d i t i o n e r 35 universitetet och grundades i Bologna, Italien, på 1000-talet. Under de kommande århundradena tillkom universitet i många europeiska städer, även i Sverige som fick sitt första universitet i Uppsala 1477. I det nätverk av universitet som fanns över hela Europa erbjöds likartad undervisning och lärare och studenter kunde vandra fritt mellan olika lärosäten. Även om vi idag använder många begrepp och titlar som etablerades redan på medeltiden finns utan tvekan avgörande skillnader mellan det medeltida universitetet och dagens högre utbildning. Att reproducera kunskap var det medeltida universitetets huvuduppgift. Det var professorerna som skrev avhandlingarna och doktorandernas viktigaste uppgift var att vid sina disputationer visa att de kunde försvara och reproducera den sanna

och rätta kunskapen. Målet med undervisningen var att förmedla den kunskap som fanns vid universitetet och professorernas uppgift var att undervisa. Forskning var inget som professorerna i det medeltida universitetet förväntades ägna sig åt överhuvudtaget (Burman, 2014). Som pedagogisk metod var mästarläran under medeltiden vanlig i det skråväsende som dominerade inom handel och hantverk (Nielsen & Kvale, 2000). Även i den högre utbildningen var mästarläran länge den metod som användes i utbildningen. Dock resulterade stora samhällsförändringar i slutet av 1700-talet i att den högre utbildningen reformerades. Traderingsidealets sätt att lära ut korrekta åsikter och handlingsmönster hade utvecklats för ett statiskt samhälle, men fungerade helt enkelt sämre i ett föränderligt samhälle (Skoglund, 2000). Som ett direkt resultat av franska revolutionen stängdes universitet i Paris och efter revolutionen skapades istället elithögskolor, grandes écoles, som hade till syfte att utbilda den blivande eliten inom fransk administration och kultur. Istället för att studenterna i Paris skulle efterbilda sina lärares kunskap i en mästarlära, som de hade gjort i det tidigare universitetssystemet, utformades särskilda mål för deras lärande. Denna idé, att utveckla explicita lärandemål, skulle långt senare komma att prägla en stor del av den högre utbildningen i Europa genom Bolognaöverenskommelsen (1999). Vid tiden för franska revolutionen hade det i Storbritannien utvecklats en borgerlig kultur som med aristokratiska inslag kom att forma den högre utbildningen. De ledande universiteten, Oxford och Cambridge, skulle fostra studenterna till att bli gentlemän, c h a p t e r 1 36 vakna, belevade och mångsidiga (Bron & Talerud, 2005; Liedman, 2020). Däremot kom utvecklingen i Tyskland att stå i kontrast mot dessa utbildnings- respektive fostringsideal. När Berlinuniversitetet grundades av Wilhelm von Humboldt 1810 var det istället bildningen som stod i centrum (Östling, 2016). En viktig skillnad vid Berlinuniversitetet jämfört med äldre universitet och de medeltida traditionerna, var att lärare och studenter i akademisk frihet skulle ägna sig åt kunskapsproduktion. Lärarna skulle alltså både undervisa och forska. Tidigare hade ju professorerna enbart undervisat. Dessutom skulle lärarna och studenterna tillsammans i seminarier skapa ny kunskap. Under 1800-talet utvecklades även inriktningen Liberal Arts Education vid många college i USA (Burman, 2014). Det är utbildning som inte har ett specifikt smalt ämnesmål utan snarare ger allmän kunskap i olika ämnen och syftar till att utveckla studenternas intellektuella förmåga. Fortfarande har många av de högst rankade amerikanska lärosätena en sådan inriktning (Jung, Sanderson & Fajardo, 2019). Samtliga dessa fem synsätt, mästarläran från det medeltida universitetet, det franska utbildningsidealet, fostransträvanden i Storbritannien, bildning i Tyskland samt Liberal Arts Education, har under de senaste århundradena på olika sätt påverkat de traditioner som utvecklats vid svenska universitet och högskolor (Burman, 2014). De svenska universiteten var länge utpräglade utbildningsinstitutioner men 1852 infördes, med Tyskland som förebild, en ny gemensam konstitution för Uppsala och Lund som vid den tiden var de universitet som fanns i Sverige (Skoglund, 2000). Under 1800-talet växte antalet utbildningsinstitutioner och verksamheten vid svenska universitet och högskolor kom fortsatt under 1900-talet att omfatta såväl utbildning som forskning. 1940–1975 utvecklades forskningen vid universitet och högskolor i hög grad och särskilda forskartjänster inrättades. I och med 1977 års högskolereform blev högskola en gemensam benämning på universitet och högskolor, alltså den högre utbildningen i Sverige, och i den reformen betonades särskilt att kopplingen mellan utbildning och forskning skulle bli starkare. Efter 1977 års högskolereform har ytterligare förändringar genomförts och högskolereformen 2007, då det svenska högskolesystemet anpassades till Bolognasystemet (1999), har fått stor betydelse för hur högre utbildning i e n s n å r s ko g av t r a d i t i o n e r 37 genomförs i Sverige. I och med högskolereformen 2007 kom all högre utbildning i Sverige att omfattas av krav på att studenterna, för att kunna få sin examen, måste genomföra ett självständigt arbete och examineras i enlighet med förutbestämda lärandemål så som de beskrivs i högskoleförordningens examensbilaga (SFS

1993:100). Detta gäller alltså även högre utbildning i musik och var ett tydligt brott mot tidigare traditioner. En annan viktig förändring är att högskolepedagogisk kompetens bland lärarna har lyfts fram som än mera viktig för framtida utveckling inom den svenska högra utbildningen (Universitetskanslersämbetet, 2020, s. 29). Detta bör komma att få konsekvenser för hur traditionerna i svensk högskoleutbildning, inklusive utbildning i musikproduktion, ljud- och musikteknik, utvecklas under kommande år. Gamla och nya traditioner i musikproduktion, ljud- och musikteknik Musikproduktion är svår att definiera exakt som ett begrepp. Termer som produktion, producent och musikproduktion har olika betydelser i olika sammanhang. Internationellt används ibland begreppet skivproduktion [Record Production] synonymt med musikproduktion (Frith & ZagorskiThomas, 2012). Även begreppet musikteknik är besvärligt att tydligt definiera och avgränsa. Under hela musikhistorien har olika tekniska framsteg, som utveckling av nya industriella produktionsmetoder, haft direkta konsekvenser för hur musik och musikinstrument har utvecklats och hur musik har kunnat spridas. Ända sedan boktryckarkonsten etablerades i slutet av medeltiden har musik medialiserats. Industrialiseringen och tekniska framsteg inom såväl pappersframställning som tryckteknik ledde under 1800-talet till att många förlag växte fram med stor utgivning av olika slags musik som kammarmusik, symfonier och operaarior. Denna handel gick långt utöver de professionella musikernas behov utan vände sig snarare till en växande musikintresserad medelklass i städerna. Det gick att köpa noterna till såväl gamla som nyskrivna verk och framföra musiken själv tillsammans med amatörmusiker och -sångare. Detta ledde till en växande marknad för musikinstrument och till exempel piano växte fram att bli en statussymbol. Därför var den c h a p t e r 1 38 musiktekniska utvecklingen länge knuten till just musikinstrumentutveckling (Östman, 2018). Edison uppfann fonografen 1877 och efter hand växte en kommersiell marknad för inspelad musik fram. Detta ledde till att den musiktekniska utvecklingen inriktades mot att förfina formerna för att sprida medialiserad musik. På den tiden, och under många år som följde, var musikproducentens arbete främst inriktat på att göra liveinspelningar med skickliga sångare och instrumentalister som kunde fungera som artister, tillsammans med orkestrar med specialister på att göra inspelningar: studiomusiker. I de flesta fall var de personer som producerade musiken helt okända för alla som inte var professionellt verksamma i musikbranschen (Burgess, 2014). Länge var den tekniska utrustning som används för musikproduktion mycket dyr och krävde också omfattande teknisk kompetens. Nya kreativa tekniska verktyg för musikproduktion utvecklades som ett resultat av den omfattande ljud- och datatekniska utveckling som skedde under den andra halvan av 1900-talet. Denna utveckling har resulterat i att de musikproduktionsverktyg som finns idag gör det möjligt för musikproducenter att först och främst fokusera på den kreativa produktionen av musiken, från första idé till det slutresultat som når lyssnaren. Dessutom gör samtida ljud- och musiktekniska verktyg det möjligt för musikproducenter att manipulera många av de musikaliska parametrarna, som till exempel rytm, tempo, harmoni, melodi, instrumentering och dynamik. Därför är det kreativa och konstnärliga intressent i dagens musikvärld ibland mer riktat mot musikproducenter än mot kompositörer och artister (Moorefield, 2005; Hepworth-Sawyer & Golding, 2011; Frith & Zagorski-Thomas, 2012; Zagorski-Thomas, 2014; Seabrook, 2015; Norberg & Wiberg, 2019). Eftersom den utrustning som behövs för att producera musik har blivit långt mer tillgänglig genom åren finns det också många fler nu som ägnar sig åt att producera musik. I de traditioner som finns i dagens professionella musikvärld arbetar musikproducenter på en mängd olika sätt. Många föredrar att jobba i arbetsgrupper (Norberg & Wiberg, 2019). Därför kan det för en utomstående som besöker en pågående inspelningssession vara svårt att förstå vem som gör vad: vem är kompositörer, artist, musikproducent eller ljudtekniker? Uppgifter och roller är ofta sammanvävda och det är vanligt att i e n s n å r s ko g av t r a d i t i o n e r 39 dela ansvar på olika sätt. Men alla

arbetar inte i team. Många musikproducenter är multikompetenta och arbetar med sina musikproduktioner helt på egen hand. I ett försök att dela upp det professionella musikproducentuppdraget i olika roller eller funktioner anger Burgess (2013) olika kategorier av produktionsroller som utöver att vara just musikproducent även innefattar att till exempel vara låtskrivare, musiker eller arrangör. Tidigare musikalisk erfarenhet som artist, musiker, ljudtekniker eller kanske låtskrivare kan, enligt Burgess, vara en värdefull förkunskap för att bli musikproducent oavsett om den kunskapen erhållits genom studier eller praktiskt arbete. Dessutom menar Burgess att en del professionella musikproducenter snarast är entreprenörer och beskriver även att det finns många musikproducenter som framgångsrikt kombinerar flera olika roller eller funktioner. Musikproducenter kan alltså ha många olika ansvarsområden, såsom att fatta konstnärliga beslut, göra ljudtekniska bedömningar eller hantera administrativa uppgifter. Ett viktigt ansvar är naturligtvis att se till att en produktion blir klar och om uppdragsgivaren är extern, som till exempel ett skivbolag eller ett musikförlag, färdig inom en viss tidsram och inom en viss budget. Även om ekonomiska och administrativa ansvar är en del av musikproducenters arbete är dock det primära och övergripande ansvaret att ansvara för olika konstnärliga och kreativa aspekter i samband med en musikproduktion (Burgess, 2013, 2014; Gullö, 2010; Gullö, Gardemar, Holgersson, Thyrén & Westman, 2019). Sedan 1983 finns musikproducentutbildning och sedan 1986 finns ljudteknikerutbildning i svensk högre utbildning (Gullö & Thyrén, 2019, s. 186–187). Många nya universitets- och högskoleutbildningar i musikproduktion har sedan dess tillkommit, inklusive treåriga kandidatprogram samt kortare kurser.2 Vid Kungliga Musikhögskolan (KMH) i Stockholm finns ett tvåårigt masterprogram i musikproduktion, men än så 2 Treåriga kandidatprogram i musikproduktion ges vid Högskolan Dalarna, Linnéuniversitetet, Kungliga Musikhögskolan, Stockholm, Göteborgs universitet och Örebro universitet. Korta musikproduktionskurser och andra studieprogram där musikproduktion är huvudämne eller ingår i stor omfattning ges vid Blekinge Tekniska Högskola, Högskolan Dalarna, Karlstads universitet, KTH Royal Institute of Technology, Linnéuniversitetet, Luleå tekniska universitet, Lunds universitet, Mittuniversitetet, Kungliga Musikhögskolan, Stockholm, Umeå universitet, Göteborgs universitet, Universitetet i Skövde och Örebro universitet. c h a p t e r 1 40 länge finns det ingen svensk forskarutbildning i musikproduktion. Till de flesta svenska högskoleutbildningarna i musikproduktion genomgår studenterna omfattande antagningsprov innan de påbörjar sina studier och söktrycket är överlag mycket högt. Även privata utbildningsorganisationer och folkhögskolor ger kurser i musikproduktion och dessutom förekommer musikproduktion och musikteknik på olika sätt i ungdomsskolans musikundervisning sedan många år tillbaka. Ända sedan gymnasiereformen 1994 (Lpf 94) har musikproduktion och ljudteknik varit ett ämne vid gymnasieskolans estetiska program. Under de senaste decennierna har musikproduktion och musikteknik alltså etablerats som ämnen inom både svensk högre utbildning och i ungdomsskolan. Denna utveckling kan ses som ett direkt eko av samhällsutvecklingen i stort, där nya sätt för ungdomar att producera sin egen musik har resulterat i att allt fler studenter vill studera musikproduktion och närliggande ämnen. Varje år söker många unga till högre konstnärlig utbildning, som till exempel musikproducentutbildning, men långt ifrån alla som söker blir antagna till sitt förstahandsval (SOU 2007:50; Gustavsson, Börjesson & Edling, 2012; KMH, 2019). Däremot får många av dem som söker sig till högre utbildning i musik istället plats på någon annan av de utbildningar de sökt även om det kanske är ett andra- eller tredjehandsval. Dock saknas än så länge studier som tydligt visar hur många som fortsätter sin utbildning och sedan övergår till yrkesmässig konstnärlig verksamhet av dem som inte blev antagna till den utbildning som de helst ville gå (Hultberg, 2010; Gullö, 2011; KMH, 2019). Oavsett detta är genomströmningen och slutförandegraden, alltså andelen studerande som slutför sin utbildning, överlag hög i konst- och kulturutbildningar och till och med mycket hög i högre

utbildning i musik (SCB, 2020). För vissa utbildningar, som till exempel kandidat- och masterprogram i musikproduktion, förekommer att genomströmningen och slutförandegraden ofta är nära 100 procent (KMH, 2019). Det går också ofta bra för studenterna efter avslutad konst- och kulturutbildning (SCB, 2020). Detta trots att det finns rapporter om överetablering och prognoser som visar att efterfrågan på konstnärligt utbildade beräknas öka långsammare än vad tillgången på personer med i e n s n å r s ko g av t r a d i t i o n e r 41 konstnärliga utbildningar beräknas öka (Universitetskanslersämbetet, 2015). Likväl finns också indikationer på att det råder brist på välutbildade konstnärligt verksamma inom musik. I högre musikutbildning ser arbetsmarknaden särskilt ljus ut för de studenter som går kyrkomusikerutbildning, musiklärarutbildning och utbildning i musikproduktion, ljud- och musikteknik. Inom svenska kyrkan kommer nästan tre fjärdedelar av de knappt 2000 verksamma kyrkomusikerna att gå i pension inom de närmsta femton åren (Söderberg, 2018). Lärarbristen i Sverige beräknas fortsatt vara problematisk under många kommande år och därför har de som utbildar sig till musiklärare goda förutsättningar att få arbete efter sin examen (Skolverket, 2019). För såväl nyblivna kyrkomusiker som musiklärare kan dessutom musikteknik vara en viktig yrkesmässig kompetens (Ericsson & Lindgren, 2015; Gullö, 2017b, 2019), men än mer i andra delar av musiklivet efterfrågas särskilt musikteknisk kompetens. I en kartläggning av den svenska musikbranschens estimerade kompetensbehov för perioden 2017–2022 förväntas den ekonomiska tillväxten bli sex procent per år och alltså 34 procent för hela tidsperioden. Dessutom beräknas ökningen av arbetskraftsbehovet under denna tidsperiod vara 12 procent (Mangert, 2017). Då den svenska musikbranschen under 2016 sysselsatte drygt 10 000 personer (Werner, 2018, s. 28) är alltså prognosen att det årligen behövs många nya musikbranschverksamma under den närmast överblickbara framtiden. Detta stämmer väl överens med andra prognoser som, på ett övergripande plan, indikerar en fortsatt stark svensk arbetsmarknad 2019–2021, men också att tillgången på utbildad arbetskraft är begränsad (Almérus, 2019, s. 6). Spelindustrin, eller dataspelsbranschen, är en annan viktig och expansiv del i svenskt näringsliv och spelutveckling har tydlig koppling till såväl konstnärlig musikalisk gestaltning som musikproduktion, ljud- och musikteknik eftersom ljud och musik i olika former ofta har en bärande berättarfunktion i spel (Wingstedt, 2012; Summers, 2016). Under en femårsperiod 2013–2018 femdubblades den svenska spelindustrins omsättning, och under 2018 nyanställdes hela 650 helårsanställda till denna bransch där totalt närmare drygt 5000 personer var verksamma i 384 svenska dataspelsföretag samma år (Nylander, 2019). c h a p t e r 1 42 För yrkesverksamma inom musikalisk gestaltning med ljud- och musikteknik, som ljudläggare, musikproducenter och kompositörer, har alltså expansionen inom den svenska spelindustrin inneburit en klart utökad möjlig arbetsmarknad. I en rapport om musikteknik (SBR, 2016) beskrivs Stockholmsområdet, vid sidan av Silicon Valley, ha vuxit fram som en världsledande inkubator för idéer inom teknik- och musikindustrin. Ett av de företag som lyfts fram i rapporten som särskilt framgångsrikt är streamingtjänsten Spotify som också har undersökts i musikpedagogisk forskning (Leijonhufvud, 2018). I det kluster som beskrivs som ”the Stockholm Musictech scene” (SBR, 2016, s. 7) ingår ytterligare drygt tjugo företag i fem olika marknadssegment, varav flera av företagen har en marknadsledande position. Dessa fem olika marknadssegment är musiktillbehör i form av hårdvara, musikinstrument och –utrustning, mjukvara för digital musikproduktion, programvara för digital musikutgivning och för hantering av upphovsrättsliga intäkter, programvara för strömmande musik och annan musik- och ljudunderhållning. Den ovan beskrivna utvecklingen inom såväl spelindustrin som teknikoch musikindustrin kan ses som ett resultat av förändrade traditioner i medieanvändningen bland såväl barn och ungdomar som vuxna. En stor utmaning i den allt mer utvecklade mediavärld som dagens unga växer upp i är att medieanvändningen å ena sidan är mycket likartad för stora delar av den yngre populationen genom bruk av

smartphones, läsplattor och datorer (Findahl & Davidsson, 2015). Men å andra sidan visar också olika studier på att övergången i medieanvändning från massmedier som press, TV och radio till nätbaserade multimedier har resulterat i en stor fragmentisering av medieinnehållet likaväl som av användandet (Nygren & Wadbring, 2013, 2019). Därför kännetecknas traditionerna i den samtida medieanvändningen allt mer av att likasinnade, genom olika webbtjänster, kan mötas och bekräfta sina uppfattningar. Det mottagna medieinnehållet från de digitala nätbaserade medierna skiljer sig alltså från de äldre massmediernas överbryggande pluralistiska ansats, som inte minst varit synlig i public service. Därför är det rimligt att de unga vuxna som kommer till högre utbildning, som till exempel högre utbildning med inriktning mot musikproduktion, ljud- och musikteknik, genom sin i e n s n å r s ko g av t r a d i t i o n e r 43 medieanvändning under sin uppväxt i såväl skola som på fritiden, besitter långt mer varierande kunskaper, men kanske även mer varierande kunskapsbrister, jämfört med tidigare generationers studenter. Det finns alltså en fara med att ny teknik snarare kan bidra till att skapa bubblor än broar (Nygren & Wadbring, 2019). Dagens elever och studenter är online i hög utsträckning och använder internet som sin huvudsakliga källa till information och underhållning (Davidsson & Thoresson, 2017). En stor del av internetanvändarna i Sverige lyssnar på musik på nätet och mer än hälften av dem lyssnar regelbundet på Spotify. Under 2018 passerade andelen svenska internetanvändare som betalade för att lyssna på musik 50 procent. Nio år tidigare, 2009, betalade nästan ingen och det mesta finansierades då istället med reklam. Bland 16–25-åringarna lyssnar 85 procent av befolkningen på musik på internet dagligen. I åldersgruppen tolv till femton år är dagligt lyssnande på musik nästan lika vanligt, 78 procent (Davidsson, Palm & Melin Mandre, 2018, s. 80–85). Musikintresset bland unga är alltså mycket stort i Sverige. Många unga producerar också sin egen musik och många vill göra det professionellt. En tydlig indikation på detta är att Svenska tonsättares internationella musikbyrå, Stim, i slutet av 2019 hade över 90 000 anslutna varav de absolut flesta är kompositörer och/eller textförfattare. Därför kan lite mindre än en procent av den totala svenska befolkningen sägas ha ett personligt ekonomiskt intresse i musikproduktion, ljud- och musikteknik som upphovsrättsinnehavare (Stim, 2020). Svensk musik har återkommande också uppmärksammats som viktig exportprodukt (Burnett & Wikström, 2006; Portnoff, 2015; Werner, 2018). En viktig förklaring till denna musikexport är att svenska musikproducenter och låtskrivare komponerar och producerar musik till många internationella artister. Dessutom har många svenska artister och producenter haft framgångsrika internationella karriärer, som till exempel Zara Larsson, First Aid Kit, Swedish House Mafia, Avicii, Max Martin och Shellback (Seabrook, 2015; Björnberg & Bossius, 2017; Norberg & Wiberg, 2019). Artister, musiker och producenter som dessa är förebilder för många ungdomar i Sverige och bidrar säkert till att många unga vill producera egen musik och även söker sig till högre utbildning i musikproduktion, ljud- och musikteknik. c h a p t e r 1 44 Avslutande reflektioner För verksamhet inom musikproduktion, ljud- och musikteknik finns alltså många olika, ofta svårtolkade och även ganska motsägelsefulla traditioner, såväl i den högre utbildningen som i det omgivande samhället. Säkert kan förståelsen av sådana traditioner vara en rejäl utmaning för många studenter i utbildning och kanske även för de lärare som undervisar. Genomgående har jag i detta arbete strävat efter att, genom den kunskapskritiska analysmetoden (Hellspong, 2001), i första hand lyfta fram kunskaper som jag värderat som apodiktiska och alltså helt säkra och omöjliga att betvivla eller assertoriska och alltså är ett resultat av en eller flera verklighetsiakttagelser och därför kan diskuteras. Däremot har jag så långt som möjligt undvikit att från det analyserade materialet lyfta fram kunskaper som jag värderat som problematiska och därmed öppna för argumentation, tolkning och diskussion. Nu haltar detta resonemang visserligen eftersom det både är jag själv som valt ut det källmaterial som analyserats och även jag som har genomfört analysen, men arbetet är genomfört med full

transparens och gott uppsåt och jag har genomgående strävat efter att bekräfta uppgifter med flera datakällor. Det är heller inga särskilt vidlyftiga analyser eller tolkningar som presenteras. Däremot vill jag hävda att det samlade materialet ger en bild som kan bidra till att täcka åtminstone några kunskapsluckor rörande traditioner med betydelse för högre utbildning med inriktning mot musikproduktion, ljud- och musikteknik och vad som kan beskrivas kännetecknа sådana traditioner. På ett övergripande plan visar analysen att det finns traditioner som har en generell karaktär och bör vara giltiga för många olika slags utbildningar. Det handlar till exempel om de utbildningstraditioner som fanns i det medeltida universitetet och i de olika traditioner som växte fram i Frankrike, Tyskland, Storbritannien och USA kring sekelskiftet för drygt 200 år sedan och vilken betydelse dessa traditioner fått för utvecklingen av svensk högre utbildning. Analysen visar också att det finns traditioner inom musikproduktion, ljud- och musikteknik om till exempel olika karriärvägar som knappast är särskilt giltiga i andra sammanhang. Däremot är frågan om hur traditioner av det slag som här diskuteras kan ha betydelse för studenter som antingen deltar i eller planerar att i e n s n å r s ko g av t r a d i t i o n e r 45 delta i utbildning i musik med inriktning mot musikproduktion, ljudoch musikteknik betydligt svårare. Den kan bara, enligt min uppfattning, värderas och möjligen besvaras genom att, i enlighet med den modell Biggs och Tang (2011) presenterar, lägga fokus på vad studenterna gör och hur de förhåller sig till undervisningen. Hur kan lärare stödja studenterna i deras lärande när en student navigerar i den uppsjö eller snårskog av idéer, ideal och traditioner som presenterats i denna text? Det kan vara en stor utmaning att som lärare reflektera över vad det innebär för en student att förstå det kunskapsinnehåll som beskrivs i en kurseller läroplan genom de lärandemål som anges att studenten ska nå. Det som komplicerar är att de studenter som kommer till utbildningen alla är individer med olika förkunskaper och förutsättningar som dessutom kan ha vitt skilda föreställningar om vilka traditioner som är gällande i den aktuella utbildningskontexten. En blivande students föreställningar om sin kommande utbildning kan dessutom vara långt mera präglad av erfarenheter från egen tidigare utbildning och/eller förutfattade mediebilder än av vilka traditioner som går att utläsa i aktuella utbildnings- och kursplaner eller vad de undervisande lärarna förmedlar. Dessutom har lärarna själva kanske inte alltid full koll på vilka traditioner som gäller. Sedan den svenska högre utbildningen, i samband med högskolereformen 2007, anpassades till Bolognaöverenskommelsen (1999) gäller, i varje fall formellt, andra traditioner än tidigare. Högskoleutbildningens tidigare kurs- och utbildningsplaner med mer eller mindre vaga lokala syftesbeskrivningar, som hade sin grund i en gammal tysk bildningstradition, är sedan 2007 ersatta av explicita lärandemålsbeskrivningar som anknyter till gammal fransk utbildningstradition (Burman, 2014), och som dessutom i mångt och mycket är reglerade i förordningstexter beslutade av den svenska riskdagen. Detta är exempel på en tradition i den högre utbildningen som har förändrats under min egen tid som högskolelärare, men det är inget som jag någonsin uppfattat att vi lärare i någon större utsträckning diskuterat i lärarrummet, och inte heller i andra forum för den delen. För de studenter som kommer till den högre utbildningen, och under sin tid i ungdomsskolan genomgående planerat sina studier med utgångspunkt i explicita lärandemål, är dock detta kanske inte alls ett problem. Men det vet vi inte om vi inte undersöker det! c h a p t e r 1 46 Ytterligare en stor utmaning för lärarna i den högre utbildningen är att det finns så många olika mål i utbildningen och att olika mål grundar sig i olika traditioner. Utbildningens lärandemål följer till exempel helt andra traditioner och idéer än gemensamma mål för hållbar utveckling, jämställdhetsmål eller individuella mål för den enskilde. Det kan också vara svårt att veta vilka mål som driver studenterna som ju i en grupp kan ha helt olika individuella mål med sina studier. Just detta kan vara svårt att förhålla sig till som lärare då dessutom enskilda studenter kanske inte är särskilt explicita med vad som just är deras mål, då det kanske inte heller är helt klart för dem själva. Avslutningsvis vill jag

lyfta fram att resultat från väl genomförda forskningsprojekt och erfarenheter från relevanta handböcker om musikproduktion och musikteknik definierar, så som beskrivs tidigare i denna text, olika aspekter av musikproduktion på olika sätt, inte bara rörande traditioner, och det är utan tvekan värdefull kunskap. Trots att det alltså finns mycket värdefull forskning så har utbildning i musikproduktion eller studentperspektivet för blivande musikproducenter inte undersökts grundligt i tidigare forskning. Därför kan det vara lite av en utmaning för blivande musikproducenter att navigera ibland de traditioner och normer som finns i den högre utbildningen. Dessutom krockar kanske sådana traditioner och normer med egna mer eller mindre välgrundade uppfattningar om vad som egentligen är kärnan i musikproducentens uppdrag eller hur musikteknik bäst ska kunna användas för att nå egna konstnärliga och kreativa mål. En viktig avslutande reflektion är därför att mer forskning om utbildning i musikproduktion, ljud- och musikteknik, som sätter studentperspektivet i centrum, behövs för att nå en djupare förståelse och säkrare kunskap om de frågor som denna studie utgått från.

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av elektriske mikrofoner bidro til nye muligheter for å uttrykke seg vokalt allerede fra midten av 1920-årene. Det andre eksemplet tar for seg båndteknologiens effekt på innspillingsmediet, både med hensyn til innspillingsmediets status og for mulighetene for flersporsopptak og for å eksperimentere med nye, virtuelle rom. Det tredje eksemplet går inn på den digitale revolusjonen som satte sitt definitive preg på lyden av 1980-årene, men som i stor grad også preger den måten vi skaper og dokumenterer musikk på i dag. Kapitlet er på denne måten ment å gi et innblikk i sentrale problemstillinger knyttet til soundbegrepet i et historisk perspektiv. Andre studier (Burgess, 2014; Cunningham, 1998; Sterne, 2003) har i større grad gått mer detaljert til verks i opptakshistorien. Dette kapitlet er derfor ikke ment som en uttømmende detaljstudie av opptakshistorien som sådan. Målsettingen med dette kapitlet er derimot å øke bevisstheten rundt hvordan interaksjonen mellom mennesker og teknologi har spilt en avgjørende rolle i utviklingen av nye sound gjennom innspilling og produksjon. Gjennom de nevnte eksemplene utforsker jeg tre ledd i denne prosessen: • Oppdagelse: Hvordan nye sound kan oppstå som mer eller mindre tilfeldige resultater av feil eller ikke-intendert bruk av ulike teknologier. • Naturalisering: På hvilke måter enkelte av disse oppdagelsene approprieres og inngår som en naturlig del av en produksjon i en gitt tidsepoke. • Kanonisering: Hvordan enkelte teknologisk funderte musikalske koder gjenoppstår som lydmarkører (Askerøi, 2016) for en gitt historisk epoke. Jeg forsøker med andre ord ikke å forklare hva musikken betyr. For som en rekke sentrale populærmusikkforskere har vist, vil musikkens mening for den enkelte lytter avhenge av kontekst, bakgrunn, referanser og musikalsk kompetanse (Brackett, 2000; Middleton, 1990; Moore, 2001). Jeg hevder heller ikke at sound er det eneste meningsbærende elementet i en s o u n d i h i s to r i s k p e r s p e k t i v 55 innspilling. Snarere vil jeg rette oppmerksomheten mot viktige øyeblikk i innspillingshistorien for å vise sound som et aspekt ved musikken som er sentralt for å forstå hvordan innspilt musikk kan skape mening. Hva er sound? Forskningslitteraturen presenterer ulike innfallsvinkler til soundbegrepet. Blant de første som tok sound på alvor fra et musikkvitenskapelig ståsted, var Per Erik Brolinson og Holger Larsen. I sin bok Rock: Aspekter på musik, teknologi & sound (Brolinson & Larsen, 1981) foreslår de en avgrensning av soundbegrepet som «grundkaraktären hos alla musikaliska element som den framträder i ett mycket kort tidsavsnitt av musiken, men som sätter sitt prägel på ett längre sammanhängande avsnitt» (Brolinson & Larsen, 1981, s. 181). En gjenkjennelig sound er altså, hvis vi skal følge en slik definisjon, i stor grad knyttet opp mot en umiddelbar opplevelse av den musikalske helheten. Som redskap for å bryte ned og dechiffrere hva det er i denne opplevelsen som gjør sounden gjenkjennelig, lanserer Brolinson og Larsen begrepet «soundbestemmende parametere». Dette er musikalske elementer som «är aktiva i präglingen av soundets karaktär. Detta förutsätter att övriga parametrar är neutrala, dvs. inte framstår som aparta i förhållande till den övergripande stilram innom vilken det specifika soundet framträder» (Brolinson & Larsen, 1981, s. 183). Ideen om at enkelte elementer i musikken i større grad enn andre bidrar til å prege den musikalske helheten, vil kanskje ikke overraske så mange. Det som imidlertid er noe mer problematisk i denne forståelsen, er påstanden om at det finnes parametere som forholder seg nøytrale innenfor en gitt stilramme. Jeg vil hevde at sound ikke bare kan ses i lys av isolerte enkeltelementer i musikken, som teknologi, spillestil, vokalfremføring og så videre, men må snarere må betraktes som et relasjonelt anliggende. Peter Wicke foreslår for eksempel at «[sound] is not just a sound image, but also a particular concept of sound, that results from the creative handling of recording technology» (Wicke, 2009, s. 149). Sentralt for Wicke er den kreative bruken av opptaksteknologi, altså ikke nødvendigvis den «riktige» bruken. Det relasjonelle hviler her på forholdet mellom teknologien og de som bruker den på et gitt sted til en gitt tid, c h a p t e r 2 56 innenfor en gitt sjanger eller stil. Dette åpner for å forstå sound relasjonelt i lys av (minst) fire innfallsvinkler: 1) Sound og teknologi: Når et spesifikt sound

knyttes til en gitt teknologi (instrument, opptaksteknologi eller effektprosesseringsverktøy). 2) Sound og agency: Når et spesifikt sound knyttes til personer, gjerne produsenter, artister eller band). 3) Sound og tid: Når et spesifikt sound knyttes til en epoke eller et tiår (sekstitalls-, syttitalls-, åttitallssound osv.). 4) Sound og sted: Når et spesifikt sound knyttes til steder eller byer (Liverpool, Manchester, Bristol, Seattle). Ulike teknologier har utvilsomt spilt sentrale roller i utviklingen av nye musikalske uttrykk (Brøvig-Hanssen og Danielsen, 2016; Katz, 2004), og som vi skal se i de følgende avsnittene, har all teknologi involvert i enhver innspilling, fra mikrofonene man spiller inn med, til innspillingsmediet og alle former for underveis- og etterbehandling, til alle tider bidratt til å prege lyden av den ferdige innspillingen. Teknologien alene er imidlertid ikke nok til å forme et gjenkjennelig sound. Oftere enn man kanskje er klar over, kommer nye sound som følge av at bruken av teknologien langt på vei har overskredet det den i utgangspunktet er laget for. Forholdet til tid og sted blir sentralt her, gjennom at man følger den aktuelle innspillingen til det punktet der den er produsert. Det kan dreie seg om et gitt studio, en by, et land eller et kontinent – detaljfokuset vil som regel avhenge av lytterens kompetanse og interesse. Tidsaspektet, altså når innspillingen er spilt inn og utgitt, står også sentralt som innfallsvinkel til å forstå sound, et poeng som gjøres spesielt gjeldende i det tredje eksemplet. Tidlige opptak, elektriske mikrofoner, nye vokaluttrykk Det første lydopptaket vi kjenner til, daterer seg til 1857 og ble foretatt på en fonoautograf, oppfunnet av den franske boktrykkeren Édouard-Léon Scott de Martinville. Utgangspunktet for å spille inn lyd skal, som navnet på oppfinnelsen antyder, ha vært en genuin nysgjerrighet på hvordan lyd s o u n d i h i s to r i s k p e r s p e k t i v 57 ser ut. Som Jonathan Sterne påpeker, var det ikke Scott de Martinvilles anliggende å kunne reprodusere lyden som lyd, men snarere å kunne skrive den: «[H]e understood the phonoautograph as a machine for literally transforming sound into writing. In this respect, Scott's phonoautograph was one in a long line of nineteenth-century attempts to write sound» (Sterne, 2003, s. 36). I denne linjen av forsøk på å skrive lyd finner vi også Thomas Alva Edisons kanskje mer kjente fonograf fra 1877. Denne skal ifølge Sterne ha kommet som et resultat av at Edison selv var nærmest døv. Den franske dikteren og oppfinneren Charles Cros oppfant paleofonen mens han arbeidet på en skole for døve og stumme (også før Edisons oppfinnelse). Selv om det altså finnes eksempler på opptak fra før Edisons fonograf, var det likevel hans oppfinnelse den første fasen av opptak skulle dreie seg rundt. Frem til cirka 1920 gjorde man opptak etter fonografprinsippet – via lydhorn der endringene i lydtrykknivået ble skrevet på voksruller. Etter hvert ble voksrullene erstattet med metalldekkede ruller for bedre lydkvalitet og holdbarhet. Musikk ble nå spilt inn for å lyttes til, ikke for å leses. Dette avsnittet illustrerer to momenter som jeg mener er viktige for å forstå forholdet mellom menneske og teknologi i utviklingen av karakteristiske sound. For det første er det et eksempel på at opptakshistorien i stor grad er formet av at man oppdager nye muligheter for bruk av teknologier som i utgangspunktet er ment for noe annet. Sterne hevder til og med at selve opptaksmediet er et resultat av helt andre formål enn å lytte til lydopptak: «[D]eafness was the very beginning of sound reproduction» (Sterne, 2003, s. 41). Jeg skal komme tilbake til flere eksempler som underbygger dette poenget, men for øyeblikket ønsker jeg å foregripe noen konklusjoner ved å foreslå at feil eller ikke-intendert bruk av teknologi er et grunnleggende premiss for at musikalsk utvikling har funnet sted i det hele tatt. For det andre underbygger eksemplene med fonoautografen og fonografen hvilken revolusjon det var da Western Electrics elektriske mikrofoner1 kom på markedet rundt 1926. Den elektriske mikrofonen 1 Den elektriske mikrofonen overtok i stor grad for sin forgjenger kullkornmikrofonen, som hovedsakelig er forbundet med eldre telefoner. Såkalt telefonlyd har begrenset frekvensspekter, særlig i bass og diskant. Prinsippet med kullkornmikrofoner er at endringer i lydtrykket skaper friksjon mellom kullkornene, som igjen oversettes til elektrisk spenning i en forforsterker. c h a p t e r 2 58 ble introdusert og videreutviklet med

utbredelsen av radiomediet i 1920- årene. Lydopptak i den spede begynnelsen ble også gjort i små radiostudioer eller provisoriske «hjemmestudioer». Som Charles Wolfe uttrykker det i dokumentaren Lost Highway: The Story of Country Music: «All of a sudden, the sound was vastly improved. Now, you could in fact put everything you needed to make a record into the back of a 1927 touring car» (Chambers & Cohen, 2003, 8:57–9:12).2 Den britiske sosiologen Jason Toynbee (2000) peker på to mekanismer han mener er sentrale i denne utviklingen: spredning (dissemination) og stilkrystallisering (style crystallisation). Dette er mekanismer som i stor grad var drevet frem av teknologisk utvikling. Overgangen fra opptakshorn til elektriske mikrofoner forbedret utvilsomt kvaliteten på opptakene en god del og bidro sammen med overgangen fra voks- og metallspoler til skjellakkplater til en økt oppblomstring av små opptaksstudioer i USA ut over i 1920-årene. En tredje faktor som skulle bli sentral i denne utviklingen, var den stadige utbredelsen av det kommersielle radiomediet. Radioens utbredelse og den gradvis økende tilgangen på innspilte plater gjorde at musikken nå kunne spres over større geografiske avstander. I tillegg ble musikerne nå i større grad delaktige i komposisjonsprosessen. Denne økte tilgjengeligheten gjennom nye kanaler for spredning førte i sin tur til det Toynbee kaller for stilkrystallisering, og innspillingsmediet satte også klare rammer for den musikken som skulle spilles inn. På hver side av de nye skjellakkplatene hadde man i overkant av tre minutter til rådighet, og følgelig ekskluderte dette en rekke musikkformer fra det nye mediet. Formen på blues ble i økende grad standardisert, men også i det klassiske sjiktet skjedde det former for tilpasning til innspillingsmediet, da riktignok med pianola3 som opptaksmaskin. Ifølge Mark McFarland (2011) komponerte Igor Stravinskij kun ett stykke spesifikt for pianola, «Le Étude pour Pianola» (1917). Instrumentet skulle likevel komme til å fungere som et viktig komposisjonsverktøy for ham helt frem til 1930: 2 Wolfe beskriver Peers innspillinger med The Carter Family som den kommersielle countrymusikkens fødsel. Dokumentaren er tilgjengelig her: https://www.youtube.com/watch?v=fvhmqdWXusE&t=585s 3 Pianola var et automatisk piano ment for å spille av musikk i barer og puber, som en slags jukeboks. Det kunne også fungere som et innspillingspiano, slik at kjente komponister kunne spille inn sine og andres komposisjoner i sine egne versjoner. s o u n d i h i s to r i s k p e r s p e k t i v 59 «Stravinsky was attracted to the pianola because of the instrument's ability to eliminate performers' 'arbitrary interpretations'» (McFarland, 2011, s. 87). Imitasjon av plater påvirket også det musikalske uttrykket. Flere sangere, for eksempel Ida Cox, skal ifølge Toynbee ha tilegnet seg en mer nasal vokalstil som følge av lydmessige begrensninger i opptaksmediet. Allerede her ser man altså tegn til det Lucy Green (2008) refererer til som uformelle læringsprosesser; man lærer seg ny musikk ved å lytte til plater i tillegg til å lese noter og gå på konsert. Disse nye mulighetene for nærlytting og gjenlytting fører ikke bare til kopiering av stilarter, men også til en økt intensivering av stilidiomer. Som følge av dette, og kanskje mest sentralt for denne artikkelen, oppstår det nye stiler basert på innspillingene – fremveksten av nyanserte sound. Radiomediets stadig økende utbredelse i 1920-årene bidro sterkt, ved siden av militærindustrien, til økt teknologisk utvikling. For som Timothy Taylor understreker, «radio was never simply a technological gadget: it is a communication technology, a medium» (Taylor, 2002, s. 400). Der platemediet, fremdeles mye på grunn av sin begrensede lydkvalitet, ennå ikke for fullt hadde blitt allemannseie, ble radioen et stadig vanligere møbel i de tusen hjem. Sentralt i denne utviklingen sto den elektriske mikrofonen, en teknologisk innretning som for alvor skulle bidra til utviklingen av nye vokaluttrykk: Crooning was a style of singing made possible by the development of the electrical microphone – vocalists could now be heard singing softly – and the source of a new sort of male pop star (Rudy Valee, Bing Crosby, Al Bowlly) whom the BBC found sentimental and «effeminate». (Frith, 1986, s. 263) Crooning ble den nye stilen, croonerne var de første popstjernene, og for første gang fikk man en vokalstil som var utviklet i tospann med en

teknologisk innretning. På den andre siden av Atlanterhavet ble denne nye stilen imidlertid ikke så godt mottatt i radiokretser. Ifølge Frith beskrev BBCs programsjef Cecil Graves crooning som en «slushy» vokalstil, og han frarådet i 1936 sine programledere på det sterkeste å spille slik musikk. Påskuddet for dette forbudet var at teknologisk uærlighet var ensbetydende med følelsesmessig uærlighet: c h a p t e r 2 60 «Legitimate» music hall or opera singers reached their concert hall audience with the power of their voice alone; the sound of the crooners, by contrast, was artificial. Microphones enabled intimate sounds to take on a pseudo-public presence, and, for the crooners' critics, technical dishonesty meant emotional dishonesty. (Frith, 1986, s. 264) Denne formen for myk, smektende sang hadde ikke vært hørbar over et storband eller orkester, og denne forsterkningen ble derfor av mange betraktet som uærlig. Rent fysisk blir det nødvendigvis en sonisk ubalanse mellom orkester og vokalist, men denne ubalansen er knapt hørbar for oss i dag. I 1936 ble denne forsterkningen imidlertid betraktet som unaturlig, og det soniske resultatet av denne ubalansen ble mer eller mindre betraktet som en løgn. Det er også verdt å merke seg at det her også må ha ligget en kjønnspolitisk dimensjon til grunn, og det er fristende å beskylde Graves og andre croonerkritikere for en uheldig sammenblanding av moral og estetikk. Den lydmessige representasjonen av intimitet bidro til å stille spørsmål ved artistens seksuelle legning – en fortolkning av forholdet mellom teknologi og sound som i stor grad var basert på fordommer. Likevel, som Allison McCracken påpeker, var Rudy Vallée, Russ Columbo, Gene Austin, Morton Downey, Nick Lucas og Bing Crosby ikke bare populære i sin samtid, de var også verdens første popstjerner: «Their intimate address and passionate, sensitive personae made them America's first modern singing stars» (McCracken, 2015, «Introduction», avsn. 3). I dag er ikke crooning lenger betraktet som en sjokkerende vokalstil. Enten man liker stilen eller ikke, så inngår den nå i det som må betegnes som en vokaltradisjon som for alvor fikk feste med artister som Frank Sinatra og Nat King Cole. Denne stilen blir så kanonisert med artister som Harry Connick jr. og Michael Bublé, og den fremføres i større konserthus. Crooning som vokalstil signaliserer på den ene siden en form for eksklusivitet, men ligger på den andre siden i stor grad til grunn for vokaluttrykket til artister som Morrissey, Bryan Ferry, Jim Morrison, Ian Curtis, Elvis Presley, Dave Gahan og en rekke andre. Ny teknologi kan med andre ord oppleves som unaturlig så lenge den er identifiserbar som en del av det musikalske uttrykket (Frith, 1986, s. 264), men med tiden viskes den teknologiske merkingen ut, og uttrykket som ligger bak, naturaliseres som del av en tradisjon. s o u n d i h i s to r i s k p e r s p e k t i v 61 Båndteknologi, ekko og klang Skjellakkplater er grunnkomponenten i alle innspilinger frem til rundt 1948 (Day, 2002. Mikrofonene hadde riktignok økt i standard, mye takket være et ekspansivt radiomedium og til en viss grad også med populærkulturelle representanter som de før nevnte croonerne. Selve innspillingsmediet satte imidlertid sine begrensninger for lydkvaliteten på innspillingen som sådan. Det var først etter krigen at man oppnådde fullfrekvensopptak – full frequency range recordings (FFRR). Opphavet til dette er også en form for «art by accident». Rettere sagt var det her snakk om å benytte seg av eksisterende teknologi på nye måter. Ifølge kulturhistoriker Timothy Day ga Decca Records ut en serie med FFRR-innspillinger (opptil 14 000 Hz) i etterkrigsårene (Day, 2002, s. 19). Foranledningen til dette var ifølge Day at en av Deccas teknikere jobbet for RAF Coastal Command under krigen og fikk i oppdrag å utvikle sonarbøyer som kunne skjelne bedre mellom allierte og tyske ubåter. Får å få til dette måtte man ha utstyr med bredere frekvensrespons enn det gamle, og Decca utviklet mikrofoner med bedre frekvensrespons for innspilling av øvelsesplater til bruk for RAF Coastal Commands offiserer. Skjellakk skulle imidlertid fortsette å sette sitt preg – sitt «frying bacon sizzle» (Osborne, 2016, s. 67) – på innspillinger i flere år. Toynbee (2000) betrakter båndteknologiens inntog sent i 1940-årene som en budbringer om en revolusjon i populærkulturen, på grunn av den markant forbedrede lydkvaliteten, men også for det utallet

av muligheter som den nye teknologien kunne tilby – også dersom man valgte ikke å bruke den akkurat som den var tiltenkt: «Tape became the harbinger of a revolution in popular culture that brought the means of production within the ambit of a political economy of local entrepreneurs, so opening up access and allowing a more decentralized music-making culture» (Toynbee, 2000, s. 80). To sentrale oppfinnelser i opptakshistorien kan høres på Les Pauls og Mary Fords versjon av How High the Moon, som toppet Billboards singellister i ni uker i 1951. Spesielt med denne versjonen er at den er spilt inn med tolv gitarspor og tolv spor av Fords stemme. I tillegg forsterkes det rytmiske drivet i låten av en slapback echo på et av Les Pauls gitarspor. Lester William «Les Paul» Polsfuss (heretter Les Paul) hadde gjennom nitid eksperimentering og stadige ombygginger av c h a p t e r 2 62 sine Ampex-båndspillere funnet opp både flersporsteknologien (soundon-sound) og slapback echo-effekten,4 og gjennom samarbeidet med sin daværende kone Mary Ford skulle dette endelig få sitt kommersielle gjennombrudd. I likhet med de før nevnte croonerne ble Les Paul og Mary Ford i tillegg beskyldt for å drive uærlig arbeid, og for at det var maskinene som gjorde jobben. I et intervju i CBS-programmet Omnibus demonstrerer paret hvordan de lager musikken sin, hvorpå programleder Alistair Cooke gjør et hederlig forsøk på en gang for alle å avkrefte den etter hvert voksende myten om at Les Paul og Mary Ford skulle drive med noen form for juks: This is the final demolition of this popular and ignorant rumour, that the basis of Les Paul and Mary Ford's Music is electronics. They make music the way people have made music since the world began. First of all, they are musicians. They have an accurate ear for harmony. They work very hard. They have a lot of patience, and they take advantage of the trick, which granted electronics makes possible: That you can record one part of a song, and then you can play it back to yourself. Then you can accompany that part and then you can keep on recording. (Cooke, 1953, 5:24) Selv om vi som lyttere ikke nødvendigvis er i stand til å identifisere det, er vi i dag vant til å høre den samme stemmen dubbet i mange lag fordi prosessen har blitt så innarbeidet. Her er det teknologien som åpner for nye måter å komponere musikk på, og effekten av disse komposisjonsprosessene blir identifiserbare i det endelige uttrykket. I dette tilfellet får vi nok et eksempel på at ny teknologi beskyldes for å representere noe uærlig, all den tid den er identifiserbar som en del av det musikalske uttrykket. Selv om Les Pauls oppfinnelse resulterte i at flerspors båndmaskiner kom i produksjon allerede rundt midten av 1950-årene, skulle det fortsatt gå en god stund før dette ble en utbredt praksis.5 I stedet skulle lyden av 4 Les Paul eksperimenterte ifølge Toynbee (2000) med «disc-to-disc»-opptak allerede i 1930-årene med skjellakkplater, men suksess fikk han først ved overgang til magnetisk bånd. I tillegg til de nevnte oppfinnelsene var han også først ute med å patentere den såkalte solid body-gitaren rundt 1941, og Gibson Les Paul-gitaren bærer hans navn som en dedikasjon til hans oppfinnelse. 5 Ifølge Mark Cunningham (1998) skal Les Paul selv ha kommet over en 8-sporsmaskin i gangen i et studio som var forlatt der, fordi ingen trodde at det var andre enn Les Paul som kunne bruke den. s o u n d i h i s to r i s k p e r s p e k t i v 63 innspillinger fra tidlig i 1960-årene preges av klangkamrene i de større studioene. Et viktig eksempel på dette er Phil Spector, som på mange måter var en konservativ produsent i det at alt skulle spilles i samme rom samtidig. Det nyskapende i hans Wall of Sound ble grunnlagt i hans utstrakte bruk av kontrollert lekkasje mellom de forskjellige instrumentene og ekstensiv bruk av klangkammeret i Gold Star Studios: «Sonically, the Wall of Sound was a combination of Gold Star's echo chambers and Spector's desire to record large numbers of musicians without any form of isolation, inside a small room with a ceiling height of fourteen feet» (Cunningham, 1998, s. 62). Musikerne som bidro, var også en sentral del av Spectors karakteristiske sound, og som mange produsenter benyttet også Spector faste musikere (The Wrecking Crew)6 og teknikere (Larry Levine og Stan Ross) han hadde musikalsk tillit til. På denne måten kunne han realisere sine visjoner med faste musikere som var villige til å prøve

ut ideene hans, selv om det ifølge tekniker Larry Levine til tider krevet en rekke kompromisser: Phil would get the guitarists to play the patterns he heard in his head, then change and modify these ideas as things progressed. When he was satisfied that he had something he could work with, he would add the piano to the mixture. The drums were always the last element to consider. In order to affect the drum sound, I had to try balancing the other instruments against the kit. It wasn't like today where the drums are recorded in total isolation and they can be placed anywhere you want in the mix. I had to get enough presence on the drums while still being able to hear the other instruments. So it was always a compromise. (Levine i Cunningham, 1998, s. 63) Hvis 1950-årene kan settes i sammenheng med båndteknologiens inntog, med flersporsinnspillinger og utvidelse av virtuelle rom som estetiske konsekvenser av dette, er det fristende å hevde at 1960-årene preges av en videreføring og intensivering av disse prosessene. Innspillingen ble i større grad å betrakte som originalkomposisjon – det Stan Hawkins 6 Gitarist og senere bassist Carol Kaye og trommeslager Hal Blaine, som utgjorde kjernen i Spectors faste husband, ble døpt The Wrecking Crew av sine eldre og langt mer velkledde musikerkollegaer i Gold Star Studios, ifølge Blaine fordi de på grunn av sine slitte dongeribukser og t-skjorter truet med å ødelegge hele businessen (Cunningham, 1998, s. 63). c h a p t e r 2 64 (2002) refererer til som «the Pop Score». Ofte er denne delen av historien forbundet med The Beatles og The Beach Boys, og ikke uten grunn. Beach Boys-albumet Pet Sounds (1966) og The Beatles' Revolver (1966) og Sgt. Pepper's Lonely Hearts Club Band (1967) bidrar – mye på grunn av sitt enorme kommersielle nedslag – sterkt til å tydeliggjøre et skille i historien fra innspillingen som en dokumentasjon av en fremføring til det Toynbee (2000, s. 70) kaller en projeksjon. Dette skillet ble i stor grad skissert av Les Paul og markert med tydeligere penn av Spector, men det er først med disse albumene at man virkelig begynner å utnytte det kompositoriske potensialet i studio til fulle. Et av de tydeligste eksemplene på denne prosessen finner vi som avslutningsspor på Revolver. «Tomorrow Never Knows» ble spilt inn live i Abbey Road Studio med tape loops fra elleve båndspillere, tekniker Geoff Emerick med to assistenter ved miksebordet og produsent George Martin som dirigent for det hele. Sistnevnte beskriver det slik: We did a live mix of all the loops. All over the studios we had people spooling them onto machines with pencils while Geoff [Emerick] did the balancing. There were many other hands controlling the panning … It is the one track, of all the songs The Beatles did, that could never be reproduced: it would be impossible to go back now and mix exactly the same thing: the «happening» of the tape loops, inserted as we all swung off the levers on the faders willy-nilly, was a random event. (Lewishon, 1988, s. 72) The Beatles sluttet å spille konserter rundt 1966, ifølge Paul McCartney som følge av at de ikke lenger var i stand til å høre seg selv i den øredøvende larmen fra en stadig voksende fanskare på stadig større konsertarenaer. Som en konsekvens av denne fysiske forflytningen fra scene til studio samt fri tilgang til Abbey Road Studio og George Martin som aldri sa nei før noe var utprøvd, kunne Beatles nå jobbe med studioet som utgangspunkt for å komponere musikk. Sentralt i dette tilfellet sto båndspillerne – ikke heller her i form av flersporsopptak, men i form av å klippe opp magnetisk bånd og spille dem av i sløyfer (loops) – mye på samme måte som elektroakustiske komponister som Pierre Schaeffer og Pierre Henry hadde arbeidet frem «musique concrète» tidlig i 1950-årene (omtrent samtidig med Les Pauls arbeider med flersporsteknologi i USA). s o u n d i h i s to r i s k p e r s p e k t i v 65 1970-årene representerer i sin tur en ytterligere raffinering av innspillingen som originalkomposisjon, men studioet som komposisjonsarena og kommersiell fødestue ble også ramme for en rekke teknologiske nyvinninger. Det er vanskelig å sette fingeren eksakt på hva som preger dette tiåret, men tre elementer må sies å ha vært sentrale for det som i ettertid har blitt kalt «dry as a bone sound». Ifølge Greg Milner kan denne karakteristikken spores både geografisk og kulturelt: There was a cultural and geographical component to the dry-as-a-bone-sound. It

was especially prevalent in West Coast studios, and especially audible on the California-centric rock bands of the seventies … But really, it was everywhere, rock, disco funk – the sound of the age. (Milner, 2010, s. 173) Med den økte kommersialiseringen av produksjonsapparatet ble det bygget en rekke nye innspillingsstudioer med opptil 24-spors båndopptakere, noe som muliggjorde større innspillinger, men også mer fokus på tilstedeværelsen av hvert instrument. Mange studioer tok også i bruk plateklang, en stor ramme med en metallplate spent opp og kontaktmikrofoner plassert rundt rammen for å fange opp klangen som kom av vibrasjonene i metallplaten. Dette var egentlig en femtitallsoppfinnelse, men kommer først for alvor i bruk i 1970-årene. For det første var disse langt rimeligere enn å bygge store klangkamre, men de ga også en langt mindre og tørrere klang enn store murrom. En tredje faktor som i stor grad preget lyden av 1970-årene, var det økte tilfanget av mer tilgjengelige og spillbare elektroniske instrumenter som Minimoog (1971), Polymoog (1975), stemmeforvrengningsinnretninger som vocoder og talkbox samt de første digitale samplerne Synclavier (1977) og Fairlight CMI (1979) – de siste som klare budbringere om den digitale revolusjonen som skulle komme til å prege tiåret etter. Gated reverb former lyden av åttitallet Med inntoget av digitale teknologier i form av klangmaskiner, synthesizere, samplere, sequencere, trommemaskiner og audiovisuelle plattformer som MTV, Sky TV og andre tok 1980-årene for alvor videre den drastisk økte kapitaliseringen av kulturell produksjon som hadde satt fart i løpet c h a p t e r 2 66 av 1970-årene. Den teknologiske påvirkningen var nå i høyeste grad både hørbar og synlig i musikken så vel som i produksjonsapparatet. Til tross for denne enorme tilveksten av nytt utstyr skulle likevel en av de mest banebrytende soundbestemmende parameterne for lyden av åttitallet formes i interaksjonen mellom tid, rom, teknologi og agency. For mange, enten det er bevisst eller ubevisst, har nemlig lyden av gated reverb på trommer bidratt til å definere lyden av åttitallet. Hva er det for eksempel ved Depeche Modes People Are People (1983), Kate Bushs Hounds of Love (1985) og Roxettes The Look (1989) som gjør at vi kategoriserer dem som åttitallssound? Stilistisk er disse låtene relativt forskjellige, men de har alle det til felles at de er produsert i 1980-årene, og at trommene er prosessert med gated reverb.7 Jeg skal ikke gå ytterligere i dybden på teknikken som sådan her, men for å kontekstualisere innflytelsen denne lyden har hatt, vil jeg likevel trekke frem tre sentrale hendelser som bidro sterkt til å befeste denne karakteristiske lydens posisjon. Historien om nok en oppdagelse, det som ofte blir beskrevet som nok en «art by accident», vil trolig variere med hvem man spør, men ifølge Hugh Padgham skjedde det hele under innspillingen av Peter Gabriels tredje soloalbum 3: Melt (1980). Stedet var Townhouse Studios i London, produsent var Steve Lillywhite, tekniker var Hugh Padgham, og bak trommene satt Gabriels tidligere kollega fra Genesis, Phil Collins. Mens Collins spilte gjennom trommebeaten før innspilling, fanget talkback-mikrofonen i trommerommet ved et uhell opp det han spilte. Denne mikrofonen gikk allerede gjennom en kompressor, men den gikk også gjennom en noise gate, en effekt opprinnelig ment for å fjerne eller dempe støy, og som var blitt standard på alle kanaler i SSL-mikserne. Ifølge Padgham var den til og med koblet inn for moro skyld: I just turned on the noise gate for a laugh. Suddenly, when Phil played it produced a massive sound, which shut off between the beats of the snare and the bass drum because I had the release of the noise gate wound up very fast. Phil heard it in the headphones and started playing to the speed of the noise gate's 7 Lyden av gated reverb er frembrakt av stor klang på den aktuelle kilden – for eksempel en skarptromme – som i sin tur «kveles» relativt raskt av en noise gate. Denne karakteristiske lyden er dermed gjenkjennelig på sitt massive anslag og abrupte avslutning. s o u n d i h i s to r i s k p e r s p e k t i v 67 release. We still didn't have any samplers then. Peter asked Phil to play to the release of the noise gate for five minutes and he wrote a complete song around the sound of the drums. (Padgham i Cunningham, 1998, s. 324) Klangen fra det steinbelagte trommerommet ble med andre ord kuttet av rett etter anslaget, og lyden av gatede trommer

var født. Det vil si at selve fødselen ble muliggjort av Gabriels fasinasjon for denne lyden – en fasinasjon så stor at han skrev «The Intruder» over dette fem minutter lange trommetaket og lot den åpne sitt nye album. Art by accident eller ikke, så viser det seg at Gabriel selv hadde noen tanker om nettopp denne lyden i valget av Padgham som tekniker, på bakgrunn av Padghams tidligere arbeid med XTC:8 There was a drum sound that Hugh Padgham had experimented with, using SSL gates, on the XTC record that I was very excited about. There was this huge resonant sound that would be trapped down in sort of square shapes and then flattened into nothing. It was a very big and aggressive sound. So I then thought I'd build a track around it, which was the track Intruder. Phil Collins who I got in for that, then went on to take Hugh and work on his own record using a lot of those sounds, but there was a real sense of discovery when that first arrived. (Gabriel, 1980) Introen til «The Intruder», som i hovedsak dreier rundt Collins' repeterende trommebeat, lett akkompagnert av rytmisk gitar og piano med noen ubestemmelige knirkelyder under, varer i førti sekunder. Kanskje dette er noe av grunnen til at det mest kjente eksemplet på tidlig bruk av gated reverb kom ut året etter med Phil Collins' egen In the Air Tonight. To sentrale aktører i dette eksemplet er Hugh Padgham, nå som produsent med Collins som medprodusent, og Townhouse Studios, med sitt relativt lille, men høye trommerom. Som Collins selv beskriver det: «The snare drum and tom toms kind of bark, but it is made from a lot of compression with ambient mics as far away from the drums as possible, and those are noise-gated» (Flans, 2005). 8 Platen han referer til, er Drums and Wires (1979). Den mektige, men samtidig kontante trommelyden på åpningssporet «Making Plans for Nigel» kan leses som en forløper til den gatede trommelyden som blir så karakteristisk for «The Intruder». c h a p t e r 2 68 Fra det Peter Gabriel beskriver som «a real sense of discovery», til formingen av en trend, var veien bemerkelsesverdig kort. Allerede i 1982 lanserte AMS sin første digitale klangmaskin, en AMS RMX16. Og som en av 99 forhåndsprogrammerte presets fant man «non-linear reverb», som i all hovedsak var lyden av en gated reverb. Selv om denne klangmaskinen sannsynligvis langt ifra var tilgjengelig for alle, ble den eksklusive lyden av gated reverb nå i hvert fall tilgjengelig for samtidens plateprodusenter. Man trengte i det minste ikke å leie seg inn i Townhouse Studios med Padgham eller Lillywhite for å oppnå den ønskede lyden. Og som historien har vist oss, ble denne tilgjengeligheten utnyttet til fulle og vel så det. Faktisk skulle lyden av gated reverb bidra sterkt til å forme det vi i dag kjenner som soundet av 1980-årene, kanskje mer enn noen annen teknologi. Da han senere ble spurt om hvorvidt han følte seg smigret eller var irritert over at så å si alle nå kopierte trikset hans, svarte Hugh Padgham følgende: «I was so busy in those days, I barely noticed, to tell you the truth. But I suppose I was flattered, really» (Padgham i Massey, 2000, s. 178). Smigret eller ikke, Padgham forlot selv sin egen oppdagelse rundt midten av 1980-årene, i god tid til å styre unna denne karakteristiske lydens akutte død rundt 1990, da en ny generasjon grungerockere overtok scenen under vingene til produsenter som Steve Albini og Rick Rubin, med et helt annet sett med lydidealer på menyen. Kanonisering Så langt i dette kapitlet har jeg rettet søkelyset mot tre sentrale øyeblikk som på hver sin måte har preget lyden av sin samtid, men som også har hatt sterk innflytelse på opptakshistorien. Disse øyeblikkene har i stor grad vært preget av oppdagelse gjennom eksperimentering i prosess, og av at tilgjengelig teknologi er brukt på andre måter og med andre formål enn det som i utgangspunktet var intensjonen. Selv om den elektriske mikrofonen i hovedsak ble utviklet med tanke på radiomediet, muliggjorde den også nye måter å synge på. Crooning, som det første eksemplet på en vokalstil muliggjort av den elektriske mikrofonen, utgjorde et klart brudd med normen for hvordan man skulle synge. I ettertid er det imidlertid vanskelig å tenke seg noe populærmusikalsk vokaluttrykk som ikke s o u n d i h i s to r i s k p e r s p e k t i v 69 inkluderer en form for mikrofonforsterkning. Les Paul bidro til oppdagelsen av flersporsteknologien ved å eksperimentere med en båndspiller. I dag er flersporsteknologi underforstått når vi skal spille

inn og produsere musikk i et studio – enten i et profesjonelt studio eller med et lydkort og en bærbar datamaskin på et soverom. I tillegg bidro hans eksperimenter med slapback echo til å utvide mulighetene for å implementere virtuelle rom i en innspilling. Gjennom 1950-årene skulle artister som Elvis Presley og Jerry Lee Lewis, under vingene til Sam Phillips og hans Sun Studio, bane vei for rockabilly, en sjanger der slapback echo har blitt en sentral sjangerdefinerende markør: «The Sun Studio's tape echo, known as a slap-back echo, provides a full sound to the small ensemble» (Morrison, 1998, s. 13). Gated reverb kom til mer eller mindre som en «art by accident» under en spesifikk innspilling, under relativt kostbare forhold (Townhouse Studios, SSL-mikser, Hugh Padgham og Steve Lillywhite). Denne karakteristiske lyden ble imidlertid tilgjengelig på markedet som et preset på AMS Neves digitale klangmaskin allerede to år etter. Dette er eksempler på naturaliseringsprosesser der den ene generasjonens oppdagelse blir den neste generasjonens konvensjon (Hebdige, 1979). Når vi som lyttere gjenkjenner en innspilling som representant for et sound, en stil eller en sjanger, er det blant annet fordi dette soundet allerede er legitimert som noe spesifikt (Brackett, 2016). De lyduttrykkene som er diskutert i dette kapitlet, fra nasalt orientert bluesvokal, crooning og slapback echo via dubbing av samme stemme til loopbasert komposisjon og gated reverb på trommer, er på hver sin måte legitimert som soundbestemmende parametere (Brolinson & Larsen, 1981). De har også det til felles at de har gjenoppstått i nyere tid og på den måten har bidratt til å kanonisere disse uttrykkene som deler av ulike tradisjoner. Lawrence Kramer (2011) beskriver denne mekanismen ut fra kanoniseringen av komponister: «Composers who gain canonical status receive an informal patent on certain stylistic traits that are then instituted as both trademarks and surrogate identities» (Kramer, 2011, s. 124). Kramers tanke om at kanonisering fordrer en uformell patentering av stiltrekk, gjør det relevant å bruke kanonisering som et begrep også for gjenkjennelige sound. På den ene siden kan vi si at kanoniseringen av et sound finner sted gjennom at prosessene for å gjenskape oppdagelsene gjenskapes, enten c h a p t e r 2 70 helt eller delvis, men at kanonisering først er mulig etter at dette soundet har blitt legitimert som noe spesifikt. På den andre siden kan vi også si at kanoniseringen finner sted gjennom å beskrive disse prosessene og mekanismene i kapitler som dette. Slike mekanismer har inspirert begreper som «retromania» (Reynolds, 2011) og «retronormativitet» (Askerøi, 2016) for på forskjellige måter å beskrive overgangen fra oppdagelse til noe tradisjonsbundet og nærmest normativt. Ved å anlegge et historisk perspektiv på crooning, slapback echo og gated reverb og betrakte dem i lys av deres posisjon i dag fremstår de som relevante eksempler på kanoniserte lyduttrykk, men også som sjangerbestemmende parametere og tilgjengelige lydmarkører. Crooning kan anses som en trettitallslydmarkør, fordi selve sangstilen oppsto og ble popularisert i det tiåret (McCracken, 2015). Kanoniseringen av crooning skjer gjennom at utrykket blir opprettholdt av artister som Harry Connick jr. og Michael Bublé, men også, som vi har vært inne på tidligere, som en sentral uttrykksparameter i andre musikalske sjangere. Det samme gjelder for slapback echo. Effekten kan anses som en femtitallslydmarkør, fordi oppdagelsen ble gjort tidlig i 1950-årene. Den ble normalisert som en sjangerdefinerende parameter for rockabilly og senere kanonisert gjennom tradisjonsbærende rockabillyartister av i dag. I tillegg til en rendyrking av denne sjangeren har slapback echo også blitt et sentralt produksjonselement i nyere populærmusikk. Gated reverb kan også ses gjennom den samme linsen. Den kan leses som en tydelig åttitallsmarkør gjennom at den ble oppdaget tidlig i 1980-årene og normalisert som et sentralt element i selve åttitallssoundet i løpet av veldig kort tid. Det klare bruddet med denne estetikken rundt 1990 bidrar også til å forsterke dette inntrykket. Kanoniseringen av gated reverb har skjedd i stort monn gjennom de siste tjue årene. Lyden har vært sjangerdefinerende for synthwave som oppsto tidlig i 2000-årene, og som gradvis har satt sitt preg på vår samtid gjennom serier som Turbo Kid, Stranger Things og Summer of '84. Effekten har også blitt et sentralt

produksjonselement i nyere pop med artister som The Weeknd og Dua Lipa. For å bety noe, for å bidra til å skape en form for mening, må altså sounden av en innspilling snakke fra et sted, enten 1) som en oppdagelse av noe helt nytt, noe man aldri har hørt før, 2) som en naturliggjort musikalsk parameter som s o u n d i h i s to r i s k p e r s p e k t i v 71 initierer deltakelse i en sjanger (Brackett, 2016), eller 3) som en kanonisert lydmarkør som kan fungere både som en tradisjonsbærer gjennom å være tro mot en sjanger (crooning, rockabilly eller synthwave), eller som et kompositorisk element i produksjonssammenheng. Konkluderende momenter I dette kapitlet har jeg anlagt et historisk perspektiv på soundbegrepet for å belyse noen av de faktorene som har spilt inn i formingen av gjenkjennelige lyduttrykk frem til 1980-årene. Forholdet mellom utviklingen av ny teknologi og effekten av denne på ulike musikalske utrykk har stått sentralt. Det viktigste momentet her er kanskje likevel bruken av teknologien – særlig den som kan fremstå som ikke-intendert eller feil bruk av teknologi og effekten av denne, og hvordan slike effekter har vært sentralt i vår kulturelle forståelse av forskjellige tidsepoker i innspillingshistorien. Eksemplene på slike oppdagelser er mange, og det er lett å knytte myter an til selve hendelsene. Opptak i seg selv kom som resultat av ønsket om å vise døve hvordan lyd ser ut – de kan jo ikke høre den likevel. Utviklingen av mikrofoner skjedde for en stor del som følge av radiomediets utbredelse (Toynbee, 2000) og spesielle behov i krigsindustrien (Day, 2002). Båndteknologi hadde blitt brukt i filmindustrien siden 1930-årene, men ble først introdusert i lydstudioene for innspilling av musikk etter 1945. Satt i sammenheng med beskyldninger om uærlighet, juks og forenkling når nye teknologier identifiseres som en del av lyduttrykket, er det kanskje ikke så vanskelig å forestille seg at det har tatt litt tid fra disse hendelsene fant sted, til at metodene og teknologiene – og den karakteristiske lyden av interaksjonen dem imellom – fant veien til det kommersielle produksjonsapparatet. Som følge av de nærmest uendelige mulighetene de nye digitale teknologiene tilbyr, er det ikke lenger de fysiske hindringene i utstyret som setter grenser for hva det er mulig å få til. I prinsippet kan vi i dag, med relativt rimelig og lett tilgjengelig teknologi, hente elementer fra ethvert musikalske uttrykk og på den måten skrive oss inn i en tradisjon ved å appropriere en legitimert sound, enten helt eller delvis. Samtidig er det verdt å stille spørsmål ved om et nærmest uendelig tilfang av muligheter kanskje også kan bli en begrensning, i det at oppdagelse c h a p t e r 2 72 og nyskaping fordrer nettopp en eller annen form for hindring eller begrensning? Referanser Askerøi, E. (2016). Who is Beck? Sonic markers as a compositional tool in popular music. Popular Music, 35(3), 380–395. Bowman, R. (1995). The Stax sound: A musicological analysis. Popular Music, 14(3), 285–320. Brackett, D. (2000). Interpreting popular music (2. utg.). University of California Press. Brackett, D. (2016). Categorizing sound: Genre and twentieth-century popular music. University of California Press. Brolinson, P. E. & Larsen, H. (1981). Rock: aspekter på industri, elektronik & sound. Gummesons Tryckeri AB. Brøvig-Hanssen, R. & Danielsen, A. (2016). Digital signatures: The impact of digitization on popular music sound. MIT Press. Burgess, R. J. (2014). The history of music production. Oxford University Press. Camilleri, L. (2010). Shaping sounds, shaping spaces. Popular Music, 29(2), 199–211. Chambers, J., & Cohen, A. (Executive Producers). (2003). Lost highway: The story of country music [TV series]. BBC. https://www.youtube.com/watch?v=fvhmqd WXusE Cooke, A. (1953, 23. oktober). Omnibus. [Video]. Youtube. https://www.youtube.com/watch?v=BjKX0P4t_ac Cunningham, M. (1998). Good vibrations: A history of pecord production (Rev. utg.). Sanctuary Publishing. Day, T. (2002). a Century of recorded music: Listening to musical history. Yale University Press. Flans, R. (2005, 1. mai). Classic tracks: Phil Collins' «In the Air Tonight». Mix. https:// www.mixonline.com/recording/classic-tracks-phil-collins-air-tonight-365521 Frith, S. (1986). Art versus technology: The strange case of popular music. Media, Culture & Society, 8(3), 263–279. Frith, S. (1996). Performing rites: On the value of popular music. Oxford University Press. Gabriel, P. (1980, 30. mai).

Peter Gabriel 3: Melt [Musikkalbum]. Charisma. http:// petergabriel.com/release/peter-gabriel-3/ Green, L. (2008). Music, informal learning and the school: A new classroom pedagogy. Ashgate. Hawkins, S. (2002). Settling the pop score: Pop texts and identity politics. Ashgate. s o u n d i h i s to r i s k p e r s p e k t i v 73 Hebdige, D. (1979). Subculture: The meaning of style. Routledge. Katz, M. (2004). Capturing sound: How technology has changed music. University of California Press. Kramer, L. (2011). Interpreting music. University of California Press. Lewisohn, M. (1988). The complete Beatles recording sessions: The official story of the Abbey Road years. Hamlyn. Massey, H. (2000). Behind the glass: Top record producers tell how they craft the hits. Miller Freeman Books. McCracken, A. (2015). Real men don't sing: Crooning in American culture. Duke University Press. McFarland, M. (2011). Stravinsky and the pianola: A relationship reconsidered. Revue de Musicologie. 97(1), 85–110. Middleton, R. (1990). Studying popular music. Open University Press. Milner, G. (2010). Perfecting sound forever: An aural history of recorded music. Farrar, Straus and Giroux. Moore, A. F. (2001). Rock: The primary text: Developing a musicology of rock (2. utg.). Ashgate. Moore, A. F. (2012). Song means: Analysing and interpreting recorded popular song. Ashgate. Morrison, C. (1998). Go Cat Go! Rockabilly music and its makers. University of Illinois Press. Osborne, R. (2016). Vinyl: A history of the analogue record. Routledge. Reynolds, S. (2011). Retromania: Pop culture's addiction to its own past. Faber and Faber. Sterne, J. (2003). The audible past: Cultural origins of sound reproduction. Duke University Press. Taylor, T. D. (2002). Music and the rise of radio in 1920s America: Technological imperialism, socialization, and the transformation of intimacy. Historical Journal of Film, Radio and Television, 22(4), 425–443. Toynbee, J. (2000). Making popular music: Musicians, creativity and institutions. Arnold. Wicke, P. (2009). The Art of phonography: Sound, technology and music. I D. B. Scott (Red.), The Ashgate research companion to popular musicology (s. 147–171). Ashgate. Part 2 Music Technology Channeling Music Education 77 Citation of this chapter: Støckert, R., Bergsland, A., & Xambó, A. (2020). The notion of presence in a telematic cross disciplinary program for music, communication and technology. In Ø. J. Eiksund, E. Angelo, & J. Knigge (Red.), Music technology in education – Channeling and challenging perspectives (pp. 77–101). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.108.ch3 chapter 3 The Notion of Presence in a Telematic Cross-Disciplinary Program for Music, Communication and Technology Robin Støckert Norwegian University of Science and Technology Andreas Bergsland Norwegian University of Science and Technology Anna Xambó De Montfort University Abstract: This chapter examines how students in a two-campus, cross-disciplinary program in Music, Communication and Technology (MCT) experience the sense of presence of peer students and teachers, some physically co-localized while others are present via an audiovisual communications system. The chapter starts by briefly delineating the MCT program, the audiovisual communications system and the learning space built around it, named the Portal, and the research project SALTO which frames the current study. We then review research literature on presence relevant to this particular context and use this as a basis for the design of an online survey using a combination of Likert items and free text response. Our main findings, based on responses from the 16 students who participated in the survey, are that the mediating technologies of the Portal affect the experience of presence negatively, but that formal learning scenarios are less affected than informal scenarios that require social interaction. Keywords: cross-campus, distance learning, e-learning, future learning space, presence c h a p t e r 3 78 Creating arenas and learning spaces for collaboration and communication that bring teachers, students, researchers and artists together to share new ideas, resources and knowledge is more relevant than ever due to the circumstances caused by the COVID-19 pandemic. Distance learning solutions and platforms to help schools, universities and teachers facilitate student-active

learning, share strategies and provide social caring and interaction, which all are necessary in order to minimize learning disruption during the closure periods and through the aftermath of COVID-19. Mediating technology is available, but it is up to us to create the content and safeguard the sense of human presence in the process by preserving the constituent parts of dialogue, interaction, gestures and finely-tuned, intimate and highly responsive communication (Pentland, 2010). A combination of governmental digital strategies, reforms within higher education and the sudden need for distance learning solutions due to COVID-19 serves as the backdrop for this chapter. The starting point of our study is founded on the cross-university Master's Program "Music, Communication and Technology" (MCT) with its associated telematic learning space (the Portal). The development of student-active learning methods in the Portal is coordinated through the research project SALTO (Student-Active Learning in a Two-Campus Organization). We proceed by discussing the concept of presence and several factors related to it. This discussion forms the basis for our survey. After discussing some methodological issues, we look at the results of the survey, then discuss possible explanations and relations to other findings in the literature. We conclude the chapter by briefly suggesting how our research may affect the development of pedagogy, learning spaces and technology. Background To serve increasing numbers of students and meet their expectations of learning anywhere, any time and in any format, universities need to transform and create flexible learning environments. This transformation requires a redesign of learning spaces and pedagogy. Suitable technologies must be acquired to support active learning and create arenas for interaction with the option of sharing experiences, social activities, t h e n ot i o n o f p r e s e n c e i n a t e l e m at i c c r o s s - d i s c i p l i n a ry 79 workspaces and resources, both asynchronously and synchronously, through distance learning, online learning and blended or hybrid learning scenarios. The Norwegian Government has introduced a long-term plan for research in higher education, where digitization and use of new technology will be a part of both the strategy and efforts to simplify, renew and improve the efficiency of higher education (Ministry of Local Government and Modernisation, 2016; Ministry of Education and Research, 2018; Directorate for ICT and Joint Services in Higher Education and Research, 2019). It is a complex task with many factors influencing the organization, quality and effect of cross/multi-campus teaching and learning. However, to navigate this transformation towards functional telematic learning spaces, the main point on the map should be a good user experience which maintains and accommodates social human interactions and engagement, a sense of belonging and presence and, finally, facilitates a good and supportive learning environment across distance, time and space (Anderson & Date-Huxtable, 2011; Bahmani et al., 2019; Bahmani & Hjelsvold, 2019; Lillejord et al., 2017, 2018; Ministry of Education and Research, n.d.; Morgan et al., 2016; Støckert & Stoica, 2018, 2020). MCT "Music, Communication and Technology" (MCT) is one of Norway's first joint Master's programs, run by the two largest universities: the Norwegian University of Science and Technology (NTNU) and the University of Oslo (UiO). The two-year program is hosted by the Department of Musicology at UiO and the Department of Music at NTNU. The Portal and MCT represent a new type of learning strategy and environment that prepares students for the fourth industrial revolution: a future where the borders between the online/offline, physical, digital and biological worlds are blurring, resulting in a fusion of advances within artificial intelligence, machine learning, physical computing, the Internet of Things and other technologies (Kivunja, 2015, p. 444; O'Neill, 2018.; Schwab, 2017; Støckert et al., 2017). c h a p t e r 3 80 The Portal The Portal is a flexible, telematic, shared space and consists of dedicated physical rooms at UiO and NTNU that are interconnected through Uninett (Norway's research and education network). The Portal can be described as a "black box" theatre stage with props to create scenography for several learning scenarios. The physical rooms use mirrored set-ups for defined student-

active learning scenarios with regard to the applied AV equipment and its placement. These mirrored set-ups create the illusion of an extended and shared space. They enhance eye contact and provide the same orientation of people, sound and shared workspaces/ screens when pointing or looking at the same object respectively from each side of the Portal. Nevertheless, the Portal's possibilities and limitations influence the students' and teachers' daily experiences and notions of presence related to activities like human-computer interactions, social interaction, resource sharing, communication and collaboration (Støckert et al., 2019b). SALTO SALTO started in 2018 and is a three-year project within the NTNU Teaching Excellence scheme (NTNU, n.d.; Støckert, n.d.). The NTNU initiative consists of a portfolio of development measures with the purpose of developing innovative approaches to learning, teaching and assessment. The SALTO research project was set up parallel to the MCT program, first to support the design, development and implementation of the Portal, and second to adapt and evaluate "student-centered" activities such as flipped learning, problem-based learning and team-based learning in a cross-campus learning scenario with teams consisting of members from both locations (Bergmann & Sams, 2012; Davidson & Major, 2014; Michaelsen et al., 2004; Støckert et al., 2019a; Xambó et al., 2019a; Xambó et al., 2019b). Working in the Portal, students and teachers explore, evaluate and reflect on educational, methodological and technological strategies together. SALTO documents these experiences through interviews, observations and online questionnaires during the project period (Støckert, n.d.). t h e n o t i o n o f p r e s e n c e i n a t e l e m at i c c r o s s - d i s c i p l i n a ry 81 Presence With today's society's ubiquity of mobile networked technologies and social media, our ideas of "here and now", related to social contact and communication, are deeply affected by the way in which the very same technologies blur the sense of time and space. Mediating technologies often make people appear present to one another, even if they are not sharing the same physical space and time. This form of present absence (Rainie & Wellman, 2012) closely resembles what is often referred to as presence in the literature, which refers to the experience that something or someone is "here and now" through the use of mediation technology. In the context of learning in mediated environments, the concept of presence is often specified as social presence. According to Lowenthal (2010b), the theory of social presence is perhaps the most widely-used theoretical construct to describe and understand mediated interaction in online learning environments. Despite the frequent use of this term, several authors note that there is not a clear, agreed-upon definition of the term (Lowenthal, 2010a, 2010b; Cui, 2013; Kreijns et al., 2014). Nevertheless, we will attempt to delineate some aspects of presence relevant to our inquiry into learning activities in the Portal, which we will subsequently apply in the design of a survey about the topic. These aspects are: attention and compensatory behavior; audio quality and level; video quality, camera perspective and image size; and social awareness and interaction. If we look at attempts to define presence and social presence, many explicitly involve the role of technology. For some theoreticians, the experience of presence is simply the result of "overlooking" or "disregarding" the technology or mediation part of the experience, or accepting the illusion of non-mediation (e.g. Lee, 2004; Lombard & Ditton, 1997). In other words, for presence to occur the mediating technology needs to retreat into the background of the experience while the human participants and their communicative actions need to be in the foreground. This is often seen as a result of selective attention, where the perceiver attends to what is interesting or relevant (the mediated content) while the properties of the medium or communications channel itself are filtered out (e.g. Nash et al., 2000; Schubert et al., 2001; Witmer & Singer, 1998). Thus, selective c h a p t e r 3 82 attention can also be seen as a form of compensation by the receiver, which enhances the content or message of the medium even if the mediating channel degrades or adds noise to the signal. In the research literature on online learning this compensation is also observed (Kock, 2005; Kock & Garza,

2011). Moreover, in media compensation theory it is argued that media users do not passively accept the obstacles posed by the media, but instead compensate for the obstacle by changing their communication behavior, often in an involuntary way (Hantula et al., 2011). Other theoreticians might not explicitly refer to the practice of "overlooking technology" but view social presence more generally as "a theory of how technology might affect, distort, and enhance certain aspects of social cognition" (Biocca & Harms, 2002). The most relevant technologies in this context can be grouped into audio and video. On the audio side, different factors have been related to the experience of presence. Some studies indicate that degraded audio quality will affect the experience of presence negatively (Lessiter et al., 2001; Reeves & Nass, 1996). In a study by Bergsland (2010, p. 230), using a phenomenological approach with vocal sounds only, he argues that the experience of traces of the technology involved in recording or mediation, or the use of audio manipulation techniques, can contribute to directing focus towards the technology and/or mediation, and thereby reduce the sense of presence. Bergsland's findings correspond with the more general view that a degraded sense of "realism" will affect presence negatively (Lombard & Ditton, 1997). Although somewhat lacking in empirical support, Lombard and Ditton's (1997) review suggests that the audio level might have a positive effect on presence, at least up to a point. This is not very surprising, since in real-world settings people who are located close to each other will sound louder, whereas those who are distant from each other will sound softer. Regarding presence and the video side of the technology, Lombard and Ditton (1997) list a number of studies that point to the finding that the properties of a video image such as its size and resolution, as well as the proportion of the visual field covered by the screen relative to the full field, affect the experience of presence. Also, in Lee's (2004) review, presence is closely associated with variables such as image resolution, t h e n ot i o n o f p r e s e n c e i n a t e l e m at i c c r o s s - d i s c i p l i n a ry 83 color quality, clarity of image, image size, field of view and scene update rates. Lastly, Perrin et al. (2016) studied how subjects experienced the sense of presence with three different image sizes, using both subjective and physiological measures, and concluded that the sense of presence was experienced as higher for the largest screen size compared to the smaller ones. In addition to aspects directly related to technology, aspects of social interaction and engagement with mediated others are also often linked to the experience of social presence. For example, Tu (2000) sees interactivity, that is, a two-way exchange with the possibility of immediate response, as contributing to social presence. Similarly, Biocca et al.'s definition of social presence involves an "awareness of the co-presence of another sentient being accompanied by a sense of engagement with the other" (2001, p. 2). Their definition hints at their three-level model of presence ranging from its individual perceptual aspects to the collective and interactive. We find this theory of presence interesting since it involves both individual and collective aspects of the phenomenon which seem highly relevant for the different scenarios in the Portal. At the lowest level of their model they posit perceptual awareness of the spatial co-presence of the other's mediated body. At this level, one can assess the other's internal state of mind or categorize basic properties like gender and age. The middle level posed by Biocca & Harms (2002) is a subjective level characterized by increased attentional (cf. the discussion above), psychological and behavioral engagement with the other. The highest level is one of mutual accessibility, interdependent behavior and shared emotional states. Although this theory embraces many complex aspects of experience and communication, we are in agreement with the idea that different levels of presence and co-presence add valuable nuance to the term. Method In line with a great deal of research on presence and social presence and our focus on the subjective experience of aspects related to presence (Cui et al., 2013) we have chosen a subjective assessment using an online questionnaire. Our respondents were recruited from the first and second-year c h a p t e r 3 84 students on the MCT program, students who are

present in the Portals at either UiO or NTNU on a daily basis. The respondents were not rewarded for their participation. Since it was a fully anonymized web survey, it was not required to notify or apply to the Norwegian Centre for Research Data for research ethical reasons. The questionnaire was implemented in the online survey tool Select. Survey.net and had a total of 27 questions divided into four parts (see Appendix A). The first part asked about study year and local campus (NTNU and UiO). The second and third parts had answer possibilities with five Likert items. Of 20 questions, 18 focused on understanding to what extent the students experienced or perceived a certain aspect of presence, or became engaged in particular aspects, with the alternatives being to a very large extent, to a large extent, to a moderate extent, to a small extent and not at all. The last two questions in part three asked about how often the students noted a modified behavior in themselves or in those remotely localized when communicating through the Portal, using the alternatives always, very often, sometimes, rarely and never. The fourth part used free text entry to gather additional opinions. The questions in part two were organized in pairs, asking the same question for issues related to the remote, i.e. where their cross-campus peers are localized, versus the local sides of the Portal, i.e. where the participant and their home-campus peers are localized, in order to compare their evaluations of the same experience, locally versus remotely. For the sake of brevity of presentation, the questions about the remote and local sides of the Portal are presented together using a slash between the question numbers in Appendix A. From the data set we translated all the answers using Likert items into the numbers one to five. We then calculated the proportion of answers falling into the five different categories as a percentage value, and then presented this in column charts for each of the questions. For questions that were given pairwise to assess local and remote aspects of the participants' experiences, the results are presented in the same chart for easy comparison. The results for audio quality and level and video image quality and size are also presented in the same chart for the same reason. t h e n ot i o n o f p r e s e n c e i n a t e l e m at i c c r o s s - d i s c i p l i n a ry 85 Results In total, 16 questionnaires were submitted. This is over two thirds of the total number of students in the MCT program.1 Of these 16, ten were firstyear students and the remaining six were second-year students. Regarding location, nine were students in Oslo and seven in Trondheim. Since at the time of the study there was only one active female student in the program, there was little point in asking about participant gender. Using the quantification of the Likert items, we calculated the average rating with standard deviations for each of the questions in Table 1 (Appendix B). Furthermore, the distribution of answers is shown in Figure 1 (Appendix B). If we look at questions 3–14, which were related to different aspects of presence, the responses indicate that the sense of presence locally and remotely taken together is somewhere between moderate and large ($M = 3.63$, $SD = 0.67$). Comparing the responses for the remote condition ($M = 3.02$, $SD = 0.68$) with the local condition in Table 2 ($M = 4.23$, $SD = 0.73$), we see that the difference between the average ratings is more than a whole Likert item (M diff = 1.21). The difference between the remote condition and the local condition is also very evident if one compares Figure 3 with Figure 4, showing the Likert item distribution for the remote and local conditions, respectively. Moreover, doing a two-tailed Mann-Whitney U Test gives a z-score that indicates that the difference in conditions is statistically significant ($z = –8.40652$, $p = 0.00001$). All this indicates that, in the remote condition, the different aspects of presence are markedly affected in a negative direction by the mediating technologies in the Portal, compared to the largely unmediated interaction in the local condition. As for the results regarding the technological factors affecting the level of engagement with students and teachers on the remote side of the Portal, as seen in Table 3 and Figure 2, the mean ratings are relatively high for audio quality ($M = 4.00$, $SD = 1.22$) and audio level ($M = 3.75$, 1 Although for one submission not all answers were completed, we chose to include the data from the respondent in the data set

since the missing answers were the free text ones and, thus, it did not affect the calculations based on the Likert items. c h a p t e r 3 86 SD = 1.39), whereas the ratings for video, including video image quality (M = 3.25, SD = 1.20), video image size (M = 3.38, SD = 1.27), and video image perspective/camera placement (M = 3.06, SD = 1.39) are somewhat lower. Comparing the averages for the questions about audio (M = 3.88, SD = 1.31) and video (M = 3.23, SD = 1.29) respectively, we can observe that the students rated aspects of audio as more than a half Likert item (diff = 0.65) above that of the video aspects when it comes to the level of engagement with remotely localized students and teachers. Two of the questions addressed compensatory behavior, i.e. whether there is any modification in behavior in the face of the mediating technology. Here, one question (21) addressed how often the respondents had experienced this for themselves, whereas the other (22) addressed whether they would like fellow students to modify their behavior to appear more present to them. The results for these two questions (Q21: M = 3.63, SD = 1.11, Q22: M = 3.81, SD = 1.13) differed by 0.18, thus, not very marked. It must be noted, though, that both these ratings are closer to "very often" than "sometimes", and that the modification of behavior is something that the respondents experience goes both ways. When we looked at the free text, the answers referring to presence and engagement in the Portal, issues related to audio, video and modification of behavior recurred. Overall, as many as half of the responses addressed issues of technology. Moreover, 7 out of the 16 mentioned audio level and/or quality as the factor that is most important in making remote teachers and students more present, whereas another 7 of the answers mentioned video image size, quality and/or perspective for the same questions. Other factors not brought up in the Likert-item questions were mentioned in the free text questions, often as positively or negatively affecting engagement and presence. These included speaking clearly (3 responses), the placement of the microphone and/or speakers relative to each other (2 responses), audio feedback (2 responses), the tidiness of cables and equipment (2 responses), the predictability of the technical set-up (2 responses), gazing into laptops (2 responses), having only one person speaking at a time (2 responses), attentiveness toward others on the remote side of the Portal, noise from touching/moving objects (1 response) and group work (1 response). t h e n ot i o n o f p r e s e n c e i n a t e l e m at i c c r o s s - d i s c i p l i n a ry 87 Discussion Our main finding is that students on the MCT program experience a higher degree of presence for those who are co-present locally compared to those who are connected via the audiovisual technology of the Portal. These findings are in accordance with several older studies comparing face-to-face settings with computer-mediated communication, favoring the former (Miranda & Saunders, 2003; Rice, 1993). Going into more detail, we can look at Table 2, presenting the difference in average ratings between local and remote conditions. Since the questions in part 2 are formulated in pairs, so that the same aspects are addressed and that the only difference between them is that the aspects relate to the "local" or the "remote" partners in the communication, the difference between them can, at least in part, be explained by the mediating technologies involved. A larger difference will therefore indicate that the mediating technologies play a larger part, whereas a smaller difference will indicate that the effects of the mediating technologies are more modest. Here, we can observe a relatively small difference for two question pairs referring to concrete learning scenarios (teacher/student presentations and open discussions) and engagement and attention relative to these factors (Q7 & Q8; Q9 & Q10). The lower differences in ratings between local and remote suggest that the mediating technologies pose fewer problems in these scenarios and that the difference in the sense of presence between local and remote is lower. For the question relating to student or teacher presentations this result might be partly explained by our practice of displaying the presentation slides on our main screen, regardless of whether the presentation is local or remote. Thus, if the students focus solely on the presentation slides there is no difference between local and remote

presentations. For the other question pair about engagement in open discussions, however, one would think that even with high quality audio and video the difference would be greater. Also, it might be a little puzzling that the difference in rating for questions 11 and 12 about interaction with teachers and student peers between local and remote is 0.5 of a rating point higher, with the remote average being as low as 3.0. One explanation could be that "engagement" is a more passive form of c h a p t e r 3 88 participation, in which one pays attention and follows what is said, and that "interaction" is a more active one. Paying attention to a presentation or a discussion might therefore be experienced somewhat similarly. This explanation could also be supported by the responses to some of the other questions. At the other end of the scale, we found a more marked difference for local versus remote for the questions about the students' experiences of sharing a common social space with their peers (Q5 & Q6). With more than one-and-a-half Likert-item average difference (diff = 1.56) between the ratings, and among the two lowest overall average ratings for the remote question (Q5: M = 2.69, SD = 0.68), it seems that the Portal as an audiovisual communications channel represents a major obstacle when it comes to mediating social relations when compared to the learning space of the co-present local peers. The questions about whether the students experience that they are present together with other students (Q13 & Q14), and about the degree to which the students experience that their peers are present and able to perceive them (Q3 & Q4), give a similar impression, although the differences between local and remote are somewhat less pronounced (Q3&Q4: diff = 1.38, Q13&14: diff = 1.38). Our findings indicate that social aspects of presence and the impression of being together in the Portal are more difficult to achieve than presence and engagement in more formalized settings. This is also supported by some anecdotal observations from the social get-together in the Portal with students and staff before Christmas 2019. This occasion was the last time the students gathered before the Christmas break and the teachers had provided food and drinks. Apart from one spontaneously-initiated activity, namely singing the birthday song for one of the students, minimal social interaction happened through the Portal. In a situation where one could both see and hear the people on the other side, participants consistently chose to talk and interact socially with those gathered locally. Thus, the overall impression is that for the more structured and guided activities that are a part of the learning situation, communication through the Portal is less different than communication with local students and teachers, whereas for the social aspects of communication, the Portal is more of an obstacle. However, there are other factors that might t h e n ot i o n o f p r e s e n c e i n a t e l e m at i c c r o s s - d i s c i p l i n a ry 89 play a part here. It is natural that the level of social interaction outside of the formal teaching hours would be greater between the students at each campus, e.g. in lunch breaks and other breaks. The Portal is typically not the place where the students have their breaks, and in both Trondheim and Oslo, the areas for coffee and lunch breaks are located outside of the Portal, called the "decompression area" for a good reason. Still, it might be important to facilitate less formal social activities in addition to formal learning in the Portal in the future. Research like that of Hommes et al. (2012), who found that among medicine students, informal social interaction was strongly associated with their learning, indeed points in this direction. There are also interesting findings about the technological aspects of the Portal in our study. First of all, technology appears to be important for the engagement of the students. The questions that addressed to what degree different technological aspects affected the engagement with students and teachers (Q15-Q19, see Table 3) showed that the students rated these aspects higher than to a moderate extent (M = 3.29, SD = 1.29). But perhaps more interestingly, different technological aspects were also addressed in half of the free text responses. Second, it is interesting to note how the experience of audio quality and level affected the engagement with students on the remote side of the Portal, and that these aspects (Q15 & Q16, M = 3.88, SD = 1.31) were rated on

average half a rating point higher than for video image quality, size and perspective (Q17, Q18 & Q19: M = 3.23, SD = 1.29). Although these questions were about engagement and not directly about social presence, this was perhaps surprising, at least in the light of some of the early social presence research which regarded video as evoking a higher sense of social presence than audio (Lowenthal, 2010b). One explanation for our findings might, naturally enough, be the nature of the MCT program itself, with courses that focus mostly on audio and music, and the majority of students having an interest in or a background involving sound and/or music. Although this would likely give the students a bias, it might also reflect how different channels of audio communication can make a difference to interaction and engagement. The Portal in its current state is, for example, set up with LoLa, software for uncompressed and low-latency audio communication c h a p t e r 3 90 over the Internet, as the first choice for audio, whereas "off-the-shelf" videoconferencing tools, that use compressed and gated processing, is the back-up solution. As teachers, we have observed that the back-up solutions are considerably more tiring to attend to than the uncompressed one, and have also picked up signals from the students that they experience the same. Furthermore, our findings show the importance of modifying behavior to adapt to the technology. When the students were asked about their own behavior and the behavior of those on the remote side of the Portal, their answers clustered between "sometimes" and "very often." Moreover, even if the free text answers perhaps do not point in any single direction, collectively speaking they still bring up several different topics related to the modification of behavior, including speaking one at a time, talking with clear enunciation, talking into the microphone, gazing into laptops and more. These types of behavior fit well with the behaviors described in the so-called media compensation theory, mentioned in the theoretical section above. One might think that students would modify their behavior automatically, but the fact that the students both remember doing this themselves frequently and also wanting their remote peers to do it indicates that they need to be intentional and conscious about adapting their behavior to compensate for the technology. Thus, it is apparent that it is not enough to design learning spaces filled with different communications and learning technologies; it is also important to focus on how students as well as teachers interact and adapt to the same technologies. Conclusion and Outlook How and to what degree do the students in the MCT program experience different aspects of presence in a cross-campus telematic learning space such as the Portal? Our study suggests that students on the MCT program experienced aspects related to presence differently for those who were localized remotely compared to those who were co-localized. The experience of various aspects of presence is clarified with the following points of distinction: t h e n ot i o n o f p r e s e n c e i n a t e l e m at i c c r o s s - d i s c i p l i n a ry 91 a) For structured learning scenarios, attention, engagement and the sense of social presence is not so much affected by the technological mediation provided by the Portal. b) For the social aspects of presence, however, the differences seemed to be more marked, and we noted how some anecdotal observations pointed in the same direction as our results. c) We observed how the students reported media compensatory behavior on their own behalf as well as for their peers. d) Lastly, different forms of technology appear to be important for the engagement of the students, and our findings indicate that aspects related to audio are more important than aspects related to video. As our findings indicate that audio quality is ranked higher than video quality, we recommend enhancing and preserving the auditory quality (Bower et al., 2017; Zydney et al., 2019) from sender to receiver. Good acoustics in the telematic space are crucial to obtain speech intelligibility and good listening conditions. No moderately-priced technology can really compensate for poor room acoustics. The combined space layout and technology must deliver enough quality in the audiovisual domain to preserve aural and visual cues (human signals) like eye-contact and body language, to enhance online, social,

cognitive and teacher presence across distance. It must create a “stage” where people can interact, build trust and understand that audiovisual cues have an impact on teaching, student-active learning, group work and interpersonal dynamics (Pentland, 2010; Yu et al., 2020). Based on the findings regarding structured learning scenarios and media compensatory behavior, it is crucial to establish a common understanding of the concepts, rules, etiquette, interaction and how to behave on the “stage” in an online learning space. In other words, to attain a common understanding among participants of what we want to achieve and how to get there. This will require teachers and students working together on the same team, whether it is a cross-campus or a shared telematic/blended/hybrid learning space. It is hard to make predictions, especially about the future of telematic learning spaces. However, a vision might be to create a new shared arena for lifelong learning, accessible for c h a p t e r 3 92 all, enabling cultural exchange and social interaction, playing and learning together, and safeguarding the sense of human presence and mutual respect in the process.

Acknowledgments The authors wish to thank the students who participated in the study. Also, we would like to thank MCT teachers and administration for their help in the realization of this study. This research is conducted as a part of the SALTO project (Student-Active Learning in a Two-Campus Organization) and is funded by NTNU Toppundervisning.

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in the Portal? t h e n ot i o n o f p r e s e n c e i n a t e l e m at i c c r o s s - d i s c i p l i n a ry 99 Appendix B Tables with Results Table 1: Average Rating with Standard Deviations for Questions 3–22. Question # 3 4 5 6 7 8 9 10 11 12 M 2.94 4.31 2.69 4.25 3.50 4.31 3.38 4.19 3.00 4.31 SD 0.43 0.77 0.68 0.83 0.71 0.58 0.70 0.73 0.61 0.58 Question # 13 14 15 16 17 18 19 20 21 22 M 2.63 4.00 4.00 3.75 3.25 3.38 3.06 2.75 3.63 3.81 SD 0.93 0.87 1.22 1.39 1.20 1.27 1.39 1.30 1.11 1.13 Table 2: Local and Remote Average Values and the Differences Between Them for Questions 3–14. Remote Local Question # M SD Question # M SD Diff 3 2.94 0.43 4 4.31 0.77 1.38 5 2.69 0.68 6 4.25 0.83 1.56 7 3.50 071 8 4.31 0.58 0.81 9 3.38 070 10 4.19 0.73 0.81 11 3.00 0.61 12 4.31 0.58 1.31 13 2.63 0.93 14 4.00 0.87 1.38 Avg. 3.02 0.68 4.23 0.73 1.21 Table 3: Average Values for Questions 15–19 about Audio and Video Aspects. Audio Question # M SD 15 4.00 1.22 16 3.75 1.39 Q15–16 3.88 1.31 Video Question # M SD 17 3.25 1.20 18 3.38 1.27 19 3.06 1.39 Q17–19 3.23 1.29 Q15–19 3.29 1.29 c h a p t e r 3 100 0% 0% 0% 0% 0% 6% 6% 12% 19% 50% 12% 31% 94% 94% 81% 81% 75% 75% 50% 50% 19% 12% 6% 6% 6% 6% 19% 19% 25% 19% 44% 38% 62% 38% 81% 62% Q14 Q13 Q12 Q11 Q10 Q9 Q8 Q7 Q6 Q5 Q4 Q3 100 50 0 50 100 Percentage Response 12345 Figure 1: Bar Plot for the Results of Twelve (Q3–Q14) Five Point Likert Item Questions (n = 16). 0% 0% 7% 0% 20% 14% 13% 40% 87% 87% 80% 73% 67% 57% 47% 47% 13% 13% 13% 27% 13% 29% 40% 13% Q22 Q21 Q20 Q19 Q18 Q17 Q16 Q15 100 50050 100 Percentage Response 1234 5 Figure 2: Bar Plot for the Results of Eight (Q15–Q22) Five Point Likert Item Questions about Technological Factors (n = 16). t h e n ot i o n o f p r e s e n c e i n a t e l e m at i c c r o s s - d i s c i p l i n a ry 101 6% 12% 19% 50% 12% 31% 50% 50% 19% 12% 6% 6% 44% 38% 62% 38% 81% 62% Q13 Q11 Q9 Q7 Q5 Q3 100 50050 100 Percentage Response 1234 5 Figure 3: Bar Plot for the Results of Six (Q3, Q5, Q7, Q9, Q11, Q13) Five Point Likert Item Questions for the Remote Condition (n = 16). 0% 0% 0% 0% 0% 6% 94% 94% 81% 81% 75% 75% 6% 6% 19% 19% 25% Q14 19% Q12 Q10 Q8 Q6 Q4 100 50050 100 Percentage Response 1234 5 Figure 4: Bar Plot for the Results of Six (Q4, Q6, Q8, Q10, Q12, Q14) Five Point Likert Item Questions for the Local Condition (n = 16). 103 Citation of this chapter: Nguyen, T. (2020). Gamification and formal practice: A pilot study on gamification's contributions to Early Childhood Student Teachers' musical practice. In Ø. J. Eiksund, E. Angelo, & J. Knigge (Red.), Music technology in education – Channeling and challenging perspectives (pp. 103–129). Cappelen Damm Akademisk. https://doi.org/10.23865/noasp.108.ch4 Lisens: CC BY-NC-ND 4.0. chapter 4 Gamification and Formal Practice: A Pilot Study on Gamification's Contributions to Early Childhood Student Teachers' Musical Practice Thomas Nguyen Queen Maud University College of Early Childhood Education Abstract: Practice is, and will always be, one of the fundamental ways of attaining musical skills. However, the efficiency of skill acquisition will be dependent on the quality and quantity of musical practice. On the one hand, a learner can be dedicated in their practice, seeking guidance to improve their own weaknesses and strategize their practice time, reminding us of formal practice. On the other hand, a learner can lack dedication or even be amotivated by practicing without effort or goals, reminding us of informal practice. This pilot study explores how gamification can potentially contribute to formal practice and song acquisition, incorporating game elements like reward systems, level gaining, competition, cooperation, storytelling, and goals into a ukulele and song course. This intervention design tested early childhood student teachers (n = 60) at Queen Maud University College (DMMH) of Early Childhood Education. Keywords: gamification, game elements, deliberate practice, formal practice, ukulele, singing, motivation, pilot study, exploratory study, intervention design Whether training to become an athlete or practicing as a musician, one can systematically repeat dedicated exercises to achieve improvement (Martin, 2008). When Muhammed Ali was hitting a punching bag for one hour each day, he was perfecting specific punching techniques by c h a p t e r 4 104 using immense amounts of

repetition, focus, and dedication. Similarly, repetitive and concentrated practice on the specific chord progression D, A, B minor and G, would prepare the ukulele player for the song “I’m yours” by Jason Mraz. In both these examples, deliberate practice is recognized, in which a student practices in a goal-oriented, determined, and concentrated manner (Barry & Hallam, 2003; Bonneville-Roussy & Bouffard, 2015). Ericsson and Lehmann (1999) describe deliberate practice as “structured activity, often designed by teachers or coaches with the explicit goal of increasing an individual’s current level of performance” (p. 695). However, Bonneville-Roussy and Bouffard (2015) stress that deliberate practice alone insufficiently explains optimal practice, and suggest the term formal practice as an integrative framework incorporating two additional components, namely self-regulation strategies and practice time. Self-regulation is further characterized by the student’s ability to reflect on his or her strengths, weaknesses, learning capability (metacognition), and practice environment (McPherson & Zimmerman, 2002). Practice time is the third component, described as the total amount of an individual’s contributed practice (Bonneville-Roussy & Bouffard, 2015). Several studies by motivational theorists indicate that a subject’s perception of musical competence strongly influences their potential to practice (Bonneville-Roussy & Bouffard, 2015; Hallam, 1998; McPherson & McCormick, 1999). The self-efficacy principles include experiences of successes and failures, social comparisons, the nature and quality of the feedback received, and psychological and emotional reactions to the task (Bandura, 1986, 1993). Utilization of self-confidence, resources, motivation, and effort predict musical achievement (Hallam, 2013). On the one hand, lower achievers may be deluded by never being able to learn an instrument because of their innate skills, reflecting poorly on their musical self-efficacy, consequently resulting in limited practice. On the other hand, higher achievers believe that they are musically gifted and competent, and they spend more time on practice and better strategize their practice (Bonneville-Roussy & Bouffard, 2015). Furthermore, based to a large extent on the research by Ericsson et al. (1993), it is suggested that practitioners with higher levels of expertise better g a m i f i c at i o n a n d f o r m a l p r a c t i c e 105 understand the fruits of optimal practice, thereby incorporating deliberate practice. Educational science often tries to explore the effect of different learning strategies and techniques, typically to appeal to and motivate students. A recent, and maybe more untraditional endeavor, is the gamification approach, where elements from video games are appropriately incorporated to solve problems, encourage learning and stimulate a positive learning environment (Kapp, 2012). However, research on gamification focuses on motivation and achievement, and less on the actual quality and quantity of practice. During two weeks, O’Neill (1997) discovered more quantity of practice present with higher-achieving beginning instrumental music students than lower-achieving students. She also observed a relationship between their motivational profile and the effectiveness of practice. To better comprehend and predict musical achievement one must study both the quantity and quality of practice (Barry & Hallam, 2003). This study recognizes gamification and formal practice as two key concepts. Based on these concepts theoretical and empirical findings produced the main research question: How can gamification (independent variable) contribute to early childhood student teachers’ formal practice (dependent variable)? Furthermore, the research design tests analytical methods, gamified elements, questionnaires, learning material, and other means of gathering data in a viable and ethical manner. Assessment of these findings should prove valuable for the main trial, where a more comprehensive design may explore significant effects of gamification on formal practice, keeping the advantages of the pilot study and simultaneously avoiding the pitfalls. Theory Gamification Research literature stresses that digital tools can support music didactical teaching (Paule-Ruiz et al., 2017). An ocean of music applications, software, and other digital learning tools focus on making the learning c h a p t e r 4 106 experience more accessible,

motivating, attractive, and efficient. There is a consistent flow of new and sometimes revolutionary technology to enhance education. However, one must critically evaluate these applications before incorporating them into a learning environment, because not all of them are necessarily optimal for music learning. In a study of eight test participants with a wide variety of musical backgrounds, Graham and Schofield (2018) assess how students perceive Rocksmith as a learning tool to improve on the guitar, concluding that users tend to use the music application more as a video game than a learning tool. Some music applications can be immensely entertaining, but not necessarily as musically beneficent (Paule-Ruiz et al., 2017). These applications are seldom on their own automatically beneficent on the student's musical skill development; it depends on how the student or educator utilizes it. For example, music applications like Yousician, Rocksmith, and Rock Band measure if the player performs the right note, at the correct rhythm and pitch (approximately, but not always very accurately), and are rewarded accordingly by unlocking rewards and more content (Miller, 2013). The technology often does not evaluate the quality (timbre and fullness) of the tone, but merely confirms the tone produced. Rocksmith contains some in-game reminders on correct guitar technique, but forums frequently request more in-person video instructions (O'Meara, 2016). According to deliberate practice, a student must get sufficient feedback on ways to improve; something a teacher would typically do (Ericsson & Harwell, 2019). By incorporating the guidance of a teacher, the students could learn through Rocksmith more beneficently. A teacher with sufficient insight and skills on the guitar (or similar string instruments, like the ukulele) could provide feedback on strumming and fingering techniques, guiding the student towards creating satisfactory sounds with correct usage of their right and left hands. The educator must obtain sufficient competence and reflection regarding the usage of ICT, music, and didactics, thereby creating productive learning environments and avoiding potential pitfalls (Paule-Ruiz et al., 2017). In educational music video games, players engage in musical content through some sort of gamified software. There has been extensive research on the implementation of educational games in various learning g a m i f i c at i o n a n d f o r m a l p r a c t i c e 107 environments (Barton & Stacks, 2019; Birch & Woodruff, 2017; Graham & Schofield, 2018; Nebel et al., 2016). Both Yousician and Rocksmith are video games based on playing an actual instrument to progress in levels and challenges. In the study of Graham and Schofield (2018), two test experiments observed how participants would utilize Rocksmith as a learning tool for guitar. Despite the participants perceiving Rocksmith more as a video game than a learning tool, the in-game progression and leveling system seemed to motivate them to play the guitar through the game. Participants of both studies experienced playing Rocksmith as a fun, entertaining, and beneficial way of learning some aspects of the guitar, however, with some frustrations regarding technical issues. Rocksmith is a videogame, which often is "a system in which players engage in an abstract challenge, defined by rules, interactivity, and feedback, that results in a quantifiable outcome often eliciting an emotional reaction" (Kapp, 2012, p. 7). These quantifiable outcomes are experience points, unlocks, badges, achievements, and other measurements of the player's progression (Dicheva et al., 2015). Rocksmith and other similar musical video games use in-game contributions to motivate players to learn an instrument through the video game itself (Graham & Schofield, 2018). Using gamification does not necessarily imply using an actual video game. "Gamification is using gamebased mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems" (Kapp, 2012, p. 125). Gamification is all about extracting the game mechanics, or game elements, of a video game into a learning environment, whether it is an actual video game or not. These game elements are the driving forces behind a video game, which makes them motivational, exciting, and sometimes even addictive. Gamification occurs when we make use of these elements in a non-game context to motivate and increase interest around an activity, like learning an

instrument, exercising, and drilling mathematical equations (Deterding et al., 2011; Gee, 2008). The vast amounts of existing games contain numerous gaming elements, exploited differently from game to game. Examples of game elements are abstractions of concepts and reality, goals, rules, conflict, competition, cooperation, time, reward structures, immediate feedback, levels, storytelling, aesthetics, and replayability (Gee, 2007). c h a p t e r 4 108 One research study specifically surveys the motivational effects of gamification on two groups of young piano students, consisting of a control and a experimental group of ten people each over nine weeks. Here, Birch and Woodruff (2017) assessed how gamification could affect their practice on technical disciplines, like arpeggios, scales, chords, and fingering. Through completing different piano exercise challenges, recorded on an online website called "Technique Tower," the students obtained badges, points, and level achievements. Furthermore, they found that the experimental group had significantly higher achievement scores than the control group. Similarly, with Graham and Schofield (2018), the students in this study also experienced some frustration with the technical aspects. Birch and Woodruff (2017) also recognized an increase in manual labor for the teachers, especially when monitoring students' practice recordings, and suggested more automated solutions for future studies. In a single case study with three groups totaling 75 students aged 10–13 years, consisting of a control group (n = 25), experimental group A (n = 26) and experimental group B (n = 24), Gomes et al. (2014) introduced a gamified journey with step-by-step challenges to unlock new content. Here they discovered that both the experimental groups became more internally motivated in music skill acquisition. Gamification and Motivation According to Ryan and Deci (2000), "motivation concerns energy, direction, persistence, and equifinality – all aspects of activation and intention" (p. 69). Recent research on gamification and musical achievement tends to focus on how motivated an individual is for musical practice (Birch & Woodruff, 2017; Gomes et al., 2014; Graham & Schofield, 2018). This might not be surprising as motivation is a core concept of video games and, simultaneously, a crucial predictor of musical practice. Why else would anyone do anything in a video game, or by gamification, if it was not motivating? For a video game to be successfully engaging, its design must induce the player to progress and chase achievements, typically through positive encouragement like quantifiable rewards, such as badges, money, items, experience, and levels (Kapp, 2012). g a m i f i c at i o n a n d f o r m a l p r a c t i c e 109 The reward systems of video games are often negative and positive stimuli that affect the player to make decisions, reminding us of Skinner (1965). Extrinsic motivation compels learners to act to attain separable outcomes, often focused on obtaining future achievements that typically reward recognition from their teachers, peers, or parents (Sansone & Harackiewicz, 2000). Within self-determination theory, Deci (1985) stresses that when learning an instrument is forced upon by, for example, a study program, it might be alienating if not identifiable with any personal interests or goals. On the other hand, when learning to play an instrument is self-determined, externally motivated tasks would be more appealing, and intergraded regulation is present (Ryan & Deci, 2000). Research by Bruner (1966) acknowledged that the sheer amount of positive or negative stimulus could not predict a decision to act or not, and stressed that motivation is a more complex phenomenon. By addressing the importance of intrinsic motivation, one acknowledges that learners act for the sake of their own innate psychological needs. The action rewards enjoyment, provides learning, and evokes feelings of accomplishment, which is identifiable with the learner's goals and interests (Deci & Ryan, 2000). When the gaming experience itself is rewarding enough, often because of its aesthetics, opportunities and provided autonomy, the player decides based on his or her inherent interests and psychological needs. This is recognizable as intrinsic motivation within a video game (Kapp, 2012). In this regard, Denis and Jouvelot (2005) stress that selfdetermination theory may highly qualify to identify motivational effects of gamification,

especially on music learning, mainly because of its core components of innate psychological needs. Deci and Ryan (2000) describe amotivation as “the state of lacking the intention to act” (p. 72). Amotivation may occur when the learner does not expect the action to generate a desirable outcome (Abramson et al., 1978), the learner does not value the action in accordance with their own interests and goals (Ryan, 1995), or when the learner does not feel competent to act successfully (Bandura, 1986). In a research design on how gamification may motivate musical practice, these amotivational principles may address some potential pitfalls. A recent study on the application Habitica, incidentally the same application used for the study presented c h a p t e r 4 110 in this chapter, suggested that the gamified environment also had pitfalls that can lead to counterproductive effects, potentially leading to amotivation (Diefenbach & Müssig, 2019). These pitfalls regarded negative user experiences with the reward/punishment system and psychological reactions to counterproductive effects. Another study, based on 115 students playing an educational game-mode within Minecraft, deep-dived into the aspect of social competition, suggesting both positive and counterproductive effects (Nebel et al., 2016). Since both studies are limited in focus to only one game each, there cannot be any general assumptions on these counterproductive effects on games in general. However, these studies still point to potential pitfalls, warning educators to be careful and prepared when designing a gamified learning environment. A music learner is likely to practice as a result of different sources of motivation, both intrinsic and extrinsic (Lehmann et al., 2007). Formal Practice A general definition of practice is “repeated performance or systematic exercise for the purpose of learning or acquiring proficiency” (Cayne & Lechner, 1987, p. 787). An athlete would call it either training or practice since the two concepts are synonymous when doing sports. To the professional musician, practicing is to learn and improve proficiency through systematic exercises and experiences, and therefore is a crucial ingredient for musical skill acquisition (Austin & Berg, 2006). In the case of Schatt (2011), practice is referred to as “one of the most fundamental musical behaviors necessary to achieve success on a musical instrument” (p. 2). To understand the concept formal practice, one must deep-dive into the three components it consists of. These are deliberate practice, self-regulation, and practice time. Bonneville-Roussy and Bouffard (2015) stress that past research often addresses these components separately with musical achievement. Consequently, they constructed an integrative framework of formal practice as an analytical tool to address the three components as interactive elements. The framework was tested in a four-month prospective study on 173 music students between the ages of 17 and 30. They concluded that their framework would better predict musical achievement g a m i f i c at i o n a n d f o r m a l p r a c t i c e 111 than only assessing one of the components (Bonneville-Roussy & Bouffard, 2015). Practice time is one of the vital components of Bonneville-Roussy and Bouffard’s (2015) integrative framework, and describes the sheer quantity of minutes, hours, days, and years of contributed practice. Practice time is considered either formal or informal. Informal practice, which has been defined in various ways in literature, is typically playing songs that are already easily mastered, improvising, playing by ear, or just “messing about” (Barry & Hallam, 2003). Regarding informal practice, Platz et al. (2014) distinguish “between mere experience (as non-directed activity) and deliberate practice” (p. 1). Deliberate practice and self-regulation are often associated with high music achievers, while lower achievers tend to practice more informally (Ericsson et al., 1993; Krampe & Ericsson, 1996). Although according to the findings of Sloboda et al. (1996) high achievers are likely to report more informal practice than their less successful peers. By this they conclude that the highest achieving students have found the right balance between disciplined and free practice. Since deliberate practice often requires effort and hard work it is not inherently enjoyable (Lehmann & Davidson, 2002), especially since deliberate practice generates no immediate momentary rewards or accommodations (Ericsson et al., 1993;

Krampe & Ericsson, 1996). In spite of researchers seeing informal practice as inferior to formal practice, informal practice is still practice. Beginners tend to practice more informally, while advanced musicians more often incorporate formal practice strategies (Barry & Hallam, 2003, Krampe & Ericsson, 1996). There is an overall understanding that practice time predicts musical achievement, especially if one practices in a goal-oriented and focused manner, focusing on improving weaknesses (Barry & Hallam, 2003; Birch & Woodruff, 2017; Bonneville-Roussy & Bouffard, 2015). It is then recognized as deliberate practice (Ericsson et al., 1993), which a second vital component of formal practice mentioned. Neurological research sheds light on the neurological aspects of deliberate practice, describing how the neurons and synapses between them become more efficient and permanent if the human subject repeats a set of actions, described through processes like synaptogenesis, myelination, and pruning (Hallam, 2010). c h a p t e r 4 112 Practicing the chord change from C to G could be an example of this process. At first, the ukulele player would spend time on mapping finger movement, especially when moving them simultaneously. After repeating this change after a set number of times, in a focused and dedicated manner, it would become easier and faster. For each successful chord change, neurological paths become more and more wired to execute this specific action. In a study of three groups of violin students, recruited from the Music Academy of Berlin, Ericsson et al. (1993) suggest that a key to musical skill acquisition is the amount of time spent on deliberate practice. The three groups consisted of the 'best' group, the 'good' group, and the 'least accomplished' group. By studying recordings of the violinists' practice time, Ericsson et al. (1993) concluded that the differences in their level of expertise directly correlated with differences in the amount of deliberate practice time. In a later study on older expert and accomplished amateur pianists, Krampe and Ericsson (1996) argue that deliberate practice is essential for their original acquisition of musical competence, but also for maintaining their musical skills towards middle-age and adulthood. Here the amount of deliberate practice is most fruitful when the piano students participate in formal piano education, showing the importance of a mentor's influence on a music student (Ericsson & Harwell, 2019). Subsequent research adopting a similar approach by Sloboda et al. (1996) involved interviewing 257 young people aged between 8 and 18. They were practicing different types of instruments at different levels of expertise within the classical domain, and similar findings to Ericsson et al. (1993) and Krampe and Ericsson (1996) were found: High achieving musicians practiced more deliberately, sustained more day-to-day practice routines and, interestingly, tended to practice more in the morning than moderate and lower achievers. Also, some young musicians managed to obtain highlevel grades with much less practice time than others with similar levels of expertise. One could then hypothesize that these musicians maybe had an adequate understanding of deliberate practice and strategizing their practice time (self-regulation). Through a similar study of 109 violin and viola students aged 6–16 at various levels of expertise, Hallam (1998) found that levels of expertise would be best predicted by the quantity of g a m i f i c at i o n a n d f o r m a l p r a c t i c e 113 practice and length of time playing an instrument. These findings predict musical achievement when sufficient practice time is present, especially if deliberate practice is recognized. However, while time spent on repeating dedicated exercises on the instrument is necessary for achievement, research stresses that deliberate practice alone does not explain musical achievement (Hallam, 2013; Meinz & Hambrick, 2010). The third vital component of formal practice is the ability to organize and reflect on the practice itself. Self-regulation is apparent when music students are "metacognitively, motivationally, and behaviorally active participants in their own learning process" (Zimmerman, 1989, p. 329). When individuals learn music through belief in their own autonomy and the ability to obtain specific learning goals, self-regulation is recognized (McPherson & McCormick, 1999). More specifically,

self-regulation strategies can be divided into six dimensions, describing a perspective on key processes involved in deliberate practice (Zimmerman, 1994, 1998); these were further reinterpreted by McPherson and Renwick (2001). In a study of 101 high school woodwind players aged 14–18 over three years, McPherson (1997) assesses the students' capacity to sight-read, improvise, and play by ear and memory. The most proficient instrumentalists possessed a wide variety of practice strategies, resulting from high levels of metacognitive reflection on their ability and improvement. More specifically, some of the clarinetists went through mental rituals before initiating the main activity by chanting a melody before playing it and, in this way, getting the right "feel" and tempo (McPherson, 1997). Hallam (2001) studied fifty-five string players aged 6–18 years and found that effective practice strategy development related to the instrumentalists' musical expertise. Novices' practice strategies were less effective because they more seldom spent time on systematically correcting errors. However, in a further investigation of the relationship between self-regulation and musical achievement, Bonneville-Roussy and Bouffard (2015) stress that too little research has been conducted to provide strong evidence that self-regulation directly predicts musical achievement. In their opinion, formal practice, as integration between self-regulation, practice time and deliberate practice, can generate a more comprehensive understanding of the relationship between practice and musical achievement. c h a p t e r 4 114 In addition to the music student's formal practice time, Ericsson and Harwell (2019) stress that the role of a well-qualified teacher is essential, which is described by three criteria. Firstly, the teacher assesses the specifics of what a music student needs to improve. Secondly, the teacher communicates how the student can reach goals within musical skill acquisition. Thirdly, the teacher describes and presumably designs the practice exercises necessary for this improvement (Ericsson & Harwell, 2019). In a study on beginner music students aged between 7 and 9 years, McPherson and Renwick (2001) observed that these students were not able to recognize their mistakes, and simply played through their repertoire repeating the same mistakes without making any essential improvements. The teacher's (and parents') guidance and expertise are crucial for directing students towards their musical achievement (Davidson et al., 1998). Aims and Objectives This study hypothesizes that gamification can motivate practice and, more specifically, that: 1. Gamification contributes to increased practice time, both formal and informal. 2. Gamification contributes to increasing the student's repertoire through song acquisition. These hypotheses are based on the author's and students' experiences, attitudes and motivations within the gamified environment and learning material. In addition, earlier studies also indicate that gamification contributes to musical practice (Barton & Stacks, 2019; Birch & Woodruff, 2017; Graham & Schofield, 2018; Nebel et al., 2016). However, there is a need for additional research to understand this effect better, which is the aim of the future trial that this pilot study will facilitate. Furthermore, this study aims to examine merits and pitfalls within the research design. The findings and experiences of the pilot study will facilitate a future and more extensive research design, evaluating the feasibility of gamification's g a m i f i c at i o n a n d f o r m a l p r a c t i c e 115 contributions to musical practice (Ross-McGill et al., 2000). With a larger sample size, appropriate analytical methods, a quasi-experimental pretest/post-test scenario, and other modifications, the main trial will try to shed light on the hypotheses. Methods For this pilot study, early childhood student teachers at Queen Maud University College of Early Childhood Education (DMMH) participated in an experimental gamified environment, designed to learn playing the ukulele and songs. This pilot study prepares a future and more extensive trial, assessing the relevance of the theoretical framework and methodology on how gamification can motivate musical practice (Lancaster et al., 2004). In preparation for the main trial, several aspects of the research design were assessed, including the application Habitica, game elements, questionnaire, analytical methods, and tools to gather participant

data. I designed and taught the ukulele and song course for both the control and experimental groups, carefully watching that both groups got the same guidance and learning material, although the only difference was the use/absence of gamified learning elements. Formal practice, informal practice and song acquisition are the dependent variables in question, while the gamified elements are the independent variable that affects the experimental group. Acquiring a song repertoire is mandatory for early childhood student teachers at DMMH and provides a quantifiable measurement that may indicate practice. In addition, for the future trial, correlations between song acquisition and formal/informal practice may shed light on the effects of gamification on musical practice. Participants, Procedure and Measurement Two of my classes consisted of 85 students attending the standard bachelor program for early childhood education. However, the sample size was reduced to 60 participants (N = 60) due to sickness and students ending their program before testing. The age of most participants was between 20 and 24. SPSS calculated the interquartile range, identifying c h a p t e r 4 116 three outliers within the experimental group (aged 31, 37, and 45) and two outliers within the control group (33 and 44). As Table 1 shows, gender distribution was similar for both classes, with a greater number of females than males (which is in line with the student population's gender distribution at DMMH). Table 1. Descriptive Statistics of Participants. Number of participants (N = 60) Control group (n = 29) Experimental group (n = 31) Male/female 24/76 % 23/77 % Mean age (SD) 22.8 (3.7) 23.0 (5.2) The university divides all bachelor students into classes by complete randomization. Therefore, both the experimental and the control group are considered to be randomly assigned. There was one measurement time point after the intervention. Hence, the questionnaire prepares for a future main trial, which will ultimately conduct a proper pre-test/posttest scenario. The university accepts applicants solely based on their average grade from their previous education, and not on any preliminary music audition, nor by any previously-taken music subjects, which often results in varying musical competence within the classes. The study prioritized protecting the students' privacy, confidentiality, and anonymity through an anonymous questionnaire. The students voluntarily signed a participation agreement prior to the study, ensuring that nothing could be traced back to anyone. This pilot study is an experiment to improve music education in affiliation with the research group Music Technology in Education (MusTed), with no external or internal funding. I have been teaching guitar, ukulele, singing, composition, musical theory, and music pedagogy for almost seven years. I have taught and carried out research as an assistant professor at DMMH for almost four years. This study uses a gamified task manager called Habitica as a gamified motivator for the experimental group. Simultaneously, the control group received the same teaching, guidance, lectures, assignments, and learning g a m i f i c at i o n a n d f o r m a l p r a c t i c e 117 material (like video tutorials, PowerPoint presentations, and repertoire). The course also demands 80% physical presence by the students. Other than this, the amount of practice, contribution, and involvement were entirely up to themselves. This pilot study gathers its data through a quantitative and qualitative questionnaire on the students' practice time, attitudes toward gamification, music practice, and musical background. In Habitica, the players could complete 15, 30, and 45-minute practice challenges, eventually stored in the player's history-bank of "completed challenges," showing the total amount of practice time over a given period. The control group was encouraged and reminded to track their practice time through a written diary. The students had to specify if their practice time was informal or formal. Lectures in both classes thoroughly explained the difference. The questionnaire asked the participants the following types of questions regarding their: • Practice time, both formal and informal, like "how much have you practiced formally? Please write the answer in minutes". • Songs and chord acquisition, like "how many songs have you learned? You can select the songs suggested under and write songs learned outside of these." • Attitudes and experiences in the gamified

environment, like “which gamified elements were particularly motivating?” Based on an evaluation of the difficulty of chords and songs, a point system was calculated. A difficult song, demanding changing melodies, chords, and text, could generate up to eight points. An easy song consisting of only a few chords, repeating melodies and texts, could generate down to one point. The sum of the songs equaled a total score of points, representing song acquisition. A similar point system represented chord acquisition, based on fingering difficulty. Intervention Design: Habitica Habitica is an online application based on the principles of a role-playing game (RPG) – a video game genre in which players must interact with c h a p t e r 4 118 the surrounding world from the perspective of their controlled avatar. The avatar typically has several character-specific attributes, skills, and abilities. Players may achieve goals and complete challenges in an RPG, further rewarding them experience points, gold, gear, and other gadgets that help them progress further in the story (Barton & Stacks, 2019). As the “ukulele sensei,” I formed a guild consisting of all the students’ avatars, and from here, we collectively faced adventure, challenges, defeated monsters, and completed quests through ukulele practice and singing. I specifically engineered these challenges to guide the students toward formal musical practice by learning repertoire, correct technique, deliberate practice, and self-regulation (Bonneville-Roussy & Bouffard, 2015). When a student had completed 45 minutes of formal practice, or learned a new song from their repertoire, the student could go into the application and register these accomplishments, unlocking rewards from these challenges. These achievements would also inflict damage on the monsters they were facing. One of the most rewarding endeavors was the song challenge. Each student could individually or in groups record themselves playing and singing a song, send it to the ukulele sensei, and get this song either approved or not approved. In addition, the players had the option to obtain extra rewards by completing bonus challenges within the same song, like playing them by heart or using more advanced strumming or fingering techniques. Based on the song’s difficulty, the players were accordingly rewarded by gold and experience, further used for developing their avatar’s abilities, itemization, consumables, and pets. A gold-star sticker mark, which participants could attach to their ukulele, was also purchasable as an in-real-life (IRL) reward at the cost of 100 gold pieces within Habitica. The control group was given the same challenges, guidance, encouragement, and feedback, but only as regular assignments without the gamified elements. If the players did not get their song approved due to either unsatisfactory singing or playing, I would provide the necessary feedback and guidance for them to complete the song successfully. In Habitica, players could reap the quantifiable rewards through three different systems within Habitica’s task-managing interface, each consisting of a difficulty range between trivial, easy, medium, and hard. All these challenge systems were specifically designed g a m i f i c at i o n a n d f o r m a l p r a c t i c e 119 to promote practice and song acquisition. Formal practice yielded slightly more rewards than informal practice, indicating that focused, structured, and dedicated practice is preferable. • To-Dos are one-time tasks, like “learn how to tune your ukulele” (hard) and “learn ‘Row, Row, Row Your Boat” (medium). When the players completed all their To-Dos, the ukulele sensei initiated another to-do list for the particular player with more difficult onetime tasks, like harder songs and chords. • Dailies are tasks only doable once per day. Habitica rewards the player extra daily-streak bonuses for each consecutive completed daily challenge. Examples of dailies are “practice deliberately for 45 minutes” (hard) and “tune your ukulele” (easy). • Habits are infinitely repeatable challenges, like “practice deliberately for 15 minutes” (easy) and “learn a new song” (hard). Habits sometimes had corresponding tasks with daily challenges, giving the potential of double-completions. I specifically engineered these “conveniences” to appeal to deliberate practice and song acquisition. For instance, completing three habits of “15-minute deliberate practice” would also unlock the reward for the daily challenge of “45 minutes with deliberate

practice", doubling the reward potential for 45 minutes of deliberate practice. To spice up the story and sense of cooperation, the ukulele sensei would also announce upcoming battles and crises in the guild, allowing the players to gain double rewards for completing group challenges. Defeating some monsters required the players to group up, formally practice, rehearse and record songs, and get these approved by the ukulele sensei. In Habitica at Level 10, each player can choose a desired class (rogue, warrior, wizard, or healer), which benefits the party with different types of magic powers, making quests and monster hunting easier. I deliberately had a focus on these factors to enrich the narrative of the game, giving aspects of the game a deeper background story. Players were also able to view other guild members' progression, itemization, and pets, providing elements of competition. c h a p t e r 4 120 Results This pilot study explores a series of analytical methods, potentially relevant for seeing any cause and effect relationships between the dependent and independent variables (or, in other words: differences between the control and the experimental group). Hence, SPSS 26 was used to calculate independent sample t-tests: 1) The formal practice time, measured in minutes, reported by 28 subjects of the experimental group (M = 610.5, SD = 327.0) was higher than the report of the control group's 28 subjects (M = 566.8, SD = 240.7), but did not reach significance. 2) The informal practice time, measured in minutes, reported by the 28 subjects of the experimental group (M = 336.1 SD = 394.9) was higher than the reports of the control group's 28 subjects (M = 303.8, SD = 232.3), but did not reach significance. 3) Song acquisition, measured in song points, reported by 31 subjects of the experimental group (M = 21.94, SD = 19.75) compared to the 28 subjects of the control group, was significantly higher (M = 15.21, SD = 7.57; Welch's t-test, t(39.13) = 1.763, p = .045; d = .45). My in-field role as an educator also allowed assessment of the participants' attitudes and responses to the gamified environment, musical practice, and educational material. Empirical data on both positive and negative user experiences are discussed in the following section. Discussion Intervention Design and Method Evaluating the qualitative and quantitative data of the study gives indications for the main trial. As mentioned earlier, I specifically engineered the environment with gamified elements to encourage formal practice, mainly focusing on increasing song repertoire and formal practice. Some of the students experienced positive encouragement from the gamified elements, stressing things like "I am being tricked into practicing my g a m i f i c at i o n a n d f o r m a l p r a c t i c e 121 instrument to obtain rewards." Twenty out of 31 felt that in-game elements motivated them to practice, and 11 of these 20 felt that quantifiable rewards, like gold, were the most motivating element. Interestingly, participants stress that both in-game rewards and IRL (in-real-life) rewards (the gold star) were significant motivators, with a slight preference for the IRL reward. In this regard, students tended to do tasks that yielded most rewards, like learning songs and practicing formally. Based on experiences like these, the intervention design will further incorporate appealing game elements that encourage deliberate practice and song acquisition. The educator has the power to manipulate the gamified environment by deciding what yields rewards and prosperity, thereby manipulating the players' focus and goals. Similar to other findings (Diefenbach & Müssig, 2019) on the counterproductive effects of gamification, similar pitfalls were recognized. Some unfair and unreasonably hard punishments, like, for example, death, resulted in some frustration by the participants. In future research design, the educator will prepare the participants to approach this game mechanic cautiously. Death is avoidable by buying health potions and recruiting healers for their party, among other things. Preparing the gamer for the dangers and pitfalls of a game could reduce unnecessary frustration in a game, optimizing gamification's effect (Diefenbach & Müssig, 2019; Gee, 2007). In this regard, I discovered an administrational setting that could undo losses, giving the players a second chance, which remedied some of the frustration. However, these administrational settings could also tweak other in-game stats,

and possibly facilitate cheating, since they are accessible to all players. This is something that an educator using Habitica should be aware of. Explaining Habitica in the mandatory classes, correcting bugs, and other misunderstandings were time-consuming and had consequences for the time spent on musical practice. Because of this, the control group had slightly more time on musical practice, since I had to spend some time introducing and explaining the gamified content to the experimental group. Interestingly, the experimental group still reported more practice time and song acquisition. Furthermore, participants needed time to understand and integrate all rules and functions of Habitica. Some c h a p t e r 4 122 students never properly integrated this and decided to avoid using the application. Some students were discouraged due to the complicated content of Habitica and the comprehensive design of challenge systems. For the main trial, I will simplify and clarify the content, removing unnecessary content that might be more confusing than productive, possibly making the gamification more accessible. Based on the reports of this study, I suspect that the gamified content of this intervention design was too complicated. This pilot study explores how quantitative data might look like in the main trial and tests appropriate analytical methods to illuminate these. Measuring any causality between variables requires a comprehensive design like true experimental studies with random controlled trials (RCT). Following this pilot study method will provide randomized groups, at least one experimental and one control group (expandable by four additional classes for each year), and the gamified environment as a research-manipulated variable. Incorporating a true experimental design will further include pre-test and post-test periods over a similar duration. No pre-existing differences or extraneous factors affected the participants, which will also apply to the future main trial (Gribbons & Herman, 1996). The main trial will incorporate formal practice, informal practice, and song acquisition as leading lines of evidence, possibly shedding light on hypotheses. However, more independent and dependent variables may be included in the main trial, like chord acquisition and musical background. Furthermore, qualitative methods may also help shed light on other musical practice perspectives, and are therefore being considered for the main trial. Triangulating qualitative methods, like focus groups, in-depth interviews, and participant observation with quantitative methods, like RCT, may prove valuable and enlightening. Sample A power analysis was conducted to find an appropriate sample size for the main trial (software G*Power, version 3.1.9.3), using a two-tailed test to analyze the means difference between group C and E. With a small effect size (d = 0,2) and alpha error = 0,2 results showed that a total of 128 g a m i f i c at i o n a n d f o r m a l p r a c t i c e 123 participants with two equally-sized groups (n = 64) is sufficient to achieve the power level of 0.80. However, given that each class at DMMH never exceeds the limit of 45 students, two groups for the main trial will be impossible. Therefore, two control groups and two experimental groups will form the sample for the main trial, in theory consisting of at least 64 participants in each class. The main trial will undergo a more comprehensive background check on the participants' musical profiles. Research indicates that high selfperception of musical competence correlates with higher amounts of practice quality and quantity (Barry & Hallam, 2003; Ericsson & Harwell, 2019). These circumstances might then affect the relationship between participants and the intervention design. The Goldsmiths Musical Sophistication Index (Gold-MSI) was created to thoroughly map individual musical profiles based on participants' self-reports on their musical skills and behaviors (Müllensiefen et al., 2014). Another instrument, called "music related competence belief" (KMI), also maps individuals' self-assessment of musical competence and experience (Harnischmacher et al., 2015). Both instruments would give a comprehensive mapping of each individual's musical profile and could serve as relevant covariates for group comparison. A corresponding background check on participants' relationships and experience with video games could potentially be valuable but is yet to be developed. The main trial will also make use of more

extensive tools to examine the participants' motivational profiles, like the Motivation in Music Education Inventory (MMI) by Harnischmacher et al. (2015). Motivation often defines musical action by the individual's willingness and wish to perform. Another examinable factor is the participants' extent of "flow state". Hamari and Koivisto (2014) measure flow in the context of gamification through a comprehensive scale called Dispositional Flow Scale-2 (DFS-2). Even though Habitica typically is not an experience-heavy game, "flow state" can still be a valid factor in both playing the game and playing music. Another limitation of the current study lies possibly in the faultiness of participants' self-reports on practice time. The gathering of quantitative data depends on participants' ability to record their practice time as accurately as possible. Those who utilized Habitica successfully recorded c h a p t e r 4 124 their practice time automatically each time they checked off "x minutes practiced" tasks and was easily retrievable when collecting data. However, those who did not use Habitica, in the control group and some individuals in the experimental group, were given a diary to log their practice time, which they admittedly did not use as often as they actually practiced. Due to this, some students left empty answers in the questionnaire regarding practice minutes, resulting in some missing data. The data will be sounder if future research design incorporates a more precise tool to measure practice time and quality of practice correctly, especially for the control group. An application called Jibble could potentially provide this feature because of its ability to track participants when they "clock in" for musical practice. Another potential application is Clockify, where the user can start a timer when they practice, or manually type in their practice time. On the other hand, inserting another application research design may also overcomplicate things. Having a convenient and accurate way to track practice time (both informal and formal) is yet to be found. Fortunately, the questionnaire was more successful in tracking the actual songs learned by the participants. Using It's Learning (a digital learning management system) proved to be successful in monitoring and tracking completed songs by all participants. Summary This study applies to educators and researchers who seek to motivate musical practice through gamification. Based on observations, user experiences, and questionnaires, several pitfalls and merits surrounding the research design have been discovered, which further provide a valuable foundation for the main trial. Based on the experiences of this study, the main trial will attempt to examine if gamification can contribute any significant effects on musical practice. References
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supplement their work with a specific focus on exploring the adaption of technology into ensemble conducting practices, as indicated by the following research question that guides this study: “What perspectives relevant to conducting can live looping offer as an ensemble conducting approach?” The findings will be relevant to conducting practices in academic, voluntary, and professional music performance contexts. lo o p s tat i o n co n d u c t i n g (l s c) 133 Background and Previous Research on Live Looping In recent decades, researchers and politicians across the world have devoted much attention to teacher education (Darling-Hammond et al., 2017). While each country faces its own unique set of challenges in addressing teacher education needs, a significant aspect of those challenges pertains to the gap between the education offered and the education needed in school systems and academic institutions. Researchers continue to argue for the strengthening of teacher education and teaching practices to address this disparity (Darling-Hammond et al., 2017; Forzani, 2014). In the Norwegian context, this is expressed through an increased focus on quality and collaboration in teacher education, emphasizing that teacher education programs provide teaching based on research of high quality and relevance to the teaching profession (Kunnskapsdepartementet, 2017, p. 7). The same trends are seen in Denmark (Ministry of Higher Education and Science, 2019) and partly in Sweden (Weisdorf, 2017, p. 20). Research on teacher education also reflects that the international focus on pedagogies of teacher education has increased (Acta Didactica Norge, 2019). Both music teacher education and music technology scholars argue that music technology is an under-researched subject in didactic practices, despite its increasingly important role in music education and society in general (MusTed, 2019). Within the voluntary and professional music performative fields, the boundaries between recording studio and live stage have gradually blurred, as trends from these arenas continue to cross borders (Knowles & Hewitt, 2012). An example of this is the use of live recording and live looping on stage related to composition and arrangement (2012). Sounds, physical movements, and visual elements offer many opportunities to guide and adjust an audience’s interpretation and appreciation of music (Kjus & Danielsen, 2016, p. 324). Still, this potential has been essentially unexplored in voluntary and professional music performance, particularly pertaining to live looping and ensemble conducting. Considering the need for new knowledge about instructional practices in teacher education, especially regarding music technology (MusTed, 2019), combined with c h a p t e r 5 134 an increased focus on pedagogies of teacher education (Acta Didactica Norge, 2019), this study can also contribute to the field of research-based and practice-relevant teaching in the field of music. A search in the databases Oria and Google Scholar reveals that prior research on live looping primarily focuses on studio recording and performative practice contexts (Kjus & Danielsen, 2016; Knowles & Hewitt, 2012; Marchini et al., 2017; Mattsson, 2015; Mitchell & Heap, 2011; Renzo & Collins, 2017). Live looping in this study is considered a real-time recording of patterns of sound that are repeated, a tradition that has its origins all the way back to Pierre Schaeffer’s use of gramophone records to capture sound effects in the late 1940s, as well as Lester William “Les Paul” Polfuss and Karlheinz Stockhausen’s tape recordings of their experiments with recording, layering, and manipulating sound during the 1950s (Mattsson, 2015, p. 53). Terry Riley was the first musician to use tape loops and delay/feedback by developing the Time Lag Accumulator system, the prototype for the live looping technology we use today (Marchini et al., 2017; Mattsson, 2015). In the 2000s, the expanded availability and use of real-time sound processing recording tools led to the development of devices with features and interface pages designed and directed towards both studio recording and performative practices, also referred to as threshold technologies (Knowles & Hewitt, 2012). Artists are using these looping technologies in what is referred to as “a hybrid of studio and performance practices” (Renzo & Collins, 2017, p. 409), where the performance is mediated by a technological artifact that brings multitrack recording from its traditional studio domain

into the live arena (2017, p. 410). A larger range of musicians are using digital studio technology to create and rework their music in live stage performances (Kjus & Danielsen, 2016, p. 320). Examples of such technological devices include the software production tool Ableton Live (Knowles & Hewitt, 2012) and the digital loop pedal Boss RC-300 Loop Station (Mattsson, 2015, p. 55). These products appear to be industry standards for software and hardware products in loop technology. Live looping is usually practiced as a solo performance (Mattson, 2015, p. 61); starting from scratch and allowing the loop composition to emerge as an improvisation in dialogue with itself is the classic form of live looping (2015, p. 58). lo o p s tat i o n co n d u c t i n g (l s c) 135 Making production methods more obvious may lead to a new level of transparency that matters partly because it affects the listeners' aesthetic judgments (Renzo & Collins, 2017, p. 418). In light of this principle, technological innovations that extend and expand upon previous practices can enhance opportunities to better understand conducting techniques and, thus, the somewhat opaque production process (2017, p. 415) may become more transparent through performative and pedagogical practices. Many music pedagogical concepts seek to enable musical participation; some of the best known were developed by Emile Jaques-Dalcroze, Carl Orff, Shinichi Suzuki, Zoltan Kodaly, and John Paynter (Hanken & Johansen, 1998, p. 99). The use of loop technology in music education teaching has been researched in the past (Heyworth, 2011, p. 54), and a possible next step is to explore portable technologies as a means of further engaging teachers in creative music making (p. 61). Furthermore, research on live looping in musical ensembles is an unexplored field (Mattsson, 2015, p. 51), which also seems to be the case within the music pedagogical context. In this study, live looping as an ensemble conducting approach is investigated in a music pedagogical context using a Boss RC-300 Loop Station. Theory Various theoretical perspectives form the basis of this study. Together, these perspectives provide a framework for investigating live looping as an ensemble conducting approach, which, in this case, is examined in a music teacher education context. Constructionism This study is informed by constructionism as a fundament for the making of meaning (Crotty, 1998, p. 42). Crotty argues that meaning in the humanities cannot be detected; instead, it is constructed through interactions between people and the outside world in social contexts (1998, p. 42). Based on the constructionistic point of view, meaning-making is not purely objective or subjective, and meaning is not discovered or created but contextually constructed in interaction with others through c h a p t e r 5 136 interpretation: "What constructionism claims is that meanings are constructed by human beings as they engage with the world they are interpreting" (Crotty, 1998, p. 43). Meaning is constructed, according to Crotty (1998, p. 43), at the intersection of the objective and subjective. This corresponds, as I see it, with the way I seek to make meaning of empirical data material through interpretation. Hermeneutical Philosophy In analyzing the empirical data of this study, I find Gadamer's (2008) hermeneutical philosophy appropriate relative to interpreting research participants' opinions. Gadamer argues that all interpretation presupposes that we carry with us an understanding of the world (Alvesson & Sköldberg, 2008) and that our prejudices and understandings constitute a whole, where we can take individual elements, and not the whole, into critical testing (Krog, 2014). Prejudice here is considered in a positive light, as the condition of understanding (Gadamer, 2012, p. 314). As such, our understanding is never without preconditions that are somehow disengaged and unbiased but also are within a horizon that carries the potential to expand. This further implies the possibility of being transformed in the face of new understandings, which, in turn, presupposes the ability to truly listen to the understanding and point of view of others. Gadamer (2012) further argues that we are not caught in a horizon but that our understandings and prejudices constantly evolve through meetings and dialogues with others and with the world that surrounds us, as was my experience in meeting with the research participants and engaging with the empirical material

of this study. The content of the horizon is not primarily individually conditioned; it is better described as a shared premise that is common to members of a culture, a principle that can conceivably be transferred to the study's focus group. In this way, the hermeneutic circle (Gadamer, 2012, p. 302) may be understood as a relationship between different horizons meeting with one another, where meaning and understanding are constructed through dialogue and interpretation. By thinking of the concept of prejudice as the knowledge we carry with us in our meetings and interactions with the outside world, lo o p s tat i o n co n d u c t i n g (l s c) 137 Gadamer (2012) argues that the more prejudices we possess, the greater our capacity for understanding other horizons. According to this point of view, prejudice may be considered as something positively related to making meaning in the form of developing understandings, insights, experiences, and perceptions. Musical Concepts Producer, musician, artist, and songwriter Daniel Lanois's multifaceted practices offer pluralistic perspectives on possible aspects of musical leadership relevant to conducting (Øien, 2020, p. 7). The research question of this study is examined in view of his concepts of "preparing" and "operating by limitation." "Preparing" is highlighted as one of the most important concepts in his practice, where preparations essentially constitute Lanois's "whole thing" and are his "best friend" (Reserve Channel, 2013; Øien, 2020). He emphasizes that preparation symbolizes engagement and commitment: "For example, when he arrives at the studio in the morning, he prepares the recording room, and programs beats, makes sound collages, and more, so that when the band arrives in the afternoon, they are not just walking into 'thin air'." (Øien, 2020, p. 27) This principle is worth investigating in an educational context as well, especially in light of the potential opportunities the use of live looping allows. "Operating by limitation" (Neilyoungchannel, 2010) is about exploiting creative potential disguised as limitations that may be economic, technological, or time-related (Øien, 2020, p. 25). By working within constraints, musicians can develop their creativity and ability to exploit the potential of boxes, tools, and gear that are available (2020, p. 21) that may not otherwise have been considered. Conductors may not always have access to all desirable resources. However, from the "operating by limitation" perspective, the working process and the sounding result is not only about available equipment and resources but, rather, the expertise of the person who uses the equipment. Lanois proposes that musicians need only one specific effect to arrive at a unique outcome (Øien, 2020, p. 25), which in this study is represented by the digital loop pedal Boss RC-300 Loop Station. c h a p t e r 5 138 Method In this part of the text I explain the research framework, the process of generating and analyzing empirical material, and ethical considerations of the study, to illuminate the study's research design and process in a transparent and verifiable manner. Framework My epistemological and ontological frame of understanding for this article is based on the concept of constructionism (Crotty, 1998, p. 42); my positioning is based on a constructionistic view where opinions, understandings, and insights are developed in meetings between people. This constructionist positioning further grounds my scientific theoretical foundation in hermeneutics. Gadamer (2012) points to hermeneutics as something more than a logical method of understanding, placing the spiritual sciences' experience closer to philosophy, history, and art than to science. In light of such perspectives, Gadamerian hermeneutics may constitute areas of experience where prejudices are revealed and horizons are transformed and expanded through dialogue, during which we put our preconceptions at risk. This approach seeks to develop understanding which is not necessarily confirmed by traditional scientific methods. In other words, through expanding our horizons, we may develop insights to better understand ourselves and others. Methodologically, I consider this a practice-oriented self-study (Bleijenbergh et al., 2011, p. 147; Cochran-Smith & Lytle, 2009, p. 154), engaging me as both participant and researcher in a study related to my own field of practice and informed by a constructionistic viewpoint, where the making of meaning is understood as being

constructed at the intersection of objectivism and subjectivism. I found this an appropriate framework for this study in the making of meaning, interpretation, reflection, and ethical considerations. On Generating the Empirical Material This study is based on a teaching class during which I conducted the song “Three Little Birds” by Bob Marley and The Wailers for a nine-member lo o p s tat i o n co n d u c t i n g (l s c) 139 focus group of music teacher students at a Norwegian university. The conducting was performed pre-instrumental and by ear without use of a written score, using live looping as an ensemble conducting approach. After the 15-minute session, the focus group gathered in a circle where I informed them about my research project and invited them to share their reflections on the loop station conduction (LSC) session jointly for 15 minutes. Immediately afterwards, the focus group was assembled in a computer lab for 90 minutes, during which time they individually wrote reflection letters about their LSC experience by answering 4 questions I provided; they submitted their letters to me anonymously. This generated 4,477 words of data which together with data collected during the 15-minute teaching class and the 15-minute conversation formed the empirical basis for further analysis. The empirical data material can, therefore, be understood as generated through focus group discussion/interview (Kvale & Brinkmann, 2015, p. 179) combined with data-supported interviews (2015, p. 178) in the form of individual reflection letters written by the nine research participants and submitted anonymously. An audiovisual clip briefly demonstrates the use of live looping through the LSC conducting approach, which can be viewed by scanning Figure 1 with a QR scanner or by following the link below. Even though this video example was filmed without the research participants present, it will provide the reader with an impression of the approach carried out during the teaching session. Figure 1: Video Demonstrating Live Looping as an Ensemble Conducting Approach. https://mediasite.nord.no/Mediasite/Play/85af8b4968264216b2e8b108255967391d On Analyzing the Empirical Material The analysis phase of this study is based on Kvale and Brinkmann’s (2015) three contexts of hermeneutic interpretation, which are as c h a p t e r 5 140 follows: (a) self-understanding through the whole reading, in which I as researcher/interpreter try to formulate what the interviewees themselves perceive as the meaning of their statements; (b) critical understanding based on common sense within the context of what would be considered a generally reasonable interpretation; and (c) theoretical understanding, where a theoretical framework is used in the interpretation of a statement (pp. 241–243). In the first steps of the analysis, I rely on the selfunderstanding and critical understanding contexts (Kvale & Brinkmann, 2015, p. 241). Furthermore, I examine the empirics from the theoretical understanding context (Kvale & Brinkmann, 2015, p. 241) by applying Lanois’s concepts of “preparing” and “operating by limitation” (Øien, 2020). The three interpretative contexts offer different research perspectives and lead to different interpretations and understanding, which further form the basis for the findings of this study. Research Ethics and Challenges This study generates data material primarily from written interview responses by nine research participants in a focus group. With the approval of the Norwegian Centre for Research Data (NSD), the study has not been reported to NSD because it does not reveal sensitive personal information that can be traced back to the research participants. Nevertheless, I always consider the different phases of the analysis against the risk of doing harm. To do this I highlight the process of generating and analyzing data material in a transparent manner. The focus of the study is crucial in this process. I had and have no intention of criticizing the research participants. Therefore, this study focuses on expanding horizons by developing understandings in dialogue with the data material from a perspective that can inform the research question instead of assessing personal points of view. Furthermore, the question of who owns the opinions that emanated from the analysis is not just about interpretative validity, but also about ethics and power and about the right to impart specific meaning to the opinions of

others (Kvale & Brinkmann, 2015, p. 244). Here, I am in danger of taking on an all-knowing role, something I can never be sure to avoid. This is an important challenge lo o p s tat i o n co n d u c t i n g (l s c) 141 to be aware of as I present my research position and analysis process in a transparent and verifiable way, which I strive to do throughout this text. Findings By using the three aforementioned interpretation contexts of selfunderstanding, critical understanding, and theoretical understanding (Kvale & Brinkmann, 2015) and applying the concepts of "preparing" and "operating by limitation" (Øien, 2020) to analyze the empirical material, I found that live looping using the LSC approach offered several perspectives relevant to conducting which are elaborated on later in this article. In this part of the text the findings are presented briefly, supported by excerpts of the data gleaned from the focus group participants' written reflections. Further considerations on the findings are made in the discussion and conclusion sections Fictive names are employed to refer to the individual student. Based on the evidence, this study revealed that live looping through LSC may offer several perspectives relevant to conducting in that it can: A) Create Anticipation Having to conduct "Three Little Birds" by ear for a nine-person ensemble based on limitations such as time (15 minutes) and equipment (no instruments) required a great deal of preparation. The teaching class, or workshop, began with the group being exposed to music played through the loop station as they entered the room, "which probably helped to set the group on what nature the work in the workshop would be of" (Anna). Of course, a similar room preparation could have been accomplished in a lesson without the use of any technological equipment, but I still chose to mention it, as the loop station seemed to affect the session already at this stage by catching the attention of the research participants and creating anticipation: "Today's workshop in LSC started with a quiet attendance at Black Box. Background music was played [through the loop station] as we entered, creating a social and relaxed atmosphere" (Dina). Another research participant described his expectations, which apparently were created by the loop station and concepts of "preparing" and "operating by limitation": c h a p t e r 5 142 The room was tidy, the stage curtains were pulled back, and in the middle of the room was a loop machine [playing music] and a microphone on a stand … When I walked into the classroom, I realized that something was out of the ordinary. (Adrian) B) Evoke a Sense of Mastery and a Sense of Feeling Secure The participants seem to have perceived the use of LSC as time saving and effective, and it appears to have impacted on their sense of mastery: "My sense of mastery came earlier, since the time we spent learning the material was so short" (Adrian). In addition, live looping seems to work well in providing both a motivating start-up impulse and an overall picture of the arrangement of the song, as well as in creating a sense of mastery and security: "I think it was really fun to see how to create music using only the voice" (Benjamin). The feeling of mastering the song arrangement seems to have persisted even after the loops were turned off: "And then you get a great AHA experience when the loop is turned off at the end, and the assembly/ensemble experiences itself regardless of the recording" (Dina). Several of the research participants claimed that it felt safe to have a recorded voice in the background to lean on. It did not take long before they stood there as an ensemble and performed a section of "Three Little Birds" without support from the loop station or an ensemble conductor: The whole session took maybe ten to fifteen minutes, and then everyone was comfortable with the voice and the rhythm. You did not become insecure when the loop station was turned off. The approach also felt very effective, as we did not have to feel insecure about our own voices. It was just listening to the loop possibly supplemented by small corrections to some tones that could be difficult to hear. (Elaine) C) Serve as an Efficient Supplement to Conducting Live looping as an ensemble conducting approach was experienced as a very effective and at the same time comprehensive way to introduce the lo o p s tat i o n co n d u c t i n g (l s c) 143 group to the arrangement of the song that was to be learned a capella: "I think that if you did this without the help of

technology like the loop machine, you would end up spending a lot more time introducing the focus group into the arrangement and in teaching the different groups their voice" (Anna). Time may be one of the framework factors and resources in a conducting situation. In light of this, LSC has potential as a possible approach: "Based on what I observed in the focus group, the loop machine shows great potential in increasing the efficiency of music teaching and can, therefore, help increase what you are able to teach in a single lesson" (Anna). Although this study was conducted in a pedagogical context, LSC can offer perspectives relevant to ensemble conducting in a more general and broader sense as a result of how the approach impacts on the rehearsal of different voices: "LSC also works well to learn the voices quickly and efficiently" (Benjamin). LSC can also influence how the ensemble is effectively included throughout the rehearsal process. Following are three data excerpts illustrating how the research participants experienced the approach as efficient: (1) "Due to the repetitive nature of the method, it will be easy to include all participants from the first second … As a participant, I feel that this was an effective way to work" (Cathrine). (2) "Live looping can work, for example, for a bandleader as a faster way to get everyone to learn their voices" (Beatrice). (3) "This was a great and effective way to learn the voices, and within minutes, we didn't need the looper to keep the song going" (Dave). The research participants experienced LSC as a supporting function when the voices and the arrangement were looped one by one, as well as when being given oral instruction in the form of singing while the track played. Following are reflections from four participants that support this finding: (1) "It was much easier to work pre-instrumentally with a loop track playing in the background than if we only had ourselves and the teacher to support us during the rehearsal" (Adrian). (2) "But the looper was a very good tool for learning the voice, because the voice I was singing repeated" (Beatrice). (3) "If you lose the voice you are singing, you can quickly navigate by ear by listening to the loop" (Collin). (4) "LSC makes it much easier to relate to both tempo and pitch when c h a p t e r 5 144 you have a reference … It worked as a very good support tool. Live looping works very well when a group is rehearsing an arrangement" (Dave). The fact that the voices were played in the background seemed to make it easier to keep up and maintain a steady tempo, which may conceivably serve as an efficient supplement to conducting: "I think it is easier for younger/less musically experienced students to understand rhythm/voice when you hear it in the context of the new rhythm/voice being introduced continuously" (Dina). D) Create an Immediate and Holistic Impression of the Final Result The process was affected by the fact that the LSC approach can also impact how the product is perceived: "The most obvious thing I came across is that it will immediately sound like music" (Cathrine). This may also be relevant for choir conducting: "I also imagine that this can be very useful in the choir context. If the conductor had used it to teach the voices, we would have heard what the final result would be" (Benjamin). One cannot take it for granted that everyone will always be able to form a picture of the final song arrangement along the way; therefore, LSC can have a supporting function in this area as well: "It was cool to hear how the different voices together become an accompaniment when they are put together in layers" (Adrian). E) Serve as a Creative and/or Pedagogical Approach The participants' feedback indicates that LSC has educational potential, which I argue is a key component of ensemble conducting in most contexts. The research participants emphasize this in their reflections on the approach: It was very creative, and in my opinion, a very pedagogical way to present a choir arrangement. I especially liked the learning by ear approach, where one had to focus (zoom in) on one recorded voice/loop at a time to learn it in lo o p s tat i o n co n d u c t i n g (l s c) 145 relation to the other voices … I think LSC can work well in teaching situations with larger groups and relatively simple arrangements … For example, in conducting school choirs, group lessons in schools of music and performing arts, and music lessons in primary school. (Dina) As a conducting approach, LSC can be experienced as a

creative and new way of learning a song arrangement: I experienced the approach as fun and creative … I think LSC can be very good to use in conjunction with workshops, or as part of courses (for example, rhythmic choral conducting courses?). It is an innovative (in my eyes) approach that fits well with shorter exercises/events—just the kind of exercises one does at a workshop or course. Maybe it works well for some choir groups to use as part of their exercises … It was a new way of rehearsing an arrangement that was creative, that kept you working, and was generally fun to perform. (Elaine) As an educational approach, LSC can represent different perspectives relevant to conducting. Three participants articulated this idea well: (1) "I envision that live looping is a great fit for experienced music students, such as secondary or high school. It is a very convenient way to teach rhythmic compositions" (Collin). (2) "It is also easy to combine singing with rhythmic elements, such as hand clapping and/or foot stomping … I think this can work in several educational teaching contexts" (Cathrine). (3) "I experienced this experiment as overwhelmingly positive and hope to see it more used in 'real' teaching situations … and I hope that the work with the focus group will help inform others about this tool and its potential" (Anna). Summary of the Findings To summarize the findings, live looping through LSC as an approach offers several perspectives relevant to conducting in that it can achieve the following: a) create anticipation; b) evoke a sense of mastery and a sense of feeling secure; c) serve as an efficient supplement to conducting; d) create an immediate and holistic impression of the final result; and e) serve as a creative and/or pedagogical approach. c h a p t e r 5 146 Discussion Prior to conducting this experiment, I considered the concepts of "preparing" and "operating by limitation" in many ways and for many reasons, such as organizing the classroom so that the students would not just walk into "thin air" (Reserve Channel, 2013; Øien, 2020, p. 27). Ten minutes before the lesson started I opened the door of the classroom so I could welcome everyone as they entered the room. The students walked into a tidy room, emptied of tables and chairs, to find only a microphone on a stand, a loop station, and speakers providing background music played through the loop station. The lesson began at 12:30 p.m. without any pre-session comments or conversations. As mentioned, a similar room preparation could have been completed in a lesson without the use of any technological equipment, but the loop station seemed to affect the participants already at this stage, both visually and audibly. As part of the preparation, a short arrangement was created of only the chorus of "Three Little Birds" by Bob Marley and The Wailers, which was to be rehearsed pre-instrumentally by ear. This way of relating to both technology and the concepts of "preparing" and "operating by limitation" seems to have evoked a sense of mastery, among other things. Also, preparing an arrangement and recording it on the loop station while conducting the ensemble may have given the participants an immediate preview of what the end result may be like, of course, with room for interpretation. In this way, the technology, together with the concepts of "preparing" and "operating by limitation" (Øien, 2020), may have impacted on the outcome of the ensemble conducting in certain cases. "Preparing" is, according to Lanois, a concept that presents preparation as a symbol of engagement and commitment, for example, by preparing a recording room, programming beats, making sound collages, and more, so that when the band arrives, they are not just walking into "thin air" (Reserve Channel, 2013; Øien, 2020, p. 27). In this study the concept of "preparing" asserted itself through actions, such as the preparation of the classroom, the song arrangement, the use of the loop station, and the process of generating data material. "Operating by limitation" involves exploiting the creative potential that limitations, such as economic, technological, or time-related constraints, lo o p s tat i o n co n d u c t i n g (l s c) 147 can provide (Neilyoungchannel, 2010). Thus, exploiting limitations may strengthen the product through its ability to release creativity. Lanois highlights the importance of mastering equipment and learning to get the most out of the few effects that are available. According to Lanois, musicians need only one

specific effect to produce a unique outcome, provided they make the most of what they have available to create their sound, such as the use of a loop station in this case. LSC is an example of utilizing the musical resources available to achieve a desired outcome. For example, in this study, by exploring the melodic potential of the voices of the research participants to recreate the instrument functions in the original recording, polyphonic harmonies occurred. Despite the use of only human bodies and voices and one technological tool, we see an example of how the resource utilization principle can facilitate the creation of expression. Live looping may ease the process of learning and remembering voices and keeping track of musical elements, such as tempo and pitch. However, conductors who choose to implement music technology into their practice are not exempted from possessing conducting skills. Indeed, the opposite is true, as the preparations now also include the implementation and use of what may be a demanding technology to use. It is a broad trend that musicians reanimate their studio practice as a result of incorporating new forms from recording practices into live performances (Kjus & Danielsen, 2016, p. 320). One possible contribution of the adoption of live looping into a conducting practice may be implications that arise from technology, such as reanimating studio practice in light of the concept of the hermeneutic circle. The circle carries with it a positive opportunity for recognition through the preparation of structures based on the cases themselves (Gadamer, 2012, p. 303). Perhaps principles of using technology derived from studio and performative practices that are transferred into conducting practices may contribute as part of a hermeneutic spiral where horizons meet, interpret, and develop by being put into play by and with each other. In a hermeneutic view, bringing a technological tool like the loop station in dialogue with the musical concepts of "preparing" and "operating by limitation" may offer perspectives relevant to other fields or practices, such as, in this case, conducting. c h a p t e r 5 148 By examining the musical concepts noted previously from new perspectives and in new contexts, and by further challenging understanding of live looping, this study contributes as an example of how different practices can be informed by each other. On the other hand, rigid use of the technology, as shown in this experiment, surely offers a limited potential for developing insights. It may even negatively impact different aspects of conducting, for example, aesthetically and creatively. Nevertheless, this study does not seek to develop or offer a best-practice method but, rather, to investigate the use of music technology in an ensemble conducting context, specifically, by exploring live looping through LSC as an ensemble conducting approach. This implies that LSC is not suggested as an alternative to traditional conducting; instead, it may be a supplement that can support various forms of conducting. To further explore potential live looping techniques within various practices there is clearly a need to investigate different technologies of music and their use from other perspectives. This is, of course, a multifaceted dialogue that I address as part of an ongoing discourse. Therefore, I welcome other researchers to continue and expand this important discourse within the performative fields of research and music. To articulate a clear conclusion is both demanding and possibly something to the side of the purpose of this study. This study is designed to investigate the research question: "What perspectives relevant to conducting can live looping offer as an ensemble conducting approach?" The main aim is to investigate LSC as a possible approach to develop insights into conducting relevant to the contexts of music teacher education and voluntary and professional music performance practices. The findings are presented and discussed from a hermeneutic point of view on how different practices can inform each other. I argue that the study shows that different practices can inform each other in a way that may offer new insights and understandings, although this cannot in itself be addressed directly back to the research question. By narrowing the focus to exploring live looping as an ensemble conducting approach, insights were gained on only a very limited part of the technological and performative fields of music. Precisely by

examining fragments of a whole, different research perspectives may constitute the interaction between parts and lo o p s tat i o n co n d u c t i n g (l s c) 149 the whole and offer possible contributions to further research discourses. Therefore, the closest I can come to a reasonably clear conclusion for this article is in the form of a quote from one of the research participants: “Essentially, I think the loop machine is a technology that needs to be investigated more thoroughly” (Anna). References Acta Didactica Norge. (2019). Temanummer i Acta Didactica høst 2021: Lærerutdanningens undervisningspraksiser på campus. https://journals.uio.no/ index.php/adno/announcement/view/325 Alvesson, M., & Sköldberg, K. (2008). Tolkning och reflektion: vetenskapsfilosofi och kvalitativ metod. Studentlitteratur AB. Bleijenbergh, I., Korzilius, H., & Verschuren, P. (2011). Methodological criteria for the internal validity and utility of practice oriented research. Quality & Quantity, 45, 145–156. Cochran-Smith, M., & Lytle, S. M. (2009). Inquiry as stance: Practitioner research for the next generation. Teacher College Press. Crotty, M. (1998). The foundations of social research: Meaning and perspective in the research process. Sage. Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective teacher professional development. Learning Policy Institute. Forzani, F. M. (2014). Understanding “core practices” and “practice-based” teacher education: Learning from the past. Journal of Teacher Education, 65(4), 357–368. https://doi.org/10.1177/0022487114533800 Gadamer, H.-G. (2008). Philosophical hermeneutics. University of California Press. Gadamer, H.-G. (2012). Sannhet og metode: Grunntrekk i en filosofisk hermeneutikk. Pax Forlag. Hanken, I. M. & Johansen, G. (1998). Musikkundervisningens didaktikk. Cappelen Akademisk Forlag. Heyworth, J. (2011). Jumping through ‘loops’: A reflective study on preparing generalist pre-service teachers to teach music. Issues in Educational Research, 21(1), 42–64. Kjus, Y., & Danielsen, A. (2016). Live mediation: Performing concerts using studio technology. Popular Music, 35(3), 320–337. Knowles, J. D., & Hewitt, D. (2012). Performance recordivity: Studio music in a live context. Journal on the Art of Record Production, (6). https:// www.arpjournal. com/asarpwp/performance-recordivity-studio-music-in-a-live-context/ Krog, T. (2014). Hermeneutikk: Om å forstå og fortolke. (2nd ed.). Gyldendal Akademisk. c h a p t e r 5 150 Kunnskapsdepartementet. (2017). Lærerutdanningen 2025. Nasjonal strategi for kvalitet og samarbeid i lærerutdanningene. https://www.regjeringen.no/ contentassets/ d0c1da83bce94e2da21d5f631bbae817/kd_nasjonal-strategi-forlarerutdanningene_nett.pdf Marchini, M., Pachet, F., & Carré, B. (2017). Rethinking reflexive looper for structured pop music. NIME, 139–144. https://www.nime.org/proceedings/2017/ nime2017_paper0027.pdf Mattsson, H. T. (2015). Audiovisuella loopar och kollektiv live-looping. Dansk Musikforskning Online (DMO): Særnummer 2015. Lyd-musikproduksjon, 6, 47–63. http:// du.diva-portal.org/smash/get/diva2:892144/FULLTEXT01.pdf Ministry of Higher Education and Science. (2019). Professional bachelor programmes. https://ufm.dk/en/education/higher-education/university-colleges/universitycollege-educations?set_language=en&cl=en Mitchell, T., & Heap, I. (2011). Soundgrasp: A gestural interface for the performance of live music. NIME, 465–468. https://pdfs.semanticscholar.org/a02a/0cfa10614df 1a315624fe39f28eaebea3d23.pdf?_ga=2.264153164.1548078708.1575887124-1349048097.1575887124 MusTed. (2019). MusTed: Musikkteknologi i didaktisk praksis. NTNU. https://www. ntnu.no/ilu/musted Neilyoungchannel. (2010). Neil Young – Daniel Lanois – Track by Track Interview [Video]. YouTube. https://www.youtube.com/watch?v=D0PZbDn0Ptk Renzo., A., & Collins, S. (2017). Technologically mediated transparency in music production. Popular Music and Society, 40(4), 406–421. https://doi.org/10.1080/03 007766.2015.1121643 Reserve Channel. (2013). Daniel Lanois & Pharrell Williams at home in the studio | ARTST TLK™ Ep. 7 Full | [Video]. YouTube. https://www.youtube.com/ watch?v= ihcPhJF3wyg Weisdorf, A. K. (2017). Læreruddannelsen i internationalt perspektiv – Et studie af læreruddannelserne i Norge, Sverige, Finland og Holland.

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affected by their ongoing formal education and its included one-to-one tuition, the practice resides primarily in the informal sphere as the students see it. This makes it difficult to put it in either box. Beside the relationship between formal and informal learning is the relationship between music technology, creativity and pedagogy (Burnard, 2012; McIntyre et al., 2018; Sørbø, 2020). This relation is not m a k i n g m u s i c, f i n i s h i n g m u s i c 153 only important for scholars but also for students, learning not only the process, but also about the process (meta-learning), which is given increased attention in general education as well (Fadel et al., 2015; Fullan & Langworthy, 2014). Bell (2015, 2018) addresses how the DAW mediates our creative practices, drawing on Gibson's (1979/2014) concept of affordances. Arguably, in order to take the challenge of mastering this new music-making environment seriously, it is important for both scholars and students to become aware of how the affordances of the DAW environment affect the students' behavior and creative processes. We sought to investigate this topic through focusing on how the students experience making music in the DAW environment, narrowed down to these three research questions: 1) How do the participants understand their role while making music? 2) How do the participants normally tend to work when starting on a new composition? 3) How do the participants handle the challenge of finishing music? The structure of the chapter will be as follows: first, we present a theory section that contextualizes the DAW-environment; second, we will discuss the method and research design; third, we will utilize material from the interviews to discuss each research question; and finally, we will conclude and give a few pointers for further research. The DAW Environment At this point it is necessary to discuss what we mean by the DAW environment, and pertinent to this is the concept of affordances. "The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill" (Gibson, 2014, p. 119). A natural expansion of Gibson's usage of the term affordances is not only to discuss what the environment offers the animal, but also how the affordances relate to behavior. Don Norman uses the term signifier to discuss indicators that communicate appropriate behavior (2013, p. 14). Combining both Gibson's definition of affordances and Norman's use of signifier one can c h a p t e r 6 154 argue that affordances invite behavior (Withagen et al., 2012). In a later article, Withagen and Kamp (2018) expand on this ecological definition of affordances by introducing Ingold's theory of making. In this chapter we draw upon both of these articles where Withagen has contributed, especially when discussing environment and the process of making. When we use music making in the DAW environment in this chapter we refer to: • When the music maker is making music in one or multiple DAWs • When the music maker is able to listen back to what is currently being worked on • When the music maker can make (almost) any changes at (almost) any time Both the latest record by Daft Punk, Random Access Memories (Franco & Guzauski, Sound on Sound, 2013), and the work by producer Stevy Lacy (Pierce, 2017), constitute different forms of the DAW environment. Although there is quite a difference from making music in professional studios with top-shelf gear, as in the case of Daft Punk, and making music using iRig and GarageBand on iPhone, as Stevy Lacy does, both settings constitute different forms of the DAW environment, using the DAW as a compositional tool (Eno, 2004) or an instrument to make music (Bell, 2018, p. 37). The DAW in the 21st Century The process of popular music record production is arguably associated with a series of roles working together in a professional studio, a few examples being recording engineer, mixing engineer, songwriter, artist, mastering engineer and record producer. Today a lot of released music is still being made in this traditional structure. However, the democratization of technology in the 1980s and 1990s gradually made it possible to make music in smaller project studios with fewer people (Pras et al., 2013; Théberge, 1997). Watson notes: "Whereas in a professional studio, music production has always been a collective project between recording m a k i n g m u s i c, f i n i s h i n g m u s i c 155 artists, musicians, producers and recording engineers, in

small digital home studios, multiple roles are performed by a single person (…) That a single person could perform all of these roles would have been unthinkable without the enabling power of technology" (2014, p. 36). Bell calls the period from 1990 to the present the era of space-less studios (2018, p. 27). Arguably, music production in the 2010s became even more space-less due to the emerging laptop's portability. Further, the development of music-making software for tablets and phones has made it possible to make music almost anywhere. Or, as Scheps puts it, "Every laptop is a studio and every room is a live room" (Scheps, 2018). Contemporary popular music making in the DAW environment can crudely be separated into two roles: beat making (everything except what is vocal related) and toplining (the lyrics, melody and vocal production). The person making the instrumental is often referred to as a beat maker, producer or tracker (Auvin, 2017), where we find the first two to be the most frequently used. Bennett has also discussed different modes of collaboration in popular music songwriting extensively (2011, 2012, 2013). The music technology has continued to evolve in the 21st century, and we will present two examples of such development that indicates some of the directions in which the DAW environment is heading. Just recently, Townsend's virtual microphone system, L-22, received the prestigious award of technical achievement (TEC) in the recording microphone category at one of the largest music industry conferences in the world (NAMM TEC, 2020). A virtual microphone system gives the user the possibility to change between different virtual microphones during (or even after) the recording process while still using the same physical mic. Our second example is the website "Splice", which most music producers will associate with its vast loop and sample libraries that are all royalty free. Obviously, sampling or sample-packs are nothing new. However, the size and structure of the searchable content makes it easier to find the sound one is looking for. Music makers can search for hi-hat loops in the correct tempo, a kick sample, or a piano loop in a certain style, key and tempo. The possibilities are seemingly endless. Keeping these two examples in mind, an intriguing question becomes evident: how does the c h a p t e r 6 156 flexibility afforded by the DAW environment mediate the creative processes of music making? Four Challenges That Contribute to Complexity in the 21st Century DAW Environment Our interpretation of the term complexity is important in this chapter. On the one hand, the word points towards flexibility and possibilities, as the radius of creativity (Toynbee, 2000, p. 35) increases proportionally with the number of possibilities. On the other hand, these possibilities can make the music-making process more challenging to master, and in the following section we will address four of these challenges. The first challenge relates to the sheer number of choices the DAW environment affords. Schwartz discusses this aspect in what he calls the paradox of choice. As the number of options increases so does the demand from its user. Schwartz argues for different strategies to cope with this form of complexity (Schwartz, 2004). Some of these strategies are making one's decisions nonreversible (Schwartz, 2004, p. 178), embracing voluntary constraints, having low expectations towards the results of decisions, and paying less attention to what others around us are doing (Schwartz, 2004, p. 9). Though it might be argued that the amount of available options when creating music has always been incredibly high, we argue that the DAW environment still represents something different. Eno reflects on what he calls primitive instruments, such as electric guitars, and he argues that the limitations of these primitive instruments make the user quickly stop looking for options and start grappling with the instrument. Digital software, on the other hand, has unlimited options and therefore it is easy to get lost in the available options (Eno, 2018). The second challenge is related to how the music maker can make almost any changes at pretty much any time. Roads argues that electronic music composition is a multiscale conception, where it is possible to manipulate the entire composition just as easily as an individual sound, and that all such operations can affect any level of the composition (Roads, 2015, p. 9). Expanding on Roads' thoughts, we

argue that m a k i n g m u s i c, f i n i s h i n g m u s i c 157 the linearity of traditional record production and its inherent separation between different phases, such as songwriting, recording and mixing, are reduced in the DAW environment. In this environment one can work on all these sub-processes at the same time, in what we in this article call music making. It might be argued that the challenge of finishing music is nothing new, that artists have always had this challenge. A good example to support this argument is how the production team behind the song "Billie Jean" did 81 mixes of the song before settling on mix number two (Swedien, 2011). However, we still argue that the DAW environment represents a more severe challenge in this regard. Imagine, in the case of mixing "Billie Jean", if not only the mixing was being considered, but also, at any point, which kick sample they were using, which amp and amp settings they were using, and so forth. Joel Thomas Zimmerman (known as the artist DeadMaou5) discusses this challenge of the music-making process: "Nothing is ever finished, I can go back to any of my releases, and make them better or change something, take something out or put something different in, they are never done, so you know, good enough" (Masterclass.com, 2016). This complexity can also be identified in the the Kanye West album The Life of Pablo. This album was altered even after the release: mixes, guest performances and lyrics were changed after release, resulting in multiple released versions1 (Jenkins, 2016). The third challenge is the possibility and underlying temptation of doing everything oneself in the DAW environment. Music making in the DAW environment manifests differently for the solitary bedroom producer versus the collaborative music making often associated with record production, where the producer is not the artist or songwriter (Burgess, 2013). Nonetheless, as Seabrook (2015) writes, today's hits are often written by large teams with specialized roles. Historically, this is not something new. Therefore, one notable change is the possibility to work solitarily in an environment where anything might be possible at any given time. Montagnese discusses his creative practice in a Sound on 1 This was done incrementally, meaning that the latest change overwrote the previous version on digital music services. c h a p t e r 6 158 Sound interview (2015). In this interview he is referred to by the magazine with a multitude of roles: musician, beat maker, mixer, recording engineer and producer. "In writing and producing material for his latest album, Abel Tesfaye (aka the Weeknd) and I were in so many different studios and locations, and we were travelling so much, that I did not have a solid reference point. (…) In every place we used different mics, different mic pres, different monitors, and while it may have appeared like a nightmare to bring all that together, the technology makes it easy to do that" (Montagnese, 2015). He also discusses how he works in his DAW: "I do everything: all my writing, producing, recording, tuning, editing and mixing in one session." Furthermore, he discusses how he works with no separation: "Writing, producing, mixing is all one fluid process for me. There's no separation between any of the things that I do" (Montagnese, 2015). In a rather humorous news article, Pat discusses why his album "sucks": "DAWs are just the perfect excuse not to do stuff. Not to practice an instrument, not to meet other musicians, not to put ourselves on the line, not to ask for help or advice, not to listen to anybody but ourselves (…) I'm talking about DAW syndrome — trying to do everything on your own just because the technology allows it" (Pat, 2018). However, it can be argued that this challenge is tied to social changes rather than technical changes, and that the traditional process of record production as a collaborative process between multiple and more distinct roles was more complex. Nonetheless, we argue that mastering the sub-processes does not mean that one masters the process of the "whole", music making itself. Arguably, the whole is something other than the sum of the parts,2 and we believe this "new" and complex decision environment requires rigorous training and discipline in order to master it. The fourth challenge relates to how the numerous possibilities and readily-available premade musical structures (Bell, 2018) can invite shortcuts and deprive its user of their agency for

self-expression. On the other hand, it can be argued that the determinism of the software (Bell, 2018, p. 36) decreases complexity rather than increasing it. Although it might be easier to construct a musical structure that sounds similar to 2 Inspired by the writings of gestalt psychologist Kurt Koffka (1936, p. 183). m a k i n g m u s i c, f i n i s h i n g m u s i c 159 the current mainstream, as a lot of the available material on "Splice", for example, is tuned towards the current trends, that doesn't mean that it is easier to make music that resonates with the individual's artistic preference. In the end, it is the music maker that evaluates if the music is finished or not. Our respondents have a clear focus on making original music and, in this regard, utilizing premade material can reduce their agency. Giddens argues that structure should not be understood as something that places limitations on agency, but rather enables it (2007, p. 169). Giddens emphasizes that this understanding of structure also means that agents similarly can (or are forced to) shape or change the same structure (Sewell, 1992). This duality is challenged if the students do not have the technical knowledge to manipulate, reproduce or remake the musical structure, which might be the case with premade material. In this context we understand agency in relation to intentionality (Gallagher, 2007); if the students wish, they can change the structure as they please and thereby possess a level of control over the environment. This control would mean that the students do not have their radius of creativity decreased due to lack of technical knowledge. Therefore, the reduction of agency is most prominent in individuals that lack the ability to make such structures themselves where the availability of premade musical structures can invite shortcuts and easy solutions. All of these four challenges are markers of the 21st century DAW environment, that builds on the digital revolution in music production that happened in the 90s (Bell, 2018, p. 26). It is the aspects of working with no separation between the different roles, with a small team of few decision makers, with the technological affordance of being able to work almost forever on the same song without being bound to expensive studio rates, with a vast number of options and premade musical structures available to its user, that we argue contributes to the complexity of the 21st century DAW environment compared to the predigital revolution. Bell comes to related conclusions in his study of a songwriter called Brendan and his creative process. Bell writes, "Distinguishing distinct stages of 'composing', 'recording' and 'mixing' was a challenging task because Brendan frequently varied the sequence of these actions" (2014, p. 307). c h a p t e r 6 160 Method As this study discusses one particular practice, we selected a qualitative approach for our investigation. The design was a common single-case study, where our aim was to "capture the circumstances and conditions of an everyday situation" (Yin, 2018, pp. 85–86). The everyday situation, the case, is the practice at one particular university (the University of Agder). The target group were students from the bachelor's and master's program in popular electronic music performance at the University of Agder. The students on this program use their computers or laptops as a compositional tool, as their main instrument for music making, where they focus on making their own original music. All of the participants had a varying degree of experience releasing their own music, from posting their music on SoundCloud to releasing their music on an international label. Most of the students enrolled in the program already have high proficiency in their chosen DAWs, and the educational program seeks to expand their knowledge by giving them technical and aesthetical competencies in recording, songwriting, and production. Therefore, the core of the bachelor's and master's program is the activity of engaging with the aesthetic quality of the student's music making, which another chapter in the anthology has expanded upon (Sørbø & Røshol, 2020). In the line of questioning, we sought to direct the questions towards whatever artistic process the participant had the most agency over, meaning "their" music. Arguably, the challenge of making and finishing music is perhaps most evident in the music the student has a high degree of personal and creative investment towards. The interviews were conducted mostly in a studio environment.

However, none of the parties engaged with any music technology during the interview. In the line of the scope of this chapter, we were interested in the experience of the participants and did not want to derail the discussion towards technical aspects. Qualitative studies' rigor depends on the transparency with which they are conducted (Kuper et al., 2008) Naturally, the preparation, organization and reporting (Elo et al., 2014) were colored by the writers' acquired artistic knowledge, teaching practice and our time as students in the same institution. Though none of the participants were currently m a k i n g m u s i c, f i n i s h i n g m u s i c 161 attending any courses run by the authors, two of them (the third years) had Røshol as a teacher last semester, and two of them (the first years) will attend his course next year. Some of the masters students knew him personally, and these aspects had to be considered when analyzing the data. There is always the possibility that the answers are colored by the interviewee's relationship to the interviewer, as in this case with Røshol. In order to negate some of these issues we drew a random selection of two first-year bachelor students, two third-year bachelor students, and two fifth-year masters students. While there are a few female students in some of the classes, none of them were drawn in the random selection. In retrospect, it might have been better to curate the selection more carefully in order to avoid an all-male panel. There are numerous arguments for this, where perhaps one of the strongest is the overwhelmingly male demographic in studies related to music technology (Born & Devine, 2015) and how interviewing female students could have given a perspective on this aspect (Acker & Oatley, 1993). After the selection of participants, we conducted semi-structured interviews (Kvale, 2007) of 45-minutes average duration. The interviews focused on seven topics related to the DAW environment: the participants' backgrounds, how they tended to learn new aspects of music making, how they perceived their role while making music, how they normally start making music, how they experienced finishing music and how they experienced feedback. Since we were interested in the participants' experiences, it could be described as an interpretive phenomenological inquiry (Norton, 2009, p. 116). We utilized probe questions (Kvale, 2007, pp. 60–61) when we felt that the candidates were touching upon something important about how they experience music making in the DAW environment. The interviews were recorded and transcribed. We used the stages for thematic analysis suggested by Norton (2009, pp. 115–123) to establish main categories from the collected data. The topics of feedback and learning were omitted because it proved to be challenging to place these topics in relation to the others, and the data was already too extensive for one chapter. The topic of background informed the remaining ones. One example from the thematic analysis was the participants' discussion of roles. This topic was merged as one category, based not only c h a p t e r 6 162 on what role they identified with the most, but also how they described the different roles of music making, and how they described these roles in their creative music-making process. On one hand, the chosen method was exploratory since it was dependent on the participants' experiences, on the other hand, it was rigid since the interview questions posed limits on the inquiry itself. The three research questions are the result of the thematic analysis, all of which are linked under the theme of how the participants experience music making in the DAW environment. The quotes used in this text have been translated and occasionally slightly altered, and we omitted foul language. Due to the scope of the chapter we did not focus on the challenge the students had of maintaining the process or relating the theoretical foundation of music making to the activity of composing. Results and Discussion As mentioned previously, the data will be presented and discussed according to the research questions: 1. How do the participants understand their role while making music? 2. How do the participants normally tend to work when starting on a new composition? 3. How do the participants handle the challenge of finishing music? How do the Participants Understand Their Role While Making Music in the DAW Environment? When asking questions related to our first research

question, the respondents mostly described themselves as producers, although their understanding of the term varied greatly. It seemed like especially the younger respondents associated the activity of programing and controlling the laptop, having the latest version of the project, as the strongest indicator for the producer role. Further, they describe the songwriter as a top-liner, and one of the respondents drew a direct link from the activity of making the instrumental to the role of the producer. m a k i n g m u s i c, f i n i s h i n g m u s i c 163 Participant five: Within my field, I understand the one doing the programing, programing the beat and the synth as producer while the songwriter is the top-liner. Two of the older respondents were more reluctant about this direct link. Participant three saw the producer role as having both a technical and social aspect, where both were necessary to master. It was only participant four that understood the role entirely outside the technical sphere. It is worth noting that participant four is the oldest of the respondents. Participant four: Producer for me means that I am an active decision maker related to how it should sound or be (…) It's about changing either one's own or other people's artistic expressions for the better while following one's own voice during the process. Although the producer role was the one that respondents related to the most, the participants also identified themselves with a multitude of other roles in a varying degree. In this context it is easier to discuss which roles they didn't associate with. The clearest role they did not associate with was lyricist, although many of the participants were active when working on vocal melody. Although the participants spent a large section of their time on mixing that didn't mean that they perceived themselves as mixers or mastering engineers, even though they mixed and, in some cases, mastered their own material. All of the participants associated highly with the producer, songwriter and artist role. Overall, the participants showed an emphasis on the technical aspect as a marker for the producer role. This can relate to self-producing artists as discussed by Zagorski-Thomas (2014, p. 161), and the artist and auteur producer typologies as described by Burgess (2013, p. 9). Arguably, the participants think of their producer role not as a recording facilitator but as a recording creator (Bell, 2018, p. 33), making or creating their own music. The participants seem to think of the producer role as an overarching role with a series of sub-roles. However, the distribution and individual emphasis on these sub-roles were dependent on the type of music they made. For example, as few of the participants were vocalists, vocal-related activities, such as vocal performance, vocal production or lyrics, where not highlighted as part of how they understood their role c h a p t e r 6 164 as producer. We speculate that their understanding of the producer role might have changed if that was the case. After all, the producer role is a role that carries a high degree of agency and power (Wiggins, 1991, p. 92) over the artistic output, and people have a general tendency to present themselves favorably (Paulhus & Trapnell, 2008, p. 499). How do the Participants Normally Tend to Work When Starting on a new Composition? We discussed with the respondents how they tended to start working on new compositions. We got lengthy answers that encapsulated not only how they started, but also how they usually tended to move forward once they had created something interesting. Participant three spoke about the shaping of sound as the aspect that gave him ideas. His decision-making seemed to be informed by how the sound affords harmonic structures and how this sound carries sonic markers (Askerøi, 2020) related to released music associated with an artist, certain genres, or style of music. Participant three: If I'm going to write the bass, then I'd start by adjusting the sound of it and, for example, think like, wow, this sounds a lot like the band Boards of Canada; then I might need this form of delay or effect and then I start to work harmonically. It has a lot to do with the sound, right? The sound often carries a form of nostalgia or some form of connection towards the harmonic aspects. Participant four described how he often starts with improvisation. He uses different types of audio sources and records improvised overdubs before removing the initial idea. Participant four discussed a wide selection of

possible directions based on how he perceives the current musical construct, from an art installation or techno to more commercial forms of popular music. Participant four: These improvisations can be everything from playing on my Rhodes, doing midi stuff, singing into the microphone to improvising a poem". (…) I can do a lot of takes at full length, m a k i n g m u s i c, f i n i s h i n g m u s i c 165 and after five or six takes I might sit down and organize and edit and then see what happens, sort of like a lump of clay that at some point emerges. Participant five described how he first embodies the role of a beat maker. He uses the first 10 minutes to lay down some chords or a bassline and some drums before changing to the top-liner role and starting to improvise melodies. Although he improvises mostly in gibberish English, the improvisations will inform his lyrical writings later. After recording what he believes are going to be the final melody and lyrics, he changes back to the beat-maker role in what he calls "remix-modus." In the remix-modus he tends to change harmonic and rhythmical elements. All these things happen fast, typically within the first sit-down. Participant five: The vocal is important to me; it's important for me to have a cool melody. (…) Vocal ideas have to come quickly, preferably within 30 minutes" (…) Then I start to program around it in remix-modus. I might change the chords. You know, I grew up remixing vocals – it's what I'm fastest at (snaps his fingers and laughs a bit). It moves pretty fast. I tend to keep the vocals, but I can change everything else. If it's a complete disaster then I re-record it (…) Although the respondents' ways of working varied greatly, there were some similarities. First, most of the participants discussed directly how the current musical composite informs their next cycle of idea generation, which relates to what Edward de Bono calls lateral thinking (2017, p. 97). Lateral thinking focuses on the ideas that emerges in relation to the current musical structure. Such a way of working would mean that the music maker tries not to succumb to working a certain idea to death; rather, the music maker will focus on the ideas that arise when interacting with the musical construct. An example could be if the instrumental is not working, but the topline written towards it is great. The music maker acknowledges that the first instrumental was essential for getting the topline idea and starts working on a new instrumental from scratch. Secondly, the participants' discussion of flow experience, by either using the term directly or describing states associated with flow experience. The c h a p t e r 6 166 process of flow while making music has been the subject of several studies (Chirico et al., 2015). Two of the participants explained their process related to aspects of positive psychology and flow. When working with something new, participant three discusses a "zone" or a bubble in which he stays for a couple of hours: Participant three: I can sit like that for many hours, it's sort of a bubble, a zone with both conscious and unconscious choices. When I step out of this zone after a couple of hours or days, I might have a skeleton with a lot of different parts and a form of structure and arrangement. Then I start to think more critically: what's lacking, how should the mix the sound. (…) Everything runs kind of parallel, also the mix. Participant five emphasizes the importance of the "flow and vibe" and the importance of trying to be "free like a child" when generating ideas: Participant five: For me, it's all about being in the flow, feeling the vibe at that instant (…) I sort of try to be a child again (laughs a bit). Arguably, both these reflections relate to Csikszentmihalyi's discussions of what people tend to describe while being in flow. On the flow experience, Csikszentmihalyi lists several requirements. We will name a few here: the feeling of control over the environment, limited stimulus field, having the necessary skills to meet clear demands (Csikszentmihalyi, 2014, p. 135), no worry of failure, and that the process has clear steps (Csikszentmihalyi, 1997, p. 111). One of the affordances of working in the DAW environment is the limited stimulus field as often represented by a laptop screen and a set of monitors. The feeling of control over the environment can be the agent's ability to express and manifest what he or she desires, the knowledge of using the technology and the ideas it generates in synergy with its users. No worries of failure can be

seen in the light of participant five's response on trying to be "free" like a child, and that nobody else is present to judge their ideas. Music making does not have any clear rules or steps. However, many of the respondents discussed, in relation to lateral thinking, how the current version of the musical construct gave them further ideas to pursue. Arguably, the m a k i n g m u s i c, f i n i s h i n g m u s i c 167 song's inner logic and what the song "needs", along with typical structures in terms of instrumentation and arrangement, can serve to give the process relatively clear steps. This is especially true in the initial phase of the music-making process. However, when the musical structure starts to take form and their ideas towards the construct decline, the next steps in the process becomes more challenging to deduce. Most of the participants discussed a period of flow in the initial phase of the music-making process. We speculate that the decline of the flow experience, proportional to time spent, is related to the gradual decrease of ideas generated when interacting with the musical construct. As the next steps become more unclear, the participants rely more on their inner critic and start asking critical questions concerning their ideas and the musical construct; that simply does not occur while being in flow (Csikszentmihalyi, 2014, p. 138). Thirdly, the participants seemed to conduct normative judgment towards their mode of thought, depending on where they were in the process. This can be seen in relation to how they try to facilitate flow at the start of the composition process, suggesting that the participants are basically seeking to block their inner critic from appearing too early. All of the participants had reflections regarding this topic. Joel Zimmerman, known as the artist "deadmau5", has an online master class made for aspiring music makers. In his master class and what he calls "the deadmau5 process theory" Zimmerman discusses his strategies for being creative and how these relate to working long hours into the night, under the headline, "Find a way to stop thinking." "I start thinking of, or not thinking, and start getting, you know, more experimental things done and writing melodies and becoming more efficient at being not so critical" (Masterclass.com, 2016). The student's reflections on seeking to postpone their inner critic can be understood as a creative strategy seeking to facilitate flow. However, the participants do not disregard the importance of their inner critic. Later in the music-making process, when they seek to finalize their music, it seems like the inner critic becomes more prominent. These reflections become more evident later, when discussing the challenge of finishing music, as participant two reflects: c h a p t e r 6 168 "After we make a song or come up with an idea, I take it home and take on the role of perfectionist. I start to fix things, make it sound good, before maybe heading to the studio for a mix." Another aspect we found to be consistent in the interviews was the challenge of describing the student's music making within the framework of the traditional sequence of record production. Meaning that instead of discussing a linear process, moving from an idea to songwriting, arrangement, sound-design, recording, mixing and mastering, one can instead discuss first a process that focuses on generation of ideas and, second, a phase that focuses on evaluation and reduction of ideas. The generative phase is a process of songwriting that encapsulates traditional songwriting, sound design, programing, recording and mixing with a low degree of separation. The second phase is where the student evaluates, hones and reduces ideas, often described by the participants as a mixing phase. There are many models that discuss the different stages in creativity (Howard et al., 2008). Most of these models have four or more stages; however, one might combine these into two stages: an intuitive phase of idea generation, and a critical phase of verification (McIntyre, 2012 p. 155). Arguably, the participants share many similarities with the description of how Montagnese makes music in the DAW environment (Montagnese, 2015). However, it seems that the degree of separation between the different types of tasks increases along with the time spent on the song. Arguably, the notion of the generative and evaluative phase can be seen in light of the previous discussion of the participants seeking to postpone their inner critic. How do the Participants Handle the

Challenge of Finishing Music? All of the participants reflected on the challenge of finishing music in the DAW environment. Participant four reflected on this challenge, as well as strategies of commitment to cope with this challenge: I feel there is a challenge with all these choices one has to make. I feel that with this technique that I use, where I commit to audio through tracking of m a k i n g m u s i c, f i n i s h i n g m u s i c 169 improvisation, helps. I can't go back and change the midi or the sounds. (…) I make choices while working. (…) It's a bit of a relief to have the ability to be an active decision maker in the first part of the process; that the choices I make actually have an effect. (…) This helps me to finish a song. Later in the interview, participant four expanded upon the challenge of all the possible options the DAW environment affords: Participant four: "It's difficult because of all the possible choices. Each song can go in so many different directions." Following this thread, an important topic is how the respondents master the decision environment afforded by the DAW environment. Participant one discussed how working parallel on a large number of songs can be a helpful strategy: Participant one: I feel that many struggles to finish their music. But I have arrived at the point now where I would prefer to work on ten songs a month, which are all relatively good, instead of working on one song for a month. Basically, I believe that I learn more from it. If I work on one song for a month, I end up going into too much detail and then I become unsure if it's good or not; I waste a lot of time. I'm more positive towards working with ideas. If you have ten songs each month there's a greater chance that you'll come up with a good idea than if you only have one song per month. For me, the most important thing is to come up with a good idea; the rest is about refining it. Participant one discusses the need for quantity in order to avoid overproducing, which can be related to the law of diminishing returns: each new hour working on the song decreases the marginal output (Brue, 1993). Brue divides a process into three stages: most productive, diminishing returns, and negative returns. Arguably, overproducing in music production yields negative returns. We did not ask the participants directly what type of activity they tend to use most of their time on when making music. However, through our teaching practice and artistic practice we speculate that overproduction, as previously discussed, is in large part c h a p t e r 6 170 constituted by polishing ideas with a minimal impact on the final musical construct. This relates to the findings of Gooderson and Henley (2017) and the tendency they find of non-professional songwriters spending too much time on one particular part or idea. At the Department for Popular Music (DPM) at the University of Agder we observe that when students have deadlines or a clear context of where the music is to be presented, the ratio of finished songs increases. Related to the complexity of the process and the challenge of finishing music, Eno reflects upon how to finish music, "My daughter recently asked me the same thing. She was in my studio and she was looking at my archive where I have 2809 unreleased pieces of music and she said: Dad, how do you actually finish any of these? And I said: When there's a deadline" (Eno, 2018). Eno's reflection can be understood as an argument for a high frequency of music-making tasks with clear deadlines in the pedagogical setting. When we asked the participants how they know if a song is finished, most of their answers relate to time spent on the song, if they were getting bored by it, or if they were able to listen back to it without "cringing". Participant three: When it makes me want to puke, then it's finished. But then again, I want to convey something when I write music. If I feel I'm able to do that, then it's finished (…). It's hard to know when you are finished. I guess many of us make the wrong decision in this matter. All the participants say that their understanding of whether the song is finished or not is tied to their own experience of the given song. Participant six adds that peers as well as "normal" people inform his decision as to whether it is finished or not. Participant four reflects on how the challenge of finishing music diminishes when working collaboratively, which might serve as an interesting point of departure for further studies. All the participants draw connections

between when the music is finished and when they feel they have spent too much time on the project. It is only participant three that reflects on what one might call the dangers of overproduction or overthinking, which correlates with the previouslydiscussed law of diminishing return. m a k i n g m u s i c, f i n i s h i n g m u s i c 171 Participants four and six have criteria outside the project itself and their own perception of it, either listening to it in comparison to other music or sending it to someone else. None of the participants discuss perceived value or quality in relation to whether it is finished or not other than how it feels finished. One can understand this in relation to whether the music and its inherent self-expression is something one wants to convey to the world. When asking whether other people's opinions are important in determining whether a song is finished or not, participant five replied: Basically no, but of course other people can affect how I feel about the song. I try to trust myself for the most part (…) I think that when you're making your own music you have to trust your own vision. You're sort of giving something of yourself when you're doing this. Of course, other people can have cool ideas that I can try out, but in the end, it is my song and it should sound the way I want it to. A central aspect of this chapter is accounting for how the students experience the challenge of finishing music, which we relate to the doubleedged sword of perfectionism.3 Participant three discussed the challenge of finishing music, and some negative aspects of working in the flexible DAW environment, where it is the music maker that evaluates whether the song is finished or not. Although setting high standards for oneself can be meaningful as it gives the students something to strive towards, it can also evoke neurotic tendencies when the students set unrealistically high goals for themselves and what they are making (Hill et al., 1997). We speculate that this might be especially true if the students spend a long time on a particular project and become frustrated as the marginal output is decreasing and the time spent is sunk cost (Mankiw, 2014, p. 286). Participant three's statement below can be seen in relation to this discussion. Let's say you've been working on an album for two to four years and right before you release it you're so sick and tired of it that, instead of asking for feedback or help from someone else, you choose to change it. (…) It's so easy today to make 3 As Andrew Scheps puts it, "If you're not a perfectionist, you're not an artist" (Scheps, 2018). c h a p t e r 6 172 music and it's so easy to change things (…) A lot of good ideas get scrapped, I guess, due to this. (…) My generation, that works with music this way, we can sit and change every MIDI clip and sample all the time. (…) It becomes a kind of vicious circle where you can keep changing everything forever and starting new things without ever finishing anything. Conclusion In this chapter we have investigated the music-making process of a few students of electronic music at the Department for Popular Music (DPM) at the University of Agder in Norway. After contextualizing with relevant theory, we addressed the complexity of music-making in this environment and discussed similarities and differences from the traditional linear process of record production before the digital revolution occurred in the 90s. We interviewed six students at DPM that make music in the 21st century DAW environment. In the study we focused on how they understand their role while making music, how they tended to work when starting on something new and how they handled the challenge of finishing music. The participants identified themselves most strongly with the producer role, although their understanding of this term varied greatly. The producer role seemed to be an overarching role for the participants, incorporating a wide selection of sub-roles. It seemed that their understanding of the producer role and the sub-roles it encompasses shifts towards what the participants are actually doing. We speculate that this tendency of presenting oneself as a producer relates somewhat to the biases of self-presentation and the role's inherent power and agency over the artistic output. The affordances of today's DAW environment are spaceless and challenge the separation between the different roles of record production as it is possible for one individual to do it all themselves and fulfill all the roles necessary for music making.

Although the respondents seemed to work with a low degree of separation in the initial generative phase, this degree increased as the process evolved into a phase of evaluation and verification. In this phase, their inner critic or perfectionist become more active. m a k i n g m u s i c, f i n i s h i n g m u s i c 173 This dichotomy seemed to be consistent with all of the respondents and some of the students' strategies are tuned towards mastering this relation to their benefit. Our participants, similar to industry professionals, reflected on how the affordances of the DAW environment, with its endless possibilities, pose a challenge to finishing music. This was something all the respondents agreed upon. Reflecting on their own practice, all the participants seemed to conduct normative judgment on their own mindset depending on where they were in the process. The clearest example of this in our interviews was how the respondents were trying to postpone the critical and evaluative mindset so it would not interfere with the generation of ideas. Furthermore, some of the participants discussed creative strategies to limit possibilities, and committed to ideas with no option of reversibility, in order to be able to finish their music. We believe that the challenge of educating new music makers working in the DAW environment is not merely that of learning the process, but also meta-learning: learning about the process. Each individual needs to develop self-awareness of their own strengths and weaknesses, and which creative strategies they need, in order to tackle the never-ending cycle of iteration and doubt when making music on the computer. Teaching practices that facilitate such meta-learning are, therefore, highly relevant in higher electronic music education. This is especially relevant in the DAW environment, where discipline is required in order to stop fiddling with the details and release the student's music to the world. Further research on the impact of collaboration in the DAW environment should be considered. We speculate that the reduction of individual agency that occurs during collaboration can reduce the perceived complexity, thereby enabling students to master the DAW environment more easily and finish their music. Hill et al. (1997) discuss how individuals that score highly on self-oriented perfectionism do not necessarily score highly on other-oriented perfectionism. This finding challenges the notion that people who make high demands on themselves also make high demands on others. We speculate that collaboration might, therefore, be one way of decreasing the students' demands towards the final product and can help with the challenge of finishing music. c h a p t e r 6 174 References
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schools. Since the introduction of Kunnskapsløftet1 in 2006, the potential for technology's improvement of education has more or less been established as a truth in Norwegian school policy and the public vocabulary.2 In spite of this, it seems that technology has only slightly changed the way we teach music, both nationally and internationally (Martin, 2012; Partti, 2017; Savage, 2017; Vinge, 2010). How can the school embrace the possibilities and challenges of the increasing impact of technology on music teaching, and what does this demand of the teachers? Secondly, considering the workshop instructor's thoughts of "authentic" and "inauthentic" use of technology in music, it questions what kinds of practices 1 Kunnskapsløftet [the Knowledge Promotion Reform] is the education reform introduced in 2006 in Norwegian primary, lower secondary and upper secondary education and training. https:// www.regjeringen.no/globalassets/upload/kilde/ufd/prm/2005/0081/ddd/pdfv/256458-kunnskap_bokmaal_low.pdf 2 Report No. 17 to the Storting [Norwegian Parliament] (2006–2007) https://www.regjeringen. no/no/dokumenter/framtid-fornyelse-og-digitalisering/id2568347/, media report https://www. nrk.no/rogaland/ny-teknologi-i-skolen-1.11362391, voluntary organization https://kidsakoder. no/om-lkk/ (all web pages accessed 01.07.20). k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 183 and forms of knowledge enable teaching of music technology that is experienced musically meaningful and relevant by pupils. We are in the midst of a period of disruption, where technology increases the access to information and teaching materials, putting the school at risk of losing its status as the place to learn (Selander, 2017). Many students come to school with extensive music knowledge that they have acquired outside of school (Folkestad, 2006; Peppler, 2017), and do not necessarily perceive the school as an engaging, suitable, sought-after or "authentic" place to discover or learn music (Dyndahl & Nielsen, 2014; Weninger, 2018). The somewhat problematic concept of "authenticity" may in this way work as a lens for scrutinizing these kinds of topics. Put together, these questions define the territory of this study. The project's data material is derived from the aforementioned Science Camp 2018 in Trondheim, Norway. At the summer school ten university students specializing in music technology instructed pupils from age 11–16 in subjects such as song writing and production using music technology. A characteristic of these university students was their music-technological expertise, built on their own incipient professional activity,3 as well as their connection to the Norwegian University of Science and Technology's (NTNU's) study program in music technology. In this way the workshops offer an interesting take on this theme, as they present how this expertise can inform the teaching of music technology. Our research question is: what knowledge characterizes teaching informed by music technological expertise? In this chapter we will explain the study's theoretical perspectives and research design, presenting the results through identifying what we call authentic learning spaces, where music technological teaching practices are portrayed through three narratives. The results will be discussed in relation to the TPACK4 framework's understanding of knowledge (Gall, 2017; Mishra & Koehler, 2006), and contribute to previous research and further understanding of knowledge for the future music teacher. 3 All of the university students had a part-time professional musical practice, either as performers, producers, composers, DJs etc, which they combined with full-time studies. 4 TPACK is an acronym of the words Technological Pedagogical and Content Knowledge. c h a p t e r 7 184 Theoretical Perspectives In the following part, we will elaborate on why we believe this study addresses these issues, through our understanding of authentic learning spaces, before we move on to knowledge and expertise, as well as the TPACK framework. Authentic Learning Spaces Whenever discussing authenticity, we encounter a recurring problem: what is considered as authentic by any person or in any area will always differ depending on who, where and when you ask (Dyndahl & Nielsen, 2014, p. 107; Gilmore & Pine, 2007; Vannini & Williams, 2009). We see the notion of authenticity as an ever-negotiable social construct that still holds

significance for people in general and especially in relation to music (Kallio et al., 2014; Moore, 2002). Therefore, the workshop instructor's use of the word "inauthentic" could host a broad spectrum of meanings and does not represent an eternal or ubiquitous truth. We see all ten of those teaching at Science Camp as representatives of their own, equally valid, authentic practice: They represent an authentic musicianship that embraces technology, in any shape or form, and sees it as integral to musical expression (Savage, 2017). Throughout our interviews we have specifically asked what the research participants find to be meaningful, significant and authentic when working with music technology, and the three narratives presented later in the text take on these different views. Our main interpretation of the workshop instructor's use of the word "inauthentic" is that it means different to his experiences outside of school. It speaks to a "disconnect" experienced by many students today, especially in regard to digital tools and media (Weninger, 2018). To the workshop instructor, the content ("musical practices with music technology") might have been somewhat recognizable, but clearly the processes were not. In this way we adhere to an understanding of authenticity reminiscent of Lucy Green (2008, pp. 1–14): when applied in school, real-world content should be accompanied by real-world processes. Over the past decades, terms and theories like situated learning (Brown et al., 1989; Krumsvik & Jones, 2007) and informal learning (Folkestad, k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 185 2006; Green, 2002) have addressed this issue. In this study we apply the related term authentic learning, seen as "a pedagogical approach that situates learning tasks in the context of real-world situations, and in so doing, provides opportunities for learning by allowing students to experience the same problem-solving challenges in the curriculum as they do in their daily endeavors" (Herrington et al., 2014, pp. 401–402). This perspective reinvigorates a pragmatic view on learning where the value of knowledge lies in the relevance it has to human life and the degree to which it is experienced as useful. The activities that are carried out in school must have a value in themselves that children can relate to (Säljö, 2016, pp. 85–86), hereby recognizing and rewarding skills and forms of knowledge that are applicable both in and out of school, possibly fostering life-long learning (Green, 2008; Snape & Fox-Turnbull, 2011). Furthermore, authentic learning, like any other learning, is dependent on a setting where learning can take place: a learning space. In research this concept has been viewed from a variety of angles. To show the pedagogical possibilities when teaching is moved outside the classroom, the term learning arena (Barfod, 2018; Gabrielsen & Korsager, 2018; Larsen, 2016) has been used to describe a physical place with its inherent possibilities and limitations. The digitalization of society has also actualized what are called virtual learning spaces (Krumsvik & Jones, 2007; Weiss et al., 2006), future learning spaces (Punie & Ala-Mutka, 2008), and The Next Generation Learning Spaces (Radcliffe et al., 2009), opening up the space to include the learning consequences of digital everyday life. From another angle, learning space has been used as a pedagogical concept, including "the relations between pupil, teacher and content in design oriented tasks" (Randers-Pehrson, 2016, p. 28), understanding teaching as a social and relational practice. Our definition of learning spaces is derived from all these modes of use, while also including approaches that we believe facilitate the possible experience of authenticity and authentic learning for the pupils. Although the Science Camp workshops took place outside the traditional classroom, this is not a premise for creating an authentic learning space per se. The central issue is that the physical environment was largely influenced by the instructors' experience and expertise – which we believe c h a p t e r 7 186 to represent authentic, real-world practices. With the effort to recreate meaningful and existential experiences from their own lives as a motivation, the instructors "furnished" their learning spaces with music technology equipment, sounds, forms and working methods associated with the production of pop music genres preferred by the pupils, forming what the instructors believed to be fruitful premises and starting points for

authentic language use, instruction, communication and collaboration. To sum it up, each workshop manifested itself as an attempt to create an authentic learning space where the physical environment, the technological tools, and the relationships between instructor, pupil and content together created a range of opportunities and limitations for learning in a real-world context relevant to the pupils. Knowledge and Expertise The complexity and variety of the forms of knowledge and practices we meet, as teachers, university lecturers, teacher educators, student teachers, policy-makers or researchers, demands careful thought and reflection (Georgii-Hemming et al., 2013, p. xviii). There are many possible ways of examining such a profound concept in the context of music education. Georgii-Hemming (2013) discusses the different forms music as knowledge may have on the basis of Aristotle's distinctions between episteme, techne and phronesis. One of the reasons why she chooses this approach is to "give a voice to different forms of knowledge, and, by doing so, these voices can be respected and valued as well as being critically observed and developed" (p. 20). An important aspect of this approach is to lift up the importance of practical knowledge, acknowledging the difficulties in verbalizing the tacit or implicit knowledge underlying the many choices made in an educational context (pp. 28–29). In the current study's research question we differentiate between "knowledge" and "expertise". In the results and discussion parts of this chapter, "knowledge" is understood as explicit knowledge, meaning what the research participants themselves recognize and articulate as knowledge in the interviews. The "music technological expertise" of the research participants points to the totality of musical and technological k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 187 skills and experiences integral to their individual musical practice, including all forms of knowledge. In this study, "expertise" means that the research participants have (i) a music-technological skill level considered to be higher than what is to be expected from the average music teacher in the Norwegian school, and (ii) an individual professional music practice based on a specific set of musical and technological skills and experiences. These specifications are important in the way they connect to the understanding of authentic musicianship, where the embracement of technology, in any shape or form, is integral to musical expression. By making the distinction between "knowledge" and "expertise" we acknowledge the many different forms of knowledge at play in this specific educational context, and the way this expertise informs music teaching. In letting the research participants themselves articulate what they recognize as knowledge our task as researchers has been to facilitate and support this challenging endeavor; to tell their stories and make them comprehensible. TPACK – Technological Pedagogical and Content Knowledge One of the approaches that has been used to examine knowledge in the area of educational technology is the TPACK framework (Mishra & Koehler, 2006; Pierson, 2001; Thompson & Mishra, 2007). The TPACK framework extends Shulman's (1986, 1987) formulation of Pedagogical Content Knowledge (PCK) by including Technology Knowledge (TK), and attempts to capture some of the essential qualities of teacher knowledge required for technology integration in teaching. The motivation behind the development of this framework is the "advent of digital technology […] in most arenas of human work" (Mishra & Koehler, 2006, p. 1017). Since technology is continually changing, so will also the nature of Technology Knowledge (TK) and all intersections that include Technology Knowledge, like Technology Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and, of course, Technological Pedagogical and Content Knowledge (TPACK). Utilizing this framework may be helpful in identifying problems with current approaches, but c h a p t e r 7 188 can also offer new ways of "looking at and perceiving phenomena and offers information on which to base sound, pragmatic decision making" (p. 1019). The TPACK framework has been brought into a Norwegian setting (Giæver et al., 2014; Giæver et al., 2017), but has not, to our knowledge, been used to examine the subject music in Norwegian primary and lower secondary schools.

Chai et al. (2013) find the same tendency internationally in an extensive review of TPACK-related research, even though more studies focusing on the subject music have been conducted in the recent years (Bauer, 2013, 2014; Gall, 2017; Macrides & Angeli, 2018; Mroziak & Bowman, 2016). Also, existing research based on the TPACK framework has prioritized "traditional" teaching situations, focusing on teachers' lack of technological knowledge as a main challenge. But the TPACK framework opens for research on alternative learning settings, where "weak" and "strong" knowledge is distributed differently (MacKinnon, 2017). The current study is an example of this and gives us an opportunity to ask different questions: How are music teaching situations affected by music technological expertise? Can research on alternative learning settings influence our view on technological, pedagogical, and content knowledge? Research of this kind is a new addition to the field and may challenge and nuance the TPACK framework, especially concerning the subject music in primary and lower secondary school in Norway. Knowledge of context in the TPACK framework has been cited by several as crucial to the successful integration of digital tools into teaching (MacKinnon, 2017; Porras-Hernández & Salinas-Amescua, 2013; Rosenberg & Koehler, 2015). An example of this is Gall's (2017) adaptation of the original TPACK framework where she has put it into a musicspecific context. The result is a conceptual profile of forms of knowledge as it looks through her studies of teacher education for secondary school teaching at the University of Bristol, England. Gall also encourages other researchers to do the same, possibly forming a starting point for dialogue between teacher educators within and across countries and contexts (pp. 306, 315). Therefore, we see the following model as a fruitful basis for our music-specific study: k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 189 Figure 1: New Music Education Conceptualization of TPACK (Gall, 2017, p. 309). In this model, it is highlighted that music teaching demand a high degree of music skills, music technological knowledge and music pedagogical knowledge that come on top of the general knowledge more widely applicable across different subjects. Examples of music-specific knowledge could be the teacher's proficiency on different instruments and in different genres (Music Skills), or the diversity of "teaching styles" required for instructing class bands, composition or choir (Music Pedagogical Knowledge), or all the music-specific hardware and software that might be of use (Music Technological Knowledge). The star in the middle emphasizes the teacher's knowledge of the students' technological competence, music technology skills and music preferences as a central premise for the successful integration of technology. The outer circle highlights the teacher's personal beliefs and values and has been separated from general c h a p t e r 7 190 knowledge about educational ends, underscoring the fact that the individual teacher's self-confidence and passion for the use of music technology affects the frequency of use. Knowledge about the educational contexts is altered from enclosing the entire model to only parts of it, to take into account that we may find employees with purely technical responsibility and education in school. Although lacking knowledge of a wider school culture, they might still be put to use and contribute to music teaching. In this chapter's discussion section we will provide our own conceptualization and revision of the TPACK framework using Gall's adaptation as our starting point. The obvious advantage of using the TPACK framework is the way it integrates technology into the established discourse of pedagogical content knowledge. It identifies new areas of knowledge and emphasizes the complex interplay of the three bodies of knowledge. Still there are some unclarities we want to address before we go on. The first unclarity concerns the TPACK's understanding of "technology". In this framework technology covers "standard" technologies, such as books, chalk and blackboard, as well as more "advanced" technologies, such as the Internet and digital video, including skills required to operate particular technologies. This classification is problematic at best, even more so in a music context. What can be considered "standard" or "advanced" technologies in the subject music?

It may seem like there exists a misconception of linking the degree of “advancement” with the degree of digitalization, something that makes little sense when it comes to the practical appliance of technologies in an educational setting. For the subject music it is also unclear how “skills required to operate particular technologies” (Mishra & Koehler, 2006, p. 1027), understood as knowing how to play an instrument, does not adhere to Content Knowledge. The problematic analytical divide between Technology Knowledge and Content Knowledge points towards another unclarity in this framework concerning the understanding of knowledge. When describing the different areas of knowledge, Mishra and Koehler (2006) tend to start each definition with the words “knowledge about” or “knowledge of”. Even though there are references to “skills” in Technology Knowledge (p. 1027), and “deep knowledge” (p. 1026) in Pedagogical Knowledge, the descriptions communicate an k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 191 understanding of knowledge as explicit, leading to conscious choices in an educational setting. Such an understanding questions the framework’s capability to explore implicit or tacit forms of knowledge, something we in this study meet with our distinction and relation between “expertise” and “knowledge”. Research Design The data material for this study was generated in 2018 at the Trondheim Municipality’s summer school Science Camp, where 800 children and youths participated in a number of day-long workshops ranging from science to arts and culture. We have followed ten of these workshops, which focused on song writing and production using music technology, led by music technology students from NTNU (hereafter called “instructors”). The following data (Figure 2) was generated: Figure 2: Data of the study. Participation in the study was voluntary for both instructors and pupils, none of who were previously known to the researchers. Recruitment was done after registration to Science Camp closed, meaning normal participation in Science Camp was possible without participating in the study. All ten instructors were invited to join the study while consent was collected from pupils and guardians enabling us to generate audio and video recordings from the workshops. Observation notes were taken from a range of workshops,5 while video recordings were made from six 5 Non-participating observation (Fangen, 2010). c h a p t e r 7 192 of these. Following the workshops, three instructors agreed to individual interviews. The interviews were conducted with the support of videostimulated recall (VSR) (Lyle, 2003; Powell, 2005), where video clips from the workshops formed the basis for reflection. In the interviews we were especially interested in how the instructors perceived and explained the knowledge at play in the different phases of the workshops. They were invited to make connections between their own music technological expertise and the choices they made in planning and executing the workshops. The instructors were also invited to give feedback on general depictions based on the workshops, acting as member-checking and validation of our preliminary analysis. The study is approved by the Norwegian Centre for Research Data (NSD).6 The analysis was conducted in three phases and is inspired by the TPACK-based content analysis performed in the article “Tracing the Development of Teacher Knowledge in a Design Seminar: Integrating Content, Pedagogy and Technology” (Koehler et al., 2007). The first phase concentrated on the video recordings and observation notes. The observation notes contained descriptions of the workshops in addition to reflections made during the observation periods. By comparing the descriptions from the observation notes and video clips from different workshops we identified differences and similarities in the instructors’ approaches concerning preparation of the physical environment, the use of technological tools, and in interaction with the pupils. On the basis of this we created general depictions where we attempted to maintain the internal integrity and relations between different factors in the workshops. In a second review of the videos we identified episodes which we found illustrative of the different approaches adhering to each general depiction, and that were to be used in the interviews. In this phase of the analysis we did not attempt to explicitly identify

knowledge. The second phase of the analysis took place on the basis of the interviews. As mentioned, the instructors were invited to recognize and articulate the knowledge at play in the planning and execution of the 6 See https://www.nsd.no k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 193 workshops. In the interviews the video episodes and the general depictions from the first phase were used as starting points for reflection. Interview transcripts were coded on the basis of the TPACK framework's emphasis on different forms knowledge. The coding categories were not mutually exclusive, making it possible for interview segments to be coded with multiple codes. Through this phase of the analysis we identified a number of forms of knowledge and areas that stood out as central to the teaching practices of the instructors. Excerpts from coded interview segments will be presented in the discussion part. Together with the instructor's input and reactions to the general depictions, this laid the foundation for a new conceptualization and the third phase of the analysis. Finally, the results of the first two phases of the analysis were configurated into three narratives of authentic learning spaces. In these narratives idealized music technology teaching practices and TPACK informed knowledge are brought together expressing the pedagogical choices, work methods, content, values and focus of three music technological teacher roles, as seen through the eyes of the researchers. The narratives may be understood as "second-order narratives" (Elliott, 2005, p. 13), meaning accounts constructed by researchers to make sense of the social world and of other people's experiences. We see these narratives as ideal typical in a Weberian sense; that is, as a strategic, "unified analytical construct" (Weber & Swedberg, 1999, p. 248). Ideal types are not representations of reality, but they deal with and emphasize certain features in order to make a "context distinctive for us to understand in a pragmatic way" (Weber et al., 2000, p. 199). Together with excerpts from the instructors' interviews, the three authentic learning spaces form the basis for the discussion of the study. The data material is derived from workshops planned and executed by music technology students without formal teacher training, and Science Camp exists outside of the physical and professional demands that we meet in school. While this is a definitive prerequisite for our research and might point to exciting ways forward, it may also limit the transferability because the authentic learning spaces might require competence and working conditions that are not present in school. c h a p t e r 7 194 Results – Three Narratives of Authentic Learning Spaces The following descriptions are developed on the basis of this study's data material, where each "person" is constructed across different workshops and instructors. The names of the learning spaces have been chosen because they resonate with words the instructors used about their own roles in the workshops, but also with terminology used in the music industry and in academic discourse. They are not meant to challenge or exclude existing definitions of, for example, the producer role (Burgess, 2013), but rather to make the learning spaces somewhat recognizable and relatable to the reader. In what follows we will present our identification of authentic learning spaces of the producer, the beatmaker and the sound artist. The Producer's Learning Space In the producer's learning space, the teacher is characterized as a guide. Her background is firmly rooted in informal band settings, she is often an accomplished musician, she is open to all kinds of music, and she has listened analytically to large amounts of it. This gives the producer a general understanding of musical conventions and what constitutes a good melody or a good song across a broad spectrum of genres. The producer uses this broad knowledge to inspire others to make music, struggling to achieve the best possible outcome from the ideas they present. Her most profound motivation is to enable others to express themselves, meaning that the quality of the finished product is given a secondary role. The creative process is more important than the finished product in the producer's eyes, and she has a strong belief in the pupils' capability to contribute musically, that they participate for a reason, and that they desire to be involved and have agency in the creative process. Therefore, the music

technology equipment and tools are seen first and foremost as a means to help the pupils' ability to express themselves musically. The producer's guided tour in music creation puts the pupils in an instant creative environment. She provides a wide variety of equipment, such as a computer, a midi keyboard, synthesizers and all kinds k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 195 of acoustic instruments, and encourages the pupils to play and explore the different sounds and possibilities. She takes on a semi-passive role but provides guidance and assistance when an idea arises or the creative process stalls. All the while, she demonstrates necessary techniques for operating the software and music technology, making the pupils gradually more independent and self-reliant. The Beatmaker's Learning Space In the beatmaker's learning space, the teacher is characterized as a craftsman. In her own work she has a keen ear for detail, and she aims to express a professional sound. Therefore, she has a vast knowledge of production techniques and genre conventions and possesses the ability to emulate and reproduce specific soundscapes through the correct use of sounds, effects and processing. Her notion of what constitutes a good song is equally defined by a great sound or arrangement, as much as it is dependent on great melodies or lyrics. The foundation as a craftsman leads the beatmaker to provide "shortcuts" for her pupils, and through handing them pre-made musical structures or loops to start with, they quickly reach a professional sound. Hereafter, she takes on an active role together with the pupils, teaching them production techniques, effects, mixing, programming and processing. The goal is to take the pupils on a musical voyage, where the pupils experience agency and ownership to the product and process by being involved in creating music that sounds close to what they hear and use in their everyday endeavors. The equipment in use resembles a real-world "home studio", typically consisting of a laptop with a DAW, a midi keyboard, studio monitors and a headset. She is not afraid to use advanced terminology, and she has a strong belief in the pupils' previous technical knowledge and ability to understand advanced aspects of production. The Sound Artist's Learning Space In the sound artist's learning space, the teacher is characterized as an explorer. Experimentation is crucial to her work, and the main focus is c h a p t e r 7 196 on the creative potential found in the sounds of an object, a room, an instrument, the body or whatever you might imagine using for musical expression. All sounds are treated equally, whether they come from acoustic, digital or analogue sources, and she experiments both with how she generates and collects these sounds and how she manipulates them. This is enabled by a thorough understanding of technology, where experimentation has led her to know how to "stretch" the capabilities of digital tools, using them for purposes that were not necessarily their intention. At the start of the creative process, the sound artist takes the pupils on a journey, discovering and collecting sounds "in the field" with a handheld recorder. The collected sounds serve as the raw material for further exploration on the laptop, where the sound artist operate the technical aspects, creating instruments and soundscapes from the collected sounds that the pupils can experiment with through digital manipulation. She strives for a collaborative environment where everything is allowed and the ideas can flow freely, manifesting itself as "creative chaos". There are few, if any, references to traditional music or production, with the result that a professional sound, technical skills or advanced terminology is paid little attention. The main goal is to arouse interest and curiosity with a teacher role defined by openness, support and tolerance. Discussion We will now move on to specific descriptions of the knowledge we find characteristic, by employing the TPACK framework and offering our modification of the TPACK model where the context of Science Camp is taken into account. Here, we rely on Gall's (2017) modified TPACKmodel, adapted to further contextualize Gall's emphasis on musical specialization according to our findings.7 7 When reading note that Content Knowledge is referred to as Music Skills, but we retain the abbreviation CK to show the connection to the original TPACK framework. k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 197 Figure 3: TPACK informed by music

technological expertise. In the following we will present our model by elaborating on the types of knowledge we found most significant and characteristic in the workshops: Music Technological Knowledge (TK) and Music Skills (CK), Pedagogical Knowledge (PK), Music Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), Knowledge of Pupils, as well as Educational Ends/Context and Personal Beliefs/Values, before commenting on how these knowledge areas contribute to the understanding of Technological Pedagogical and Content Knowledge (TPACK). Music Technological Knowledge (TK) and Music Skills (CK) We choose to only include music-specific knowledge from Gall's (2017) model, to underline the specific expertise at play in the authentic learning c h a p t e r 7 198 spaces. Each of the instructors describes and demonstrates a convincing expertise in the use of one or more DAWs,8 midi-controllers, synthesizers, microphones and other relevant tools. Also, as shown in our narratives, they demonstrate a high degree of proficiency on different "traditional" acoustic/electric instruments and in different genres, both practically, theoretically and analytically. As we will see, this competence is crucial to their Pedagogical Knowledge (PK) and Technological Pedagogical Knowledge (TPK). Pedagogical Knowledge (PK) Pedagogical Knowledge (PK) can be understood as the conscious use of suitable teaching styles, processes and methods appropriate to different settings. (Koehler et al., 2007, p. 743) As mentioned, Gall (2017) further specifies this as "Music Pedagogical Knowledge", thereby highlighting the diversity of teaching styles required of a music teacher. Gall says, "For example, classroom orchestra or extra-curricular ensembles, which are mainly teacher-led, require very different pedagogical approaches to composing activities in which the teacher best acts as a facilitator of pupil learning" (2017, pp. 309–310). The workshops at Science Camp clearly were "composing activities", and in our data we find that the instructors made conscious choices to apply a teaching style reminiscent of facilitation: "I just want to be flexible and cater to what the pupils want to do" (Instructor 3), and "[m]y role was to be some kind of a robot who could do the technical stuff, but I wanted the pupils to make their own artistic and aesthetic choices" (Instructor 2) are just two of several quotes implying this. First of all, this demands an explanation of how we understand facilitation and, thereby, Music Pedagogical Knowledge in our model. In his research on American music teachers' approaches to popular music, Cremata (2017) describes the role of a facilitator as: 8 DAW is a collective term for music production software, "Digital Audio Workstation", for instance, Ableton Live or Logic Pro. k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 199 A popular music facilitator, responding to his/her students' needs, regulates control levels and differentiates instruction by giving and removing assistance. Rather than focusing on blend, balance and uniformity (aesthetic qualities), a facilitator emphasizes individuality, differentiation and freedom (social qualities). (p. 76) Throughout our narratives, we find clear examples of different approaches to facilitation: from the producer guiding the pupils through their ideas (medium control level), to the beatmaker providing pre-made musical structures (high control level), and the sound artist striving for a highly collaborative environment and "creative chaos" (low control level). Facilitation can also be connected to "real-world" practices, for instance through Burgess' (2013) descriptions of the record producer. Here we find striking similarities to Cremata's definition of the facilitator: The primary task of a record producer is to inspire and enable others toward a common vision, drawing on a flexible leadership varying from determining the goal himself or stimulating others to set the goals (p. 24). Also, we can find similar descriptions in more recent research, for instance in Tuomas Auvinen's (2017) discussions on the practices of the aspiring tracker/producer Mikke Vepsäläinen: In addition to the tracks of a project, the tracker also acts as a social agent by working with singers and musicians to make their tracks better. Therefore, the agency of the tracker is a combination of artistic decision-making, aesthetic judgment, collaboration with other creative parties and

using digital production technology. (Auvinen, 2017) To sum it up, by Music Pedagogical Knowledge we mean the ability to provide leadership through varying levels of control and assistance inspiring and enabling a group towards a common vision while acting both as social agent, decision-maker, creative and aesthetic collaborator and technical assistant. This definition might raise questions as we tap into other areas of the TPACK framework where, for instance, aesthetic collaborator might be seen as Pedagogical Content Knowledge (PCK), and technical assistant as Technological Content Knowledge (TCK). This issue tends to arise when defining or categorizing music pedagogical methods or practices as they often include a whole range of areas that might be defined as not solely c h a p t e r 7 200 pedagogical but also subject or context specific (Nielsen, 1998). If one is to discuss Pedagogical Knowledge with a music teacher, distinguishing statements into discrete pedagogical, musical or music pedagogical categories will not be an easy task and might cloud the totality and complexity of the teacher's knowledge. When the instructors choose facilitation as their approach to teaching they draw on their own experience with collaborative work in studio-like contexts. This experience has been acquired both through the instructor's informal experience, for instance, from their home studio or working with bands, and through formal experiences from their studies in Music Technology at NTNU. In other words: in the instructors' efforts to create authentic learning spaces, facilitation figures as the real-world reference that they craft their teaching style around. This highlights experience and understanding of both formal and informal contexts as key knowledge at play in this study. Furthermore, if you are to cater to what the pupils want to do, be a technical robot and be able to draw out the best of the different initiatives and ideas that arise at any moment, well-developed expertise in a wide range of musical and technological areas is of the uttermost importance. This also underscores the possible experience of the workshops as authentic learning spaces by the pupils, where the instructor figured as a real-world expert employing language, equipment, working methods and the facilitation of a creative process similar to what they would meet in a professional setting. Music Technological Content Knowledge (TCK) Although this is not specifically highlighted in our narratives we found a significant amount of time spent on listening throughout all workshops. At first this might have been understood as just "passing the time" or procrastination, but through our interviews and analysis we have found listening to be a central and explicit knowledge in the intersection between Music Skills and Music Technological Knowledge – forming a characteristic Music Technological Content Knowledge (TCK). The instructors employed different listening states throughout the creative process, guiding the pupils back and forth between them, as listening and ideas have a mutual impact on one another: listening can k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 201 be the driving force to create new ideas, and as the process moves forward new ideas will lead you to another listening state. We have derived three listening states which we will now present together with quotations from the interviews, although we would like to stress that these states are intertwined as the creative process does not necessarily follow a clear forward-moving path from start to finished product. The first state, inspirational listening, is characterized by a free and fast browsing of different sounds, samples, instruments, loops or synthesizers. In this phase it is important not to listen too critically, and you "wait for something to stand out" (Instructor 3) where a synth, a note or a sound can give inspiration which manifests through an obvious "physical reaction" (Instructor 3). When this reaction appears it can be the catalyst for the whole production or songwriting process, where the first pieces of the puzzle fall into place and you start to get "into the zone" (Instructor 1). When you have found that "spark" (Instructor 1) which put you into the zone you might enter the next listening phase – imaginative listening. In this phase you try to listen ahead in time and use your "imaginative ear" (Instructor 2) to propel the creative process forward. You have to "vibe with it and feel where you're going" (Instructor 3), and the phase is

characterized by continuously looping the material you have recorded so far. This might help keep you “inside the music” (Instructor 2) while you test different combinations of sounds and elements. “What you hear inside your head” (Instructor 1) changes along this process, and gradually the structure of the product takes shape and you start to hear the entirety of the song or the production. When more and more elements are established and you are approaching deadline you use the last listening phase, finishing, to a greater and greater degree. This phase consists of mixing, leveling, effects and finishing touches to the arrangement and transitions. Unlike the inspirational listening phase, the finishing phase consists of critical, intense and analytical listening preferably done with a headset and without disturbances. This phase was obvious in our observations but was not specifically expressed in the interviews, maybe because it was mainly employed in solitude when the pupils took a break. This is problematic as we claim to look for explicit knowledge, but we still include it as we clearly saw this c h a p t e r 7 202 listening phase used across all workshops: there was a definite goal for the instructors at Science Camp that the demo would sound as good as possible within the time they had at hand before it was played back for the rest of the participants and taken home by the pupils. Music Technological Pedagogical Knowledge (TPK) All of the instructors used professional, industry standard software, adapting their DAW of choice, like Logic Pro, Ableton Live or FL Studio, to their own specific needs. Drawing on their expertise in music technology they created educational designs and working methods in the software that they deemed manageable for the pupils while still offering real-world tools and a framework for a relevant creative experience. A common approach among the music technology students was to somewhat simplify the DAW at first, taken to an extreme in the beatmaker’s learning space where she introduces the pupils to the software through pre-made musical structures before gradually giving the pupils more and more technical knowledge and control. This knowledge enabled the instructors to set the premises, take control and purposefully adapt the affordances of the software to match their specific approaches to facilitation and authentic teaching styles in the workshops. Knowledge of Pupils At the center of our model we have continued the use of a star from Gall’s model – meaning that knowledge of pupils’ technological competence, music technology skills and music preferences is of the essence in implementing technology in meaningful and relevant ways. We find that the instructors aspired to put this knowledge to play on different levels: through our narratives we describe how the instructors tried to take the pupils’ capability to contribute musically (the producer), their previous technical knowledge (the beatmaker), and their interest and curiosity for sound (the sound artist), into account when creating their learning spaces. Also, through our discussions of authenticity earlier in this chapter we argue that the instructors tried to meet their pupils’ musical taste k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 203 and preferences by recreating the sound, form and working methods associated with the production of music familiar to the pupils. Educational Ends, Educational Contexts and Personal Beliefs/Values In our adaption of the TPACK model we use Gall’s categories for Educational Ends and Contexts, as well as Personal Beliefs/Values, but we have chosen to put them all in one circle encompassing the whole model. In this way we try to describe a context where Science Camp’s facilities, organization and the demands from the arrangers/participants (Educational Ends and Contexts) met the instructors’ own Personal Beliefs/ Values in a beneficial way. At Science Camp the instructors stood quite free to create their learning spaces as they best saw fit. Without much interference they were given the chance to recreate their own practices, aim for “life-changing” experiences and facilitate what they perceived to be authentic learning spaces. This outcome might have been different in a more traditional school setting. Here it is likely that the instructors would have to follow a specified curriculum or adhere to certain assessment demands, maybe compromising their own Personal Beliefs/Values to a greater degree on behalf of Educational

Ends and Contexts. On the one hand, this might obscure the transfer value of this study to other settings. On the other hand, it challenges the working conditions provided for music teachers in school, questioning their opportunities to create real-world learning situations relevant to the learners. Technological Pedagogical and Content Knowledge (TPACK) Technological Pedagogical Content Knowledge (TPACK) is an emergent form of knowledge that goes beyond all three components (content, pedagogy, and technology), and is the basis of good teaching with technology. It represents the thoughtful interweaving of all three key sources of knowledge, while also including knowledge of pupils, educational contexts and ends, and personal beliefs/values. An important aspect of this c h a p t e r 7 204 knowledge is that there is no single technological solution that applies for every teacher, every course, or every view of teaching (Mishra & Koehler, 2006, pp. 1028–1029). Our descriptions of authentic learning spaces, together with our elaboration of key knowledge, take all these aspects into account. The music technological solutions described in each learning space are intertwined with work methods, content, values, as well as musical and educational choices, brought together under the guiding aspiration of achieving authentic learning situations. The identification of these types of knowledge would not have been possible without the music technological expertise of the instructors, but through our descriptions they have been made accessible and visible to new groups of music teachers with less music technological expertise. Summary and Propositions for Further Research For many reasons it is important to envision the knowledge for the future music teacher, but at the same time it is extremely difficult. This may be even more challenging as the rapidly-changing domain of digital technology is a major part of the equation. One way of responding to this challenge is to explore situations and practices that may have something to offer in this endeavor, an approach we have applied in the current study. Instead of looking at "traditional" music teacher settings where music technology is still considered as something new and unformed, we have focused on a setting where technology is an integral and natural part of the educational design. By examining teaching informed by music technological expertise we have configurated three authentic learning spaces. The learning spaces are idealized examples of teaching practices designed on the basis of authentic work with music technology, offering music teachers a relational understanding of how content, teacher roles and working methods may intertwine while working with songwriting and production using music technology. These learning spaces may inspire and guide music teachers wanting to facilitate meaningful music making where music technology plays a natural and integral role. A way to build on this study would be to turn the attention to the pupils' experiences, examining whether or not the authentic learning spaces for teaching songwriting and production k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 205 using music technology contributes to meaningful music experiences, relevance and positive learning outcomes. We have also highlighted types of knowledge that characterizes the instructors' attempts to create authentic learning spaces, expressed through our adaption of the TPACK model. This model highlights not only Technological Knowledge, but also ways of understanding relevant Pedagogical Knowledge, Content Knowledge and how the different types of knowledge intersect and affect one another. This study is, to our knowledge, the first that introduces and adapts the TPACK framework to the subject music in a Norwegian context, and also represents an approach that expands the methodological appliance of the framework by focusing on an "untraditional" teaching situation. We have demonstrated the usefulness of this approach by providing new content to several knowledge categories and, by this, contributed to the further development of the TPACK framework. The approach of authentic learning spaces reinvigorates a pragmatic view of pedagogy, school, education and learning, and questions highly how and why we teach – especially in this era of disruption, rapid changes and an increasing "disconnect" felt by many both in and outside school. It shows that what we count as

significant, real and meaningful knowledge might just as well be found “outside” of the traditional school and formal teacher training – thereby empowering and validating new and different forms of knowledge and approaches to education and teaching. Continued research on how authentic, real-world practices can affect and change music education is therefore of the essence, and we highly encourage more studies where TPACK is used to identify and describe knowledge in untraditional or informal settings. References Auvinen, T. (2017). A new breed of home studio producer?: Agency and the idea ‘tracker’ in contemporary home studio music production. Journal on the Art of Record Production (11). https://www.arpjournal.com/asarpwp/a-new-breed-ofhome-studio-producer-agency-and-the-idea-tracker-in-contemporary-homestudio-music-production/ Barfod, K. S. (2018). Maintaining mastery but feeling professionally isolated: Experienced teachers’ perceptions of teaching outside the classroom. Journal of c h a p t e r 7 206 Adventure Education and Outdoor Learning, 18(3), 201–213. https://doi.org/10.108 0/14729679.2017.1409643 Bauer, W. I. (2013). The acquisition of Musical Technological Pedagogical and Content Knowledge. Journal of Music Teacher Education, 22(2), 51–64. https://doi. org/10.1177/1057083712457881 Bauer, W. I. (2014). Music learning today: Digital pedagogy for creating, performing, and responding to music. Oxford University Press. https://doi.org/10.1093/ acprof:oso/9780199890590.001.0001 Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. Educational Researcher, 18(1), 32–42. https://doi.org/10.3102/0013189X 018001032 Burgess, R. J. (2013). The art of music production: The theory and practice (4th ed.). Oxford University Press. Chai, C. S., Koh, J., & Tsai, C. (2013). A review of Technological Pedagogical Content Knowledge. Educational Technology & Society, 16(2), 31–51. Cremata, R. (2017). Facilitation in popular music education. (Report). Journal of Popular Music Education, 1(1), 63. https://doi.org/10.1386/jpme.1.1.63_1 Dyndahl, P., & Nielsen, S. G. (2014). Shifting authenticities in Scandinavian music education. Music Education Research, 16(1), 105–118. https://doi.org/10.1080/14613808.2013.847075 Elliott, J. (2005). Using narrative in social research: Qualitative and quantitative approaches. Sage. Fangen, K. (2010). Deltagende observasjon [Participating observation] (2nd ed.). Fagbokforlaget. Folkestad, G. (2006). Formal and informal learning situations or practices vs formal and informal ways of learning. British Journal of Music Education, 23(2), 135–145. https://doi.org/10.1017/S0265051706006887 Gabrielsen, A., & Korsager, M. (2018). Nærmiljø som læringsarena i undervisning for bærekraftig utvikling: En analyse av læreres erfaringer og refleksjoner [Local environment as a learning space in education for a sustainable development: An analysis of teachers’ experiences and reflections]. Nordina, 14(4), 335–349. https:// doi.org/10.5617/nordina.4442 Gall, M. (2017). TPACK and music teacher education. In A. King, E. Himonides, & S. A. Ruthmann (Eds.), The Routledge companion to music, technology, and education (pp. 305–318). Routledge. https://doi.org/10.4324/9781315686431 Georgii-Hemming, E. (2013). Music as knowledge in an educational context. In E. Georgii-Hemming, P. Burnard, & S.-E. Holgersen (Eds.), Professional knowledge in music teacher education. Ashgate. Georgii-Hemming, E., Burnard, P., & Holgersen, S.-E. (2013). Professional knowledge in music teacher education. Ashgate. k n o w l e d g e f o r t h e f u t u r e m u s i c t e a c h e r 207 Gilmore, J. H., & Pine, B. J. (2007). Authenticity: What consumers really want. Harvard Business School Press. Giæver, T. H., Johannesen, M., & Øgrim, L. (2014). Digital praksis i skolen [Digital practice in school]. Gyldendal akademisk. Giæver, T. H., Johannesen, M., Øgrim, L., & Bjarnø, V. (2017). DidIKTikk: Fra digital kompetanse til praktisk undervisning [DidIKTikk: From digital competence to practical teaching] (3rd ed.). Fagbokforlaget. Green, L. (2002). How popular musicians learn: A way ahead for music education. Routledge. Green, L. (2008). Music, informal learning and the school: A new classroom pedagogy. Routledge. Herrington, J., Reeves, T. C., & Oliver, R. (2014). Authentic learning environments. In J. M. Spector, M.

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students' unique artistic expression, and that this opportunity is distinct in art education in general and in electronic music education in particular. Further, it is argued that electronic music students might benefit from having a conscious relationship to the technologies they are immersed in, in order to see alternative ways of making (popular) electronic music.
Keywords: Gert Biesta, subjectification, popular music, music technology, electronic music, higher education c h a p t e r 8 212 The massive invasion of electronic dance music in the popular music scene in combination with accessible, affordable technology and enhanced informal learning platforms has created a large group of young musicians using their laptops, tablets or phones as creative tools (Bell, 2018). These young musicians are often self-taught, having acquired their skills and experience via online resources from their bedroom studio, often in solitude (Bell, 2014). The rise of this group suggests that "educators need to accept contemporary musical practices (…) as valid, and teach the associated skills," which further "involves transforming the ways in which we think about music and music education" (Brown, 2015, p. 5). In other words, while still developing "conventional" popular music in educational settings, we must also pay attention to the development of electronic music within this very field. The questions asked when engaging with these issues are important in terms of the answers they will provide, and this article aims at addressing some relevant (and potentially overlooked) questions worth considering in this matter, in light of some of the more general educational trends and challenges. In other words, the research question for this article is "which important questions should educators within the field of higher electronic music education ask in order to further develop educationally balanced programs?" After an outline of the current educational context in popular music education and in education in general, I will use the framework of educational theorist Gert Biesta1 to investigate which questions will be generated when applying this framework to higher electronic music education (HEME). More specifically, I will use Biesta's reflections on why and who we educate to generate questions related to how we educate in HEME. In this process I will also draw on works exploring how popular musicians learn differently to classical musicians (Folkestad, 2006; Green, 2002, 2008), to find similarities and differences in the relationship between how popular musicians and electronic musicians learn. I will emphasize the branch of electronic music that has emerged from the realm of popular music, not that of classical art music or jazz. This is due to how the entry of electronic music into the popular music scene in combination with 1 This framework is developed and presented in four books (Biesta, 2006, 2010, 2013, 2017b). b a l a n c i n g e d u c at i o n a l p u r p o s e s w i t h i n h i g h e r e l e c t r o n i c m u s i c e d u c at i o n 213 affordable and accessible technology has created both interesting and challenging situations in popular music education. To further elaborate, I will also bring in some aspects of Heidegger's discussions on technology (Heidegger, 1977). Lastly, there will be a brief discussion of how to approach potential answers to the generated questions of how we educate in order to find a meaningful balance of educational purposes in HEME. I argue that art education in general and electronic music education in particular have a unique opportunity to address subjectivity through unique artistic expression which will contribute to a balanced education for our students. Though there may be some implications in the arguments made in this chapter, I wish to be clear that I am not discussing whether or not HEME should be separated from higher popular music education (HPME), just as HPME in many cases has been separated from western classical music education. However, I still think it is important to talk about HEME in slightly different terms than HPME due to some quite substantial differences that will be addressed in the following sections. Educational Context of Popular (and) Electronic Music To clarify the context of this chapter I will give a brief outline of how the Department of Popular Music (DPM) at the University of Agder in Norway approaches higher popular music education and electronic music, before placing it in the broader context. DPM was established in 1991 and is one of two courses that the

University Board defined as a signature study in 2013, meaning a course that "truly excelled, and that was the very hallmark of this university" (Tønsberg, 2014, p. 29; emphasis in original). It is a performance-based program, and many students become participants at the highest level in the Norwegian popular music scene following the completion of their Bachelor, Master or PhD program. Due to technological developments in the music industry, DPM introduced a specialization in electronic music in 2013, offering students electronics (most commonly laptop) as an instrument. One implication of this approach is that the program not only utilizes composition and production as an c h a p t e r 8 214 educational tool, as proposed by Tobias (2013) and Lebler and Weston (2015) for example, but also explores the ways in which technology enables the students to bring the studio onto the stage in live performances. The technologies in the latter approach are described as threshold technologies by Knowles and Hewitt (2012), who further describe how artists such as Ed Sheeran and Imogen Heap use performance recordivity2 to make their music-creating transparent. Renzo and Collins (2017) elaborate on how threshold technologies contribute to transparency, and Kjus and Danielsen (2016) show how different Norwegian artists use such technologies differently to implement their works from the studio into their performances, dependent on their desired type and level of creative agency in the performance. These approaches to electronics and technologies at DPM have opened the door to the realm of art music and improvised electronic music, and the tension between the popular electronic music and electronic art music has proved to be an interesting interface for exploring musical ideas. When looking at the field of popular music education more broadly, the research undertaken by Lucy Green has been a major influence, showing how popular musicians learn in informal settings outside formal education institutions (Green, 2002). Through her numerous studies she shows how popular musicians develop their musicianship through informal and collaborative approaches to learning, and addresses how teachers tend to approach popular music in the curriculum in the same way they approach classical music, missing out on using the techniques actually used by popular musicians (Green, 2008). Based on these and similar studies (e.g. Folkestad, 2006; Söderman & Folkestad, 2004), institutions around the world have implemented aspects of these informal methods and techniques to enhance their formal programs. Queensland Conservatorium in Griffith University serves a good example (Lebler & Weston, 2015). Though these methods differ from the classical approach to music in many ways they still align nicely with other educational endeavors, for example, collaboration. Consequently, the motivation and argumentation for implementing them in the programs are quite easily recognized. 2 Performance recordivity is when recording in a live performance. b a l a n c i n g e d u c at i o n a l p u r p o s e s w i t h i n h i g h e r e l e c t r o n i c m u s i c e d u c at i o n 215 This is a critical point as I now move into the realm of higher electronic music education. Though electronic music is well established within fields like art music, hip-hop and dance music, its massive invasion into the popular music scene, in combination with enhanced online resources and accessible, affordable technology, represents a new situation in the field of education. Students often enter the educational system with radically different musical backgrounds and approaches than what is expected by the teachers, which has clear similarities to the cases Green and her likeminded researchers observed more than 15 years ago. As noted by Brown, "Information is accessed on a need-to-know basis, rather than deliberately organized or following a set curriculum," and "the experiences of such musicians resemble a pedagogy that is based more on creativity than on repertoire" (Brown, 2015, p. 20). Burnard (2007) argues similarly, urging educators to explore the potential in the relationship between creativity and technology. However, it's fairly easy to recognize the same pitfall – the tendency of institutions to simply change the content without acknowledging the fundamental structural differences in how electronic musicians acquire and develop their skills compared to popular musicians. An important and easily overlooked

aspect regarding the content is how the content itself often serves as a means to a different end. Take the content of learning notation as an example as this represents a long and ongoing discussion (Dean, 2019; Paul, 2017; Schmidt-Jones, 2018). The purpose and end of learning notation is not really learning notation. The purpose is to provide meaningful ways to write, analyze and talk about music. If we miss the distinction between content and end we might easily lose important aspects of what we are actually teaching, as well as meaningful methods to reach that end. For electronic musicians, notation might not be the best way to describe the music they are producing due to the importance of sound quality, timbre, effects and other parameters not covered by the current notation system (Roads, 2015, xxii). There are numerous other ways in which electronic musicians can discuss their music which may be more accurate and meaningful. To be clear, this is not to argue against notation in electronic music curriculum. There are strong arguments that support keeping notation in the curriculum due c h a p t e r 8 216 to communication with other musicians and being a part of the broader music business. Rather, this is an attempt to show how content and ends are not necessarily the same, and that focusing on the end when establishing the content and pedagogical methods is crucial. Educational Context in General The general educational policy in Norway during the last decades, which I partly criticize in this article, has been heavily influenced by the surprisingly weak PISA results in the early 2000s (Kjærnsli et al., 2004; Roe et al., 2007). The response to these reports was a clear turn towards a management by objectives-oriented approach to education, mainly through National Tests3 (Søgnen et al., 2002) and a new national curriculum, the LK06 (Søgnen et al., 2003). This focus on standardization and educational transferability was also reflected in the higher education system when Norway joined the Bologna process in 1999. Comprehensive research was (and still is) done to define and select competencies that would prepare learners to join the future workforce, a workforce that will probably be both increasingly diverse and complex, and transformed by automation (Council Recommendation of 22 May 2018, 2018; Fadel et al., 2015; Fullan & Langworthy, 2014; OECD, 2005; UNESCO, 2014). Hence, over the last decades it seems to be a tendency to put more emphasis on competencies of "personal character," 4 the human traits that distinguish us from automation, machines and artificial intelligence. Creativity, the ability to put knowledge into use, to communicate and collaborate well across cultures and borders, and to be a confident, open-minded and engaged citizen are some of the features that are suggested will be sought after in the future in many of the abovementioned reports. The Norwegian educational policymakers are aligning with these predictions, and in 2020 there will be implemented a new, national curriculum, heavily based on the abovementioned reports (Ludvigsen et al., 2014; Ludvigsen et al., 2015), with a clearer emphasis on these personal characteristics 3 National Tests is a national system for benchmarking Norwegian schools. 4 Commonly referred to as "soft skills". b a l a n c i n g e d u c at i o n a l p u r p o s e s w i t h i n h i g h e r e l e c t r o n i c m u s i c e d u c at i o n 217 (Department of Education and Research, 2019). However, in this new national curriculum the management by objectives-oriented structure is still present, which comes with a set of challenges that have been subject to profound criticism. One of these challenges was addressed by the Norwegian philosopher Hans Skjervheim in the 70s. He argues that education is victim to the instrumentalistic mistake: the tendency to generalize educational principles based on research conducted in specific settings (Skjervheim, 1996, pp. 241–250). He further argues that this positivist approach to education contributes to the objectivation of things and others instead of treating them as subjects (Skjervheim, 1996, pp. 71–87). Øivind Varkøy argues similarly that technical rationality, which is closely related to instrumentalism and the objective-oriented structures that dominate Norwegian (music) education (Varkøy, 2013), can be regarded as a "type of totalitarian ideology, meaning that it presents itself as the one and only way of thinking about education, thereby marginalizing and suppressing other discourses"

(Varkøy, 2015, p. 48). This argument can also be found in Heidegger's critique of technology (Heidegger, 1977). According to Heidegger, the instrumental view of technology has turned into something more challenging to human society, and our approach to technology seems to influence our view of humans as well. One of his points is that technology is so effective that we seem to lose sight of other possible ways to exist. In other words, he does not problematize the technology itself but how it blocks other ways of viewing the world. This is not merely a critique of technology but a critique of the instrumental way of viewing the world in general, and the tendency to objectivate others.5 David Lines develops these ideas of Heidegger towards music education, and argues that "this leads to questions of subjectivity – to images, concepts and perceptions of self in music technology contexts, and to an examination of ways in which the self can project positive and creative pedagogical action within controlled technological paradigms" (Lines, 2015, p. 64). This becomes particularly pertinent in the realm of electronic music education which is 5 The format of this chapter doesn't allow a proper development of Heidegger's intricate line of terminology and argument, but I still allow myself to make a few points with reference to his thinking. c h a p t e r 8 218 often very technology oriented and, to quote Lines again, "it seems fitting to discuss some of the deeper questions of how technology shapes the ways of music teaching, in pedagogy, thinking and musicianship" (Lines, 2015, p. 63). Gert Biesta is currently one of the major international contributors to the critique of what he calls the "Technological" 6 approach to education; that is, when making strong connections between educational input and output, and relying heavily on measurements and standardization, in order to ensure the desired output (Biesta, 2015). Again, we see a similar argument as those made above. Further, Biesta argues that this critique has to do with normative validity, concerning the question of "whether we are measuring what we value, or whether we are just measuring what we can easily measure, thus ending up valuing what we (can) measure" (Biesta, 2010, p. 13). In the following section I will illustrate aspects of Biesta's critique by comparing his educational ideas to those of some of the abovementioned reports to show some fundamental differences. I will do so by discussing the question of why and who we educate in general and, in turn, bring some of these conclusions into the field of electronic music education. Why Educate? The question of why we educate, the purpose of education, is one of Biesta's concerns with contemporary education. The purpose of education found in many of the abovementioned reports is to produce human beings to keep the wheels running in society. In other words, education of the individual is a means to a different end, that is, to educate objects with certain qualities. Biesta, on the other hand, urges us to see education of the unique subject as an end in itself, and to educate subjects rather than objects. One example of how this is not the case in contemporary education can be found in the four-dimensional educational framework of Fadel et al. (2015). They present three broad purposes of character education: (1) to 6 To distinguish between Technological as used by Biesta and technological when discussing technology, I will use a capital T when referring to Biesta's term. b a l a n c i n g e d u c at i o n a l p u r p o s e s w i t h i n h i g h e r e l e c t r o n i c m u s i c e d u c at i o n 219 build a foundation for lifelong learning, (2) to support successful relationships at home, in the community, and in the workspace, and (3) to develop the personal values and virtues for sustainable participation in a globalized world (Fadel et al., 2015, p. 81). As we observe, they emphasize the development of "personal values and virtues," but as a means to achieve a different end, namely "sustainable participation in a globalized world," and similar arguments for character development are present in other reports as well (e.g. European Commission, 2019). However, there are other reports that seemingly take the stand for subjectification, although the terminology is a bit different. The OECD DeSeCo project7 suggests "acting autonomously" as one of the three main categories of competency, concluding that individuals "need to develop independently an identity and to make choices,

rather than just following the crowd. In doing so, they need to reflect on their values and on their actions" (OECD, 2005, p. 14). However, in light of how this OECD framework has been utilized to make educational policies, the role of measurement and normative validity comes into play, and the actual emphasis on acting autonomously is in most cases almost absent. These are some of the reasons I find Biesta's thinking and educational framework to be an important and useful alternative. He introduces three main purposes of education: (1) qualification, that is, the acquisition of knowledge, skills and dispositions; (2) socialization, that is, becoming a part of existing social, cultural and political orders; and (3) subjectification, that is, how we exist outside the existing orders through our initiatives and responsibilities (Biesta, 2010, p. 20). One of his main critiques of contemporary education is the lack of balance between these three purposes of education: "much contemporary education seem to be significantly out of balance as a result of a strong – and in some cases – excessive emphasis on the domain of qualification, and often only on a small number of measurable 'outcomes'" (Biesta, 2015, p. 19). The absence of actual emphasis on socialization and subjectification in contemporary education is problematic, and to tackle this Biesta introduces the educational ambition: "arousing in another human being the desire to exist in 7 DeSeCo is the definition and selection of key competences-project by OECD, published in 2003. c h a p t e r 8 220 the world in a grown-up8 way" (Biesta, 2017a, p. 85). With this articulation he places emphasis on the subject itself rather than on the function the subject will have in the "human machine," which implies objectification of the subject. In other words, it matters who we educate. Who to Educate? Another manifestation of the Technological approach to education is, according to Biesta, the language of learning, which refers to how terminology from industrial processes and capitalism has been transferred to the realm of education. This has some critical implications, one of them being that learners are easily thought of as consumers and teachers as providers of goods. From this follows the assumption that "the customer is always right," placing the teachers and educational institutions in a difficult spot where they have to "deliver" an educational "product" according to the expectations of the customer: the student. The effect is the notion that students know best what they should learn and, ultimately, should determine the content of their own education. Biesta argues that if this is the case, if the content and purpose of education is individualized, it will eventually be decided by the market (Biesta, 2006, pp. 22–24). This might, in turn, reduce our students to "customers," suggesting that it doesn't really matter who we educate, only that we educate. In other words, the process-modeled educational system, amplified by the language of learning, produces interchangeable human beings or mere objects. The role they are to fill in society can ultimately be filled by anyone else. Biesta rejects this notion and, in order to build his argument, he emphasizes human subjectivity as an event rather than an essence.9 His understanding of subjectivity emphasizes responsibility10 as a defining feature of unique, human subjectivity. In his own words, "What makes me unique, 8 When using grown-up in this setting, Biesta (2017a) refers to the ability to distinguish between what one desires and what is desirable, taking into account long-term and contextual consequences. 9 For further reading on his critiques of humanistic essentialism in defining humans, see Biesta, 2006. 10 Responsibility in this context is understood as pre-conscious and beyond our control, an obligation prior to any commitment. b a l a n c i n g e d u c at i o n a l p u r p o s e s w i t h i n h i g h e r e l e c t r o n i c m u s i c e d u c at i o n 221 what singles me out, what singularizes me, is the fact that my responsibility is not transferable" (Biesta, 2013, p. 21). To further develop this argument, and to explain how we bring our subjectivity into the world, he turns to Hannah Arendt and her thinking concerning human beings as active beings. Arendt distinguishes three modes of action: labor,11 work,12 and action (Arendt, 1998). While labor and work are means to different ends, actions are activities that are ends in themselves, and Biesta argues that this is where

our subjectivity encounters the world. To act is to bring something new into the world, a "new beginning," to which the world of other beginnings re-acts. To exist as a human being is to be a beginner. Again, we observe the emphasis on the event. In order for this event to take place there must be a space to bring our beginnings into the world, and this space must necessarily consist of other beginners, bringing their own beginnings into the very same space. This ability to act in such a plural space is, according to Arendt's line of argument, the very definition of human freedom. Hence, without this plural space of other beginnings we cannot act and, accordingly, we cannot exist as free human beings. Further, this suggests that we cannot forcefully make others act. All we can do is to create a space where others freely can project their beginnings and hope for them to do so.13 This is clearly a radically different approach to human subjectivity than that of the interchangeable human being, and though it might seem like an insignificant nuance at first sight, it has clear implications for how we approach education. To summarize the previous line of argument, Biesta emphasizes subjectivity as a fundamental feature of those we are to educate. This suggests that teachers must create spaces where the students can act, that is, to bring their new beginnings into a space of other beginnings. It is "not about the educational production of the subject – in which the subject would be reduced to an object – but is about bringing the subject-ness of the child or young person 'into play'" (Biesta, 2020, 11 Labor is what it takes to maintain the state of affairs (corresponds to the biological processes of the human body). 12 Work is when humans actively change their environment, e.g. the production of things. 13 In relation to music education, a similar Arendtian argument is made by Ferm Almqvist (2019), who points out that courage needs to be encouraged by teachers, "so that all might leave the private hiding place and show who one is in disclosing and exposing oneself ". c h a p t e r 8 222 p. 95). To achieve this, teachers should ask open and difficult questions where the answers are not given, so that plurality can emerge in a space that is unpredictable, risky and weak.14 Only by doing so might teachers create a space where, hopefully, human subjectivity appears. The previous paragraphs suggest that the way we educate is fundamentally formed by how we approach the question of why and who we educate. If it matters who we educate, we must make room for our students to encounter the world as subjects, a task that by nature is both risky and weak. It is a disruptive and challenging way of educating, where students may and will encounter resistance to their own actions. This demands a whole different role of teachers than that of predefined outcomes, and Biesta puts great emphasis on the crucial role of the teacher (Biesta, 2013, pp. 43–58, 2017b). Teachers must use situated judgments for each specific situation, a task which can never be structured into a Technological education. They must also balance the educational purposes against each other, which is not an easy task as they are closely interrelated and interdependent and might even be in direct conflict.15 These questions concerning the purposes of education are normative questions where teachers must engage with values and preferences (Biesta, 2015, p. 15) which further explains Biesta's emphasis on the role of the teacher. Though this might be viewed as an argument to reintroduce the instructional method of teaching and leave the student-centered approach, that is not the whole picture. Rather, Biesta claims that his approach is neither child-centered nor curriculum-centered. In his own words: "Perhaps the best 'label' for it is to call it a 'world-centered' approach (…), focusing on what it means to exist as subject, in, with and in dialogue with the world, material and social" (Biesta, 2017c, p. 15). In other words, his proposal is for the teachers to help students find themselves existing in the world, among others, so that subjectification can happen. 14 Weak in this sense means that there is no strongly predefined outcome or answer, in opposition to the Technological approach. 15 The conflicting example provided by Biesta (2013) is how pressure on exams might be an effective way to achieve good qualifications but might have a bad impact in the domain of subjectification if it implies that competition is better than cooperation. b a l a n c i n g e d u c

When I now return to Higher Electronic Music Education (HEME), I will show how the previous discussions can inform the question of how we educate within this field. I will use Biesta's three purposes of education to generate questions I think might be important to address in the further development of HEME, in order to find a meaningful balance between these educational purposes. Potential answers to these questions will only be briefly touched upon in this article, as answers will vary and differ with each institution and educational program. Sørbø and Røshol (2020) provide an example of how some of these questions might be approached in Chapter 10 in this volume, which is a case study of a oneto-one practice at the Department of Popular Music at the University of Agder. Qualification in Higher Electronic Music Education I concur with Biesta that to succeed as an educator is dependent on finding a meaningful balance between the three main purposes of education (Biesta, 2013, p. 147). HEME is, especially within and emerging from the realm of HPME, a relatively new field of education compared to most other educational fields within the arts. Consequently, this balance is not as established as in other fields, which puts a greater responsibility on each educational institution and teacher to ensure balanced educational programs. For HEME this is especially challenging, being crucially dependent on technology which seems to be developing at an increasing speed, resulting in teachers who don't stand a chance in mastering all the different tools available to their students. According to Heidi Partti, teachers often lean towards either pedagogical fundamentalism16 or pedagogical populism17 when facing this dilemma (Partti, 2017), neither of which are desirable. Further, the job market these students will enter is equally dependent on technology, adapting and changing at the same 16 Pedagogical fundamentalism implies a skeptical attitude towards technology, where teachers to a large extent ignore new technologies and how they affect their students' lives. 17 Pedagogical populism implies a glorification of new technologies, where technologies are put ahead of teaching, and the role of the teachers is often reduced. c h a p t e r 8 224 pace, hence this becomes a question contingent on defining qualification in HEME. Teachers must teach sufficiently generally so that students can apply what they learn regardless of what DAW or electronic devices they utilize, and so that they are able to implement their knowledge in future technologies. At the same time, they must teach sufficiently specifically about technicalities18 so that the students understand how new knowledge may be applied in their specific environment. In addition, the affordances19 of the DAWs have their own musical implications (Bell, 2015, 2018; Røshol & Sørbø, 2020), which might be further illuminated by the way Heidegger discusses technology. As mentioned before, he doesn't problematize the technology itself, but how it blocks other ways of seeing the world. His solution is to connect to the essence of technology; that is, to understand and be aware of the essence of technology because only when we see technology for what it really is can we gain a free relationship to it. Though his implications deal with fundamental ontological questions, there are some pretty obvious parallels to be drawn to the way electronic music students use technologies. For example, being aware of the differences between DAWs will enable them to make informed (and hopefully better) choices in selecting a suitable DAW for specific projects. Another more fundamental example is that if the students fail to recognize how the affordances of their DAW or instrument limit and mediate the creative process itself, and how the DAW's design is in fact musical choices, they won't be able to properly examine their own practices (Bell, 2015; Mantie, 2017). Interestingly, Heidegger argues that art is one of the ways in which this connection to the essence of technology might be achieved (1977, pp. 34–35).20 The point is that when we encounter art, we might experience other ways to exist in the world, other than that provided by technology. Though we can only speculate on how Heidegger would discuss art that is itself heavily dependent on and immersed in technology, as in the case 18 By technicalities I refer to specific functions of specific

software/hardware. 19 When using the term affordance in this chapter, it will be in the same sense as Hutchby (2001), further developed from Gibson's usage: "affordances are functional and relational aspects which frame, while not determining, the possibilities for agentic action in relation to an object." 20 According to Heidegger this is because art is related to (but not similar to) technology, an argument developed from the Greek terms Techné and Poesis as used by Aristotle. b a l a n c i n g e d u c at i o n a l p u r p o s e s w i t h i n h i g h e r e l e c t r o n i c m u s i c e d u c at i o n 225 of electronic music, such speculation could provide interesting starting points for discussions and reflections on how technologies affect our practices through their affordances and mediations. As articulated by Frith and Zagorski-Thomas, "In the studio technical decisions are aesthetic, aesthetic decisions are technical, and all such decisions are musical" (2012, p. 3). Based on the previous discussions, I suggest that the following questions regarding qualification should be considered by teachers and program developers in HEME: what might a good balance between generality and specificity be, to make musical qualifications sufficiently general to be applied across multiple technological platforms and musical preferences, but specific enough to be practically applicable across these very same platforms? How are the students' agency and aesthetics mediated by technological affordances, and how can they gain a conscious and reflected relationship to them? Which pedagogic approaches might contribute to achieve this? And lastly, what can art and music say about the technology it finds itself immersed in? Socialization and Subjectification in Higher Electronic Music Education When now turning to socialization and subjectification, I will discuss these two purposes simultaneously, as they are closely intertwined in the following line of argument. As a starting point, I will use the emphasis often found in art education on unique artistic expression,21 which might be developed both as artistic subjectivity and general subjectivity.22 Pertinent to this discussion is how Biesta distinguishes between uniqueness as difference and uniqueness as irreplaceability (2013, pp. 19–22). Uniqueness as difference can be connected to having a clear artistic identity that differs from other artists, to have artistic subjectivity, and has to do with 21 Unique artistic expression can also be termed personal sound, the student's own voice, individual expression etc. I've chosen unique artistic expression due to Biesta's discussion on uniqueness and expression. 22 When used in relation to artistic subjectivity, I will use general subjectivity to distinguish subjectivity as discussed previously in this chapter from artistic subjectivity. c h a p t e r 8 226 the way the artists connect to the aesthetic discourse they are a part of. However, when approaching artistic subjectivity within the educational purposes of Biesta, the focus on unique artistic expression (uniqueness as difference) becomes a question of identity, which to Biesta has to do with socialization: how we become part of the existing order of things. In other words, to Biesta identity has to do with how we relate to the practices and structures of our society which concerns socialization rather than subjectification (Biesta, 2020). Though this emphasis on unique artistic expression is obviously an important aspect of art in education, Biesta further argues that expression in itself is never enough; teachers need to engage in the quality of the expression put forward. Quality in this regard does not refer to aesthetic quality, but to whether what is being expressed has the quality of making students "exist well, individually and collectively, in the world and with the world" (Biesta, 2017c, p. 15; emphasis in original). I understand this to mean that teachers should engage the students in the purpose and value of their unique art and music, and illuminate the possible political implications that are inherent in all art. In this context, uniqueness as irreplaceability becomes meaningful; the students are irreplaceable in their relation to their art, but also in their relation to their teachers and fellow students. This concerns their general subjectivity, which is the "kind" of subjectivity initially discussed in this chapter. What I have tried to argue here is that the two approaches to subjectivity in HEME are closely intertwined through the emphasis on unique artistic expression; the artistic subjectification will reflect on and be

informed by the general subjectification, and vice versa. In other words, teachers in HEME, as in arts in general, have a unique opportunity to address general subjectivity by using artistic subjectivity as a starting point. Another issue that is addressed when applying Biesta's educational purposes to HEME is that of structural differences in how electronic musicians acquire their knowledge and skills. As previously mentioned, the "solution" when popular music entered the realm of classical music education (as described by Green) was for the formal institutions to adapt structural aspects from informal learning, which aligned nicely with other educational endeavors. In electronic music, however, many students that b a l a n c i n g e d u c at i o n a l p u r p o s e s w i t h i n h i g h e r e l e c t r o n i c m u s i c e d u c at i o n 227 enters HEME today are self-taught, gaining their musical skills in solitude from online sources like YouTube channels and software tutorials. There are some advantages in this solitary way of working. One often recognized at DPM is how electronic musicians tend to have a deeper focus on the "whole picture" when composing or performing, as they usually are responsible for the total result. Traditional instrumentalists, on the other hand, tend to focus on their own role and performance and, at least partly, miss the context. However, if socialization and subjectification are to be increasingly important parts of the curriculum, such isolated ways of acquiring knowledge and skills might become a challenge. Here the conflict between the purposes of education becomes very practical. Electronic musicians use online communities extensively, which might be effective in regard to qualification and socialization,23 but makes subjectification challenging. There are aspects of human interaction that cannot be fully replaced by online communication or virtual representations, at least with the current technology. One example could be the opportunity for the students to act, in the Arendtian sense of the word as developed by Biesta previously in this chapter. Such inter-acting would benefit from the students being physically together in order to grasp and understand the full range of the other students' re-actions. Hence, in considering educational balance in education, online communities and collaborations might be a helpful supplement, but can not replace the need for face-toface interaction. This exemplifies how the tension between electronic and popular music faces more severe structural challenges than is the case between popular and classical music. Based on the previous discussions, I suggest that the following questions regarding socialization and subjectification should be considered by teachers and program developers in HEME: How can we address subjectivity through the emphasis on unique artistic expression? How can we use artistic subjectivity to inform general subjectivity, and general subjectivity to inform artistic subjectivity? What does it mean in HEME to create spaces where our students can act and re-act? Which situations, 23 Here it becomes clear that socialization has less to do with being social and more to do with what has been described previously. c h a p t e r 8 228 topics and questions might facilitate such spaces, and what is the role of the teacher in these situations? Further, how can teachers take methods and structures from informal electronic music learning seriously while balancing other educational purposes? What will these new approaches look like in formal settings? Finally, which values and preferences comes into play in making these decisions? Conclusions In this chapter I have used the framework of Biesta's educational purposes to generate questions that teachers in HEME might want to consider in order to develop their curricula and programs. To my knowledge, after conversations with Biesta and searching the available online databases, this has not been done before, and I hope this chapter can contribute to the further development of HEME with some new perspectives. I have intentionally raised questions rather than provided answers, as no one answer will fit all the various practices. However, the questions asked, and the underlying philosophy used in addressing the questions, insinuate a certain position in educational thinking, and touch upon the question of how we educate. Following the arguments in this chapter, I propose for teachers in HEME to strive for educational balance in

their programs, emphasizing subjectification in addition to qualification and socialization. I argue that subjectification might be approached through the emphasis on the students' unique artistic expression, emphasizing the duality of Biesta's notion of uniqueness and expression, and that this opportunity is distinct in art education. However, I have also shown how the informal structures in which electronic music students acquire their knowledge and skills create challenges to this approach. I further argue that students might benefit from having a conscious and reflective relationship to the technologies they are immersed in, in order to see alternative ways of making music. To find educational balance requires expertise and experience, and more publications reflecting different practices in HEME that tackle this challenge are a crucial part of the further development. Teachers continuously make situated judgments in varying situations, and each b a l a n c i n g e d u c at i o n a l p u r p o s e s w i t h i n h i g h e r e l e c t r o n i c m u s i c e d u c at i o n 229 experience, good or bad, can inform other teachers in their settings. Subjectification through unique artistic expression is an underdeveloped area in research, and I would argue that case studies of good (or failing) practices will be important steps in developing these fields, in close dialogue with theory. References Arendt, H. (1998). The human condition (2nd ed.). University of Chicago Press. Bell, A. P. (2014). Trial-by-fire: A case study of the musician – engineer hybrid role in the home studio. Journal of Music, Technology & Education, 7(3), 295–312. https://doi.org/ 10.1386/jmte.7.3.295_1 Bell, A. P. (2015). Can we afford these affordances? GarageBand and the doubleedged sword of the digital audio workstation. Action, Criticism & Theory for Music Education, 14(1), 43–65. Bell, A. P. (2018). Dawn of the DAW: The studio as musical instrument. Oxford University Press. Biesta, G. (2006). Beyond learning – Democratic education for a human future. Routledge. Biesta, G. (2010). Good education in an age of measurement – Ethics, politics, democracy. Routledge. Biesta, G. (2013). The beautiful risk of education. Routledge. Biesta, G. (2015). On the two cultures of educational research, and how we might move ahead: Reconsidering the ontology, axiology and praxeology of education. European Educational Research Journal, 14(1), 11–22. Biesta, G. (2017a). Letting art teach. ArtEZ Press. Biesta, G. (2017b). The rediscovery of teaching. Routledge. Biesta, G. (2017c). What if? Art education beyond expression and creativity. In C. Naughton, G. Biesta, & D. R. Cole (Eds.), Art, Artists and Pedagogy (pp. 11–20). Routledge. Biesta, G. (2020). Risking ourselves in education: Qualification, socialization and subjectification revisited. Educational Theory, 70(1), 89–104. https://doi.org/10.1111/ edth.12411 Brown, A. R. (2015). Music technology and education: Amplifying musicality. Routledge. Burnard, P. (2007). Reframing creativity and technology: Promoting pedagogic change in music education. Journal of Music, Technology & Education, 1(1), 37–55. Council of the European Union. (2018). Council recommendation of 22 May 2018 on key competences for lifelong learning (Text with EEA relevance). Official Journal of the European Union. C 198, 1–13. https://eur-lex.europa.eu/legal-content/EN/TXT/ PDF/?uri=CELEX:32018H0604(01)&from=EN c h a p t e r 8 230 Dean, J. (2019). The vanishing stave? Considering the value of traditional notation skills in undergraduate popular music performance degrees. In Z. Moir, B. Powell, & G. D. Smith (Eds.), The Bloomsbury handbook of popular music education (pp. 73–80). Bloomsbury Academic. Department of Education and Research. (2019). Core curriculum – Values and principles for primary and secondary education. https://www.regjeringen.no/ contentassets/53d21ea2bc3a4202b86b83cfe82da93e/core-curriculum.pdf European Commission (2019). Developing key competences for all throughout life. EU. https:// ec.europa.eu/education/resources-and-tools/document-library/ developing-key-competences_en Fadel, C., Bialik, M., & Trilling, B. (2015). Four-Dimensional education: The competencies learners need to succeed. Center for Curriculum Redesign. Ferm Almqvist, C. (2019). An aesthetico-political approach to music education: Transformation beyond gender. In R. E. Allsup & C. Benedict (Eds.), The road goes ever on: Estelle Jorgensen's

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this article, I investigate the research question: How can a teaching program where students composed with GarageBand on iPads be considered as middle ground education? The concept of middle ground education means that students are encouraged to exist in the middle ground between their own desires and their responsibilities towards the world (Biesta, 2018). In this article composing is seen as the process of making a music product with the chosen technology. In the analysis, performative inquiry focusing on stop moments (Fels & Belliveau, 2008) works as a key to grasping the students' negotiation of their own desires and c h a p t e r 9 234 responsibilities to the world. Furthermore, I explore how music educational practice with iPad and GarageBand can be designed to meet the intentions of a middle ground education. First, I will discuss how this can be a relevant perspective in music education. Second, I will explore the article's main theory, Biesta's concept of middle ground, and how this can be operationalized as a lens for analyzing the empiric material. Third, I will analyze the materials and present the research results. Finally, I will discuss the results and propose the joint concepts of inhibitory and promotional challenges as a guide for educational task development. Music Education Between Traditional Knowledge and Genuine Expression In the field of music education there is a diversity of different music educational practices. In traditional music education it has been common to emphasize the continuation of musical cultural conventions, like traditional Western music theory, musical craftsmanship techniques and canonized musical instruments. From such an educational starting point, the content of music education will first and foremost be about challenging students to internalize concepts, symbols, craft techniques and style ideals—concepts that exist in the culture regardless of the individual student's expressive urges. The contradiction to such an educational strategy would be to set aside all cultural conventions and to challenge students to express their innermost ideas and feelings in any way they might find— regardless of the outside world or its reactions. Bresler (1998) and Espeland (2007) mention "school music" as a music practice that differs from other music in the culture. "School music" points to a continuum with possible approaches in music education which stress different aspects more or less. In a Swedish context, Olsson (2014) points out that musical expertise has been neglected in didactic work that involves composing in such a way that knowledge-based perceptions are reduced to a question of personal musical expressions (p. 100–101). In this article I investigate how different parts of such a continuum could be emphasized simultaneously in educational practice by allowing students to explore and reshape culturally-shaped co m p o s i n g o n i pa d a s m i d d l e g r o u n d e d u c at i o n 235 musical resources, and thus also culturally-shaped musical knowledge which is embedded in technology, on the basis of their own musical desires. In this context Biesta's concept of middle ground is relevant. He writes about "the potential disappearance of the arts from art education" and "the potential disappearance of education from art education" (Biesta, 2018, p. 12). His main point is that art education is about the student's desires and the material and socially-constructed world meeting in the student's actions. Based on this, the consequence of a possible lack of art or education is that the student's desires or responsibilities towards the outside world, respectively, are removed from education. Both are equally unfortunate, according to Biesta, who proposes an art education that promotes the responsibility of the subject by asking it to seek a middle ground between its own desires and its responsibilities to the world. Biesta's (2018) concept of middle ground is based on his wider philosophy of how education should promote emancipated and responsible subjects prepared for social participation fostering democracy (Biesta, 2014; Abup, 2015). What Biesta does not answer is how such education can be carried out in practice and certainly not how it can be done in a music educational practice. There is a need for developing practical educational strategies based on Biesta's philosophy, and this is a main purpose for this article. However, there are some research contributions that are not developed on the basis of Biesta's philosophy that can,

nevertheless, be related to similar proposals of music pedagogical practice. At the same time, these research contributions are brought together by their focus on digital technology in music education. In the following I mention some of these research contributions, starting with the two recent handbooks of technology and music education from Oxford University Press (Ruthmann & Mantie, 2017) and Routledge (King et al., 2017). Researchers argue that digital technology as part of music educational practices contributes to democratization of music culture (King et al., 2017, p. xiii) and smoothing out of power structures in learning contexts (Webster & Williams, 2017, p. xiii), and to reconceptualizing music classrooms into hybrid spaces where what have traditionally been different musical subjects are joined into renewed, vitalized music pedagogical practices (Tobias, 2012; Crawford, 2014; Kardos, 2017; Humberstone, 2017). c h a p t e r 9 236 Digital technology is also considered as contributing to a change from instructive to constructive practices, from teacher-guided to studentcentered practices, towards more complex tasks and more different resources (Wise et al., 2011). In the growing research base on music pedagogical use of iPad, several contributions argue that the iPad technology can be utilized to promote learning activities that enhance students' agency (Brown et al., 2014; Juntunen, 2017; Bandlien & Selander, 2019). The impact of task formulation on students' involvement in composing activities is another relevant theme in research literature (Nilsson, 2002; Breeze, 2009, 2012), which in my opinion has a lot to do with what kind of learning the task prepares for. Nilsson (2002) views the tasks as invitations to play with the music with the musical technologies they have available and based on images used as inspirational prompts. Breeze (2009, 2012) suggests that the tasks do not contain prescriptions—recipes, but rather proscriptions—prohibitions and omissions. His goal is to create assignments where students are free to develop their musical expression without getting lost in the plethora of opportunities. Biesta's Art Pedagogical Philosophy and Methodological Perspectives Biesta (2014, p. 45–46, 2018, p. 14–15) argues that education should contribute to the development of responsible subjects. He writes: To exist as subject does not mean to simply escape from any external determination, but to ponder the question of … when, how and to what extent we should limit and transform our own desires in face of the desires of others … To exist as subject thus means to exist in dialogue with the world; it means being 'in the world without occupying the center of the world'. (Biesta, 2018, p. 14–15) According to Biesta, the task of education is to turn the student's face towards the world so that the world is shown to the student and the student is shown to the world. The students are allowed to bring their own wishes and desires into the education process. Their encounters with both the material and the socially-constructed world are manifest in the experience of resistance. This resistance can lead to an increased effort co m p o s i n g o n i pa d a s m i d d l e g r o u n d e d u c at i o n 237 and growth, but it can just as well lead to a weakening or destruction of oneself or the world. Biesta's point is that the responsible subject seeks the middle ground (Biesta, 2018, p. 16) between the destruction of oneself and the destruction of the world. Here, the subject can be active and responsible in the world without annihilating itself and without itself being the center of the world. To support the student on the road to this middle ground, education does not use force; rather it contributes with ethical authoritative questions: "The key educational question, therefore, is whether what I desire is what I should desire, whether it is desirable for my own life, my life with others" (Biesta, 2018, p. 18). Education should be a humanizing process that reinforces students' desires to be in the world (Abup, 2015, 30:10). Such a reinforcement cannot occur through sociallyestablished truths and ready-made understandings imposed on the student from the outside. Also trying to force a person to exist as subject would have the opposite impact by making them an object. Based on Biesta's thinking, students' experiences of and dealing with their own desires are an important part of education, and the art subjects play an important role in achieving this, because the students'

desires can be expressed, formed and transformed into art. The hope of such an education may be that the student, as a subject in the encounter with other people and the culturally-shaped world, creates expressions that they want to take responsibility for while aiming to touch people and their surroundings. Then the students' own art expressions are of decisive importance for their education and Bildung.1 In such a context, by comparison, a teaching design aimed at reproducing and counting preproduced knowledge content has little to contribute. The analysis in this article seeks to examine encounters between the student's desires and the world – and also the student's actions in these encounters. In researcher narratives about students' composing processes, performative inquiry is included to analyze the encounters, such as stop moments (Fels & Belliveau, 2008). Stop moments are moments that call for attention – the participant's attention as well as the researcher's attention. Stop moments are permeated with affect. They influence, 1 The german traditional term for the personal, social and subject-related development and formation that education entails. c h a p t e r 9 238 touch and engage the participants and/or the researcher. A stop moment can be an in-between space, a turning point, a strange event or a discovery. In this way, this analysis examines how Biesta's concepts of desire, world, resistance, subject and responsibility can be observed as concrete materiality, construction, challenge, choice, solution and action in learning activities. In this way, stop moments are not limited to what is spoken, but can rely on material embodiments that the researcher picks up, points to, and sometimes is able to interpret and contextualize. In this analysis, there is a need for an articulated language to explain observations. Both a traditional music theoretical analysis and popular musical analysis (Gracyk, 1996; Yadata et al., 2014) are included as supplemental lenses as they tend to mutually support each other. The popular musical analytic lens especially enables focus on students' abilities and knowledge, without judging it by traditional Western music conventions and the normative standards that follow, as it is developed from a post-structuralistic point of view and emphasizes receptive understanding of music (Moore, 2003). This analysis is based on the students' partial and final music products as well as my field notes and interviews from a microethnographic field study, where 80 eighth graders divided into four groups of 20 students each composed music using GarageBand on iPads during their music lessons—90 minutes each week for over two months (Bandlien, 2019). The research participants and their parents were well-informed about all parts of the research project, which also is approved by NSD.2 In the field work I was a participant observer (Hammersley & Atkinson, 2007; Fetterman, 2010). As a participant my presence may have impacted on the material. However, my role in the classroom as an assistant teacher provided me with an opportunity to get close to the students and the learning activity as an observer without impacting greatly on the students' work in a normative manner. Most of the contact with the participants was initiated by the students themselves, who wanted to show me their work. In this way I got to observe most of the students, but I had better contact with some of them. I collected and analyzed the musical products 2 Norwegian Center for Research Data, data protection services. co m p o s i n g o n i pa d a s m i d d l e g r o u n d e d u c at i o n 239 of all the students after each lesson. This gave me a good overview of how the material emerged. After all lessons I conducted semi-structured interviews with all the students. Strong aspects of the study could be that the results are based on a large microethnographic study with 80 participants which opened for exploring unforeseen aspects. Limits of the study could be about the use of one particular technology and the choice of one particular song, Stay With Me. Limits could also be about the researcher's ability to observe, document and analyze the material. The students were given two assignments. The first assignment was intended as a training task to practice using the technology and the theoretical concepts of music contained in the software. Some of these concepts, musical form, rhythmic measures and bars, chords and tempo, were verbally explained, visualized and demonstrated musically

by the teacher before the students started working. In this assignment students were to reproduce a recognizable version of Sam Smith's (2014) song Stay With Me with a minimum of four instrumental tracks including a vocal track. In spite of the teacher's explanation and demonstration, the students encountered a number of challenges when attempting to do the task. In the second assignment, the students were to create their own piece of music using the resources embedded in the provided technology. The assignment asked them to use more than one instrument, to sing, rap or record other sounds with the microphone, and to form a coherent piece of music with a tension curve. The students attempted performative actions in their efforts to shape their own musical expressions. I have chosen two composing processes that provide good examples of encounters between the students' desires and the material and sociallyconstructed world. The two examples can be regarded as illustrative and representative examples from the total material because they represent examples from both the two different tasks given and testify to how most of the participants made efforts to utilize their musical desires and personal musical experiences from informal learning arenas in their composing. In addition to being representative in this way, the two examples excel at providing concrete material that can easily be connected to the receptive music understandings that are so important in popular music analysis and, thus, also for recognizing musical elements desired by the c h a p t e r 9 240 students. The two compositional processes are unique in different ways, and they are suitable for providing perspectives on and concrete examples of key elements of Biesta's philosophy. Both stories contain concrete examples of the concepts of desire, world, resistance, subject and responsibility. In the following, I will tell the story about how Jan and Ola made their own version of Stay With Me (task 1), and how Marius and Po composed their own pieces of music (task 2). I will analyze the material carefully through the use of the mentioned lenses and present the research results. In this section, QR codes provide the sound and visual examples of the students' compositions.3 Jan and Ola In the first session, Jan and Ola recorded six beats with an automatic accompaniment (autocomp) of electric guitar, drums, bass and strings. They were missing every fourth beat compared to the original form of Stay With Me. The order of the chords, thus, corresponded to the original form of the song, while Jan and Ola's recording lacked four beats for every three chords. Jan and Ola also switched chords a beat earlier or later than the song's form indicated in some places (Figure 1). Figure 1: Jan and Ola's Version of Stay With Me After the First Session. https://youtu.be/XOE5SLQ6x7o 3 A QR reader for any mobile device can be downloaded for free from your appstore. co m p o s i n g o n i pa d a s m i d d l e g r o u n d e d u c at i o n 241 Jan and Ola had their stop moment number 1 in the middle of the second session. Jan and Ola now became aware that the form they had been using so far differed from the form of Stay With Me. They discovered that the form had four bars, even though it contained only three chords. By trying to sing along with the accompaniment they also understood that the form of the accompaniment was important for the design of the melody. After this, they started all over again—this time adapting to the prescribed form diagram's four-bar pattern. Jan and Ola's stop moment number 1 is about how they meet and align with the social reality of cultural conventions. At this stop moment, there does not seem to be a clear conflict or contradiction between the students' desires and the world in which they operate but rather a discrepancy in understanding. In other words, the students' desires alone are not sufficient to carry the intentional meaning within the musical world in which they operate. At the stop moment, the students' desires are supported and refined through actions which lead to encountering and accepting sociallyconstructed conventions. Thus, the students' desires are also conveyed in a meaningful way in a social context. In this way, the subjects, Jan and Ola, accept the responsibility imposed upon them in their encounter with the world. However, they still repeatedly changed chords one stroke later than the shape chart indicated. They recorded six to eight tracks (Figure 2) with very distinct and differing

autocomp patterns. The combination of the various distinctive autocomps meant that many different musical motifs and harmonic constellations were played simultaneously. From a conventional understanding of music, this can be described as competing patterns of conflict with one another or even as an overload—a problem that continues and grows in the next stop moment. The following QR coded video shows both of the compiled versions as the students left them. It also includes the researcher's investigation into how different tracks interact by adjusting their volumes up and down (Figure 2). Through this exploration it becomes clearer how distinct these interplaying tracks are. c h a p t e r 9 242 Figure 2: Jan and Ola's Representation of Stay With Me After Their Stop Moment Number 1. https://youtu.be/tg7GEj4M52o In the third session, Ola was not present. However, Jan still had his stop moment number 2. In a conversation with me, Jan expressed that he and his partner had not fully agreed on the style choices. He wanted an even more rockier style. It seemed that he now saw the opportunity to get it more the way he wanted. With a furious energy, he made a new version with a total of 29 tracks, of which five or six tracks played together at any one time. Even if Jan and Ola had previously made overloaded music, Jan now went further in the same direction. In this version, Jan included, among other things, small musical spaces—extra break bars—with drum breaks in several places and an electric guitar solo. In other words, Jan went on to explore both the software's audio supply, auto-accompaniment variations and the kind of possibilities which exist in relation to the music's form and structure. Jan's production matches Bell's (2015) metaphor about the inexperienced baker's tendency to mix all of the ingredients together that he has available without thinking about how they will taste. For example, the chords D major, G minor and Fsus2 sound simultaneously, while the electric guitar plays a low E on the fourth beat at the first bar. Such overloading can be characterized as problematic from a traditional music theoretical understanding of music. Jan also continued with the late chord changes for most of the instruments, except for the bass– it kept the form exactly. This, too, contributes to harmonic and co m p o s i n g o n i pa d a s m i d d l e g r o u n d e d u c at i o n 243 formal ambiguity, which might be judged as a problem from a traditional point of view and in the context of this reproducing task. Investigating their composing through a popular music analytic lens, however, it becomes essential to consider this saturated soundscape as an intended musical expression, where the tightly packed and energetic musical texture is most essential for Jan. This musical texture conveys a particular musical expression, with a high tempo and powerful, rocky sound sources and an intensified sound complex, which stands in stark contrast to Sam Smith's original musical expression. Gracyk (1996) writes about ontological thickness in rock music versus the thinness found in note-based music and argues that opinion formation is stronger in what he calls the performative domain. In this context, performative domain may have to do with interpretation, instrumentation and performance rather than traditional analysis categories such as melody, harmony, form and rhythm. Although Jan adheres to the prescribed form, his version of Stay With Me takes on a new and radically different musical expression as a result of performative choices of musical elements and markers that, together, provide the fast, tightly packed and powerful musical expression of his desires. It is worth noting that what from a traditional music theoretical point of view may appear as expressive ambiguity or professional challenges may convey other forms of musical expression from a popular music analytical perspective. The music can also convey other musical desires than those that can be accommodated by traditional categories, such as harmony, tone and style ideal. At this stop moment, Jan's musical desires are evident. His musical energy and intensity are displayed not only in the musical expression, but also in the overwhelming volume of production, as well as in the chaotic, compressed texture and fragmented structure of the production. It is as if Jan himself did not perceive any resistance from cultural conventions. Perhaps it is correct to say that Jan, here, is pushing so hard that

he tends to destroy something in the musical world he encounters. A milder interpretation, however, is that he transforms the materials based on his own desires. I would suggest that Jan's work could have been refined into a clearer art expression through further reflections and authoritative c h a p t e r 9 244 questions (Biesta, 2018), which empathically direct Jan's attention to both how his expression appears and how he wants it to appear. Jan's third stop moment could easily be overlooked, as the final product showed no change other than the creation of an audio track without song recording. But it is precisely this that draws attention —"what is hidden" (Fels & Belliveau, 2008, p. 36). After showing an intense energy production in three sessions, it seems like nothing happened in the last session. What happened, however, was that Jan, in Ola's continued absence, was facing the task of singing alone. He was not idle at all, but spent the whole session trying to find a way to accomplish this insurmountable task. He made technical preparations and planned for the vocal recording, but ended up using the vocal track only to insert a short soundtrack of a drum break and a guitar/bass chord as the finish at the very last beat (Figure 3). Figure 3: Jan's (and Ola's) Last Version of Stay With Me. https://youtu.be/Ry4ODMxFWYg In this third stop moment, it is evident that the resistance that Jan experiences becomes too strong and leads him to a withdrawal. From a Biesta (2018) perspective, this can be viewed as the destruction of his (Jan's) existence as a subject in the world. Jan moved within an area between the claim of the assignment to treat what Gracyk (1996) calls ontological thinness and his own musical desires (Biesta, 2018), which involved the performative treatment of a wider ontological thickness (Gracyk, 1996). The way I see it, Jan's co m p o s i n g o n i pa d a s m i d d l e g r o u n d e d u c at i o n 245 potential for development points towards further negotiation between his own musical desires and socially-constructed and material communicative resources. The insurmountable task of singing and making the expected vocal track is part of the didactic design, indicating that this design can be advantageously changed. Marius and Po Marius and Po worked together. Marius said he liked listening to techno music, especially Pegboard Nerds. In elementary school he liked the subject music because, as he said, "it was better than sitting with a book." He also said that when he makes music at school, he makes "nonsense" music for fun. Po said that he had been learning saxophone a few years ago but had quit because it was too expensive. Nowadays he just listened to pop music. He expressed that he liked composing on the iPad. Marius and Po composed their composition piece by piece for each teaching session. Each of the four pieces had its own distinctive character, and what they did in one session did not change afterwards. In this way, each of the work sessions constitutes its own stop moment (Fels & Belliveau, 2008). Already in the first session, Marius and Po's desire for synthetic sound became clear. In this session, they completed bars 1 through to 20. They let a perfectly smooth 4/4 drum beat run like a solid foundation throughout the entire piece. On top of this, they composed an ABBAA form where the two different parts were constituted through two different automatic synthesizer patterns. Part A uses tones exclusively from a pentatonic scale, which contributes to a fluid and conflict-free harmonic landscape (Figure 4). Figure 4: Part A, Marius and Po. c h a p t e r 9 246 The B section is somewhat more complex. This is recorded by activating and keeping the chord Bb major in the visual interface. The autocomp then plays a gradually decreasing bass line in the upper bass range, Bb – Ab – G – Gb, which is repeated for each beat. However, the students chose a different chord for the bass. This caused the bass tones to shift arbitrarily in relation to the rest of the music for each beat, causing the lower bass to be dissonant with the rest (Figure 5). This bass choice may seem odd based on a traditional music theoretical understanding, but it contributes to a strange, perhaps even weird, and exciting harmonic landscape. Figure 5: Part B, Marius and Po. In this first session they also used GarageBand's sampler. They recorded the sound of a voice shouting a long-running "yeeah!" (author's translation) with a slowly falling glissando. This sampling is played four times in succession

and adapted to the eight bars from five to 12. In the next teaching session, they completed bars 21 through to 41. In this section, there are no drum sounds. However, several new variants of synthesizer voices were added, while the harmonic conflict-free automatic accompaniment from part A was continued and processed through a synth sound variation. The new synthesizer voices were two different bass voices that I will call C and D. Also, these were auto-generated autocomps; they were activated by pressing a chord symbol in the visual interface. The bass voice C uses the tones B, A, E and Bb, thus contrasting with the A part (Figure 6). Figure 6: Bass Voice C, Marius and Po. co m p o s i n g o n i pa d a s m i d d l e g r o u n d e d u c at i o n 247 The bass voice D uses tones from the chord F7 (# 9), but only with one tone at a time. This results in a typical blues-like harmony, and it introduces a new contrast with the previous one (Figure 7). Figure 7: Bass Voice D, Marius and Po. A stop moment that happened in this second session was when they found their own way of making melodic vocal recordings. They made their own vocal re-presentation of how they heard the bass voice D playing. Marius sang this representation in the sampler, not in a regular audio track. Then they recorded this into a new MIDI track by holding down a key on the sampler. This meant that Marius could not listen to the bass voice D while the representation was being sampled; he sang freely from memory and his own choices. This has led to a representation that differs from the bass voice D in many ways but that is, nevertheless, recognizable. At this stop moment, the task is met with humor and ingenuity. They deal with the resistance they experience in the requirement to record sound – preferably their voices according to the task – by relying on the technology's resources and capabilities and their own ability to transform these resources into meaningful expressions. When they mimic the "suggestions" of the technology, it also sounds like they're making fun of the technology. Marius and Po had a lot of fun during these recordings. Their desire to have fun became a constructive force in their encounter with the demands of reality. It could be suggested that the challenge of singing was solved when they saw that this could be done with humor—and perhaps even at the expense of the technology. In the third teaching session, they completed bars 42 to 62. In this session, Marius and Po had stop moment number 2. They felt that the various parts were very different, almost like independent pieces of music. It was hard for them to see that the parts could belong together. Marius said afterwards that it had been challenging to see how they could join the parts together as one piece of music. They found that they could do this by inserting small and short independent parts as in-between transitions c h a p t e r 9 248 between the different pieces. Bar 42 is one such transition where they use the sampler to render a rhythmic and vocal shout: "bala-palapa-lapa!". The transition works in much the same way as a drum break between different parts. Instead of smoothing out the differences between different parts, Marius and Po highlighted the differences in this way. A stop moment can be a betweenness or a hinge that moves both ways without belonging to either one or the other (Fels & Belliveau, 2008, p. 36). Marius and Po emphasized the betweenness and re-presented the stop moment musically—with its short transitional part. This technique was also repeated later in their composing process. Thus, notable contrasts became an important part of their musical expression. In relation to Biesta's (2018) philosophy, this stop moment contributes to a balance between Marius and Po's musical desires and the task's demands for a coherent piece of music with structure and tension. The stop moment, thus, constitutes the choices of action as those of the responsible subject (Biesta, 2014, 2018). In the fourth teaching session, Marius and Po completed bars 63 to 87. This part also starts with a transition bar with vocal-rhythmic sampling. Now that this technique was established, they did not hesitate to introduce even more brand-new musical substances. Thus, they added the synthesizer voice that I call E (Figure 8); this was also automatically generated in the same way as the other voices. Figure 8: Synthesizer Voice E, Marius and Po. Marius and Po also made their own vocal representation of the synthesizer

voice E. They recorded this in the sampler in the same way as before. After repeating this three times, the entire composition concludes with a new five-bar long vocal-rhythmic transition before a final longdrawn and crazy “yeeah!” (author’s translation) (figure 9). In this last transitional part they build up the tension by increasing the frequency of repeating the syllable “now” (author’s translation), which is repeated more than 30 times, while gradually increasing the pitch. In this way, they illuminate a tension structure similar to a build, like just before a co m p o s i n g o n i pa d a s m i d d l e g r o u n d e d u c at i o n 249 drop4 (Yadata et al., 2014, p. 143), through vocal re-presentations of the synthetic instruments. By comparison, similar builds are frequently used by Marius’ favorite musicians Pegboard Nerds, for example, in the song Disconnected (Figure 10). In this context, it is easy to see that Marius’ musical desire is part of the musical expression they created. Figure 9: Marius’ and Po’s Completed Composition. https://youtu.be/UIGHpxqbBXI Figure 10: Disconnected by Pegboard Nerds (Monstercat: Uncaged, 2012). https://youtu.be/MwSkC85TDgY 4 Within the Electronic Dance Music (EDM) community, a drop is described as a moment of emotional release, where people start to dance “like crazy”. There is no precise recipe for creating a drop when composing EDM; rather, a drop occurs after a build, a building of tension, and is followed by the re-introduction of the full bassline (Yadata et al., 2014, p. 143). c h a p t e r 9 250 Marius and Po behaved like many others when they explored many possibilities and produced several musical ideas. Marius said that they discovered many effects and opportunities along the way and that the exploring of the resources was really an almost endless work. A rhythmically-varied and distinctive synthetic sound, along with strange and humorous vocal contributions, attests to the kind of musical desires they brought into the composition. Marius and Po’s composition has a humorous and ironic character. The vocal tracks contain only a few words which, in turn, are used many times: “yeah” and “now”. They drove the process through humorous and ironic interpretations and a transformation of resources. This says something about how they saw themselves in relation to the musical work as humor and irony became part of the substantial meaning content of the music. There is some musical humor in the total empirical material in this research project. It may seem that musical humor has a particular connection to a technological focus. In the case of Marius and Po humor seems to have been a genuinely creative force where their desires and resistance from the material and socially-constructed world were brought together in actions that they were willing to take responsibility for as subjects (Biesta, 2014, 2018). Marius and Po both stated that it had been very difficult to overcome harmonic challenges in the first task, Stay With Me. In Task 2, they seemingly wished to avoid harmonic challenges by largely choosing to play one instrument at a time—sometimes in addition to vocals and drums. The composition, nevertheless, appears to be full of harmony, because they selected automatic accompaniments that are themselves complex and full of many notes and tones, both as harmonics and melodic movements. In this way, Marius and Po made multiple choices in their work. Their choices show traces of trying to safeguard both their own desires and their subjective responsibility towards what is other (Biesta, 2018) – what is other than themselves, and to what they are responsible. Composition with GarageBand on iPad as Middle Ground Education Through the composing processes of Jan and Ola, and Marius and Po, Biesta’s (2018) concepts of desire, world and resistance are actualized. co m p o s i n g o n i pa d a s m i d d l e g r o u n d e d u c at i o n 251 Whether the students have approached a middle ground where they could exist as responsible subjects has to do with how their learning activity led to encounters between their desires and what is other (Biesta, 2018) and how these encounters evolved. When the goal is the development of the responsible subject, this implies a teaching program where there is room for the student himself to step towards the goal because the student himself wants to go. Otherwise, the student becomes an object. That the student brings their own desires into the teaching, then, becomes a necessary

precondition. Based on this article's analyses, such desires may be related to stylistic preferences, how one appears as a musical person or the desire to touch other people musically. In the encounters between the student's desires and the world the student's sensitivities to the material and sociallyconstructed world of music is exerted so that the student, as a responsible subject, can find a middle ground where their musical expression is shaped in dialogue with the world. This may require a lot of time for trial and reflection. In such a learning activity the music that the students produce aims to give genuine meaning to themselves and other people. Instrumental learning, where the aim is to show knowledge unrelated to actions or tasks that are perceived as significant and real in the subject's relation to the world, does not occur in such teaching. The teacher's task is to support the relation of learning to reality and to promote reflection on responsibility. The teacher does not invoke power over the learning, but instead conveys ethically-justified authoritative views related to responsibility. The teacher may question the student's choice and ask the student to turn to the world, but does not impose their own understandings on the student. This is what Biesta (2014, p. 45) calls an empty pedagogy that entails a risk of what the subjectivity event leads to. The way I see this, in relation to the analysis in this article and to limited time and large groups in secondary school music lessons, many of these teacher tasks can be handled through the use of digital music technology, where material and socially-constructed musical resources are embedded in the technology, accompanied by well-considered task formulations. c h a p t e r 9 252 Inhibitory and Promotional Challenges The encounters between student desires and the world usually contain some form of friction, and these can often be characterized as challenges. Challenges themselves are a positive necessity in the student's development as a responsible subject. However, it is crucial that these challenges are affordable for students. If the challenge gives too much resistance, it can lead to either withdrawal—destroying the student's existence as a responsible subject—or causing the student to press on with their own desires in such a way that the resisting world will be harmed. Challenges involving moderate resistance promote the student's existence as a responsible subject, while challenges that result in excessive resistance inhibit the student's existence as a responsible subject. In this way, I argue that the difference between inhibitory and promotional challenges is crucial for middle ground education. The promotional challenges are characterized by involving invitations to action, but without containing specific requirements about what actions to take and, to a lesser extent, about how any actions should be performed. In this way, promotional challenges seem to be invitations to make an effort by their own will towards intrinsically-motivated goals. Thus, affective energies are released in encountering the challenges. Inhibitory challenges, on the other hand, are characterized by containing precise requirements about specific actions to be performed and how they should be performed. In this research project it seems that inhibitory challenges, in most cases, can be identified as requirements that students should apply intuitive, physical and affective music knowledge based on certain academic standards, regardless of whether they have practiced such skills and knowledge. In this article the difference between inhibitory and promotional challenges can be seen in the difference between the two tasks given to the students. Task 1 to a greater extent was inhibitory and led to "the destruction of the subject" (Biesta, 2018), while task 2 to a greater extent promoted the responsible subject. I suggest that teachers focus on the initial task formulation as a crucial point in the educational design, where they signal openness towards the co m p o s i n g o n i pa d a s m i d d l e g r o u n d e d u c at i o n 253 risk that the students may want to follow paths that the teacher could not foresee. Similar to Nilsson (2002) and Breeze (2009, 2012), I suggest giving compositional tasks formulated as invitations without any prescriptions, while prohibitions or restrictions could be included as frames for the task. Furthermore, it is important that the task leads the students to engage in the composing process with their

desires in meaningful ways connected to the material and socially-constructed world of their interest. With such open but engaging assignments, an emphasis is placed on students' abilities to engage in the aesthetic aspects of music and to take on challenging actions of their own choice. Through such promotional challenges students can be encouraged to exist as subjects in the world (Biesta, 2014, 2018). The content knowledge for such teaching is closely shaped by the subject's involvement and action, thus reflecting the need for a knowledge subject. This implies a perspective where the socially-constructed musical conventions are not disqualified or abandoned, but where they can only be treated didactically in the face of the subject. The sociallyconstructed musical conventions are present fully or partially within the student and in the surrounding world, including in the technology. In this way such knowledge is brought into the learning situation. It is by bringing the student into the encounter with the materials and conventions of the world in this way—through promotional challenges— that the student can develop into a responsible subject. In such an educational practice, creative, communicative and informal aspects of musical learning are reinforced. As a result, the diversity of the musical resources' affordances—their multitudes of abilities to carry meaning— can come into play and enable a music education where there is room for the students' own musical desires and where the subject is made responsible. On the basis of this, such music educational practice would be suitable for promoting democratic principles, students' agency, equality in teacher—student power structures, as well as music pedagogical development against a more complex and interleaved content knowledge, relevant for today's heterogenous and diverse music classrooms. c h a p t e r 9 254 References Abup. (2015, 18 October). Abup talks – Gert Biesta – "Being at home in the world" [Video]. YouTube. https://youtu.be/qUXSxGD8WmE Bandlien. B-.T. (2019). Ungdomsskoleelevers komponering med GarageBand på iPad: En musikkdidaktisk studie av performative stopp-punkter i et kritisk designteoretisk perspektiv [Secondary school pupils' composing with GarageBand on iPad: A music educational study of performative stop moments in a critical design theoretical perspective]. [Doctoral dissertation, Norwegian University of Science and Technology]. https://ntnuopen.ntnu.no/ntnu-xmlui/handle/11250/2643673 Bandlien, B.-T., & Selander, S. (2019). Designing as composing music with iPads: A performative perspective. In A.-L. Østern & K. N. Knudsen (Eds.), Performative approaches in arts education: Artful teaching, learning and research (pp. 81–95). Routledge. Bell, A. P. (2015). Can we afford these affordances? GarageBand and the doubleedged sword of the digital audio workstation. Action, Criticism & Theory for Music Education, 14(1), 44–65. act.maydaygroup.org/articles/Bell14_1.pdf Biesta, G. J. J. (2014). Utdanningens vidunderlige risiko [Beautiful risk of education]. Fagbokforlaget. Biesta, G. J. J. (2018). What if? Art education beyond expression and creativity. I C. Naughton, G. Biesta & D. R. Cole (Eds.), Art, artists and pedagogy (pp. 11–20). Routledge. Bresler, L. (1998). The genre of school music and its shaping by meso, micro and macro contexts. Research Studies in Music Education, 11(3), 2–18. Breeze, N. (2009). Learning design and proscription: How generative activity was promoted in music composing. International Journal of Music Education, 27(3), 204–219. https://doi.org/10.1177/0255761409335953 Breeze, N. (2012). Group composing with computers in the music classroom: A reconsideration of designs for learning in order to realise the potential of recent technologies. In R. Gillies (Ed.), Pedagogy: New developments in the learning sciences (p. 65–84). Nova Science Publishers. Brown, A. R., Stewart, D., Hansen, A., & Stewart, A. (2014). Making meaningful musical experiences accessible using the iPad. In D. Keller, V. Lazzarini & M. S. Pimenta (Eds.), Ubiquitous music (pp. 65–81). Springer. https://doi. org/10.1007/978-3-319-11152-0 Crawford, R. (2014). A multidimensional/non-linear teaching and learning model: Teaching and learning music in an authentic and holistic context. Music Education Research, 16(1), 50–69. https://doi.org/10.1080/14613808.2013.812627 Espeland,

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music. Today, the realm of popular electronic music education faces some similar challenges that popular music education initially did; new ways of informal learning, and a different and diverse knowledge base for the students entering popular music programs. Related to these challenges is the question of how to teach one-to-one tuition in higher electronic music education, and this article seeks to address this challenge. We present a case-study of the practice of a teacher at the University of Agder in Norway that teaches electronics in one-to-one tuition, where the research data is based on interviewing this teacher and his students. An important aspect of the practice in question is the process of listening to and discussing the student's original recorded music. We discuss some of the challenges of one-to-one teaching in electronic music education, and argue that this particular teaching approach accommodates some of these challenges. Bringing in the educational framework of Biesta, we argue that this form of teaching practice also facilitates subjectification by addressing both uniqueness and expression. Further, we argue that this practice, which focuses on the teaching of aesthetics instead of technicalities, combined with the development of the students' unique artistic expression can open some interesting possibilities related to addressing subjectivity c h a p t e r 10 258 in higher music education. One of these is how the students need to articulate both the objectives and aims within their music, and the objectives and aims of their music, which in turn develops a terminology to talk about and beyond aesthetics. Keywords: electronic music, popular music education, higher education, music technology, subjectification, unique artistic expression Since popular music entered the educational system some decades ago, it has become increasingly prominent in both research and practice. Research regarding informal learning (Green, 2002; Söderman & Folkestad, 2004) shows how popular musicians acquire skills and knowledge through informal learning, suggesting new methods for formal music education (Green, 2008). These and similar insights have changed how popular musicians are formally educated around the world and, though many institutions are still in the process of developing their popular music courses (e.g. Beauregard, 2019), others have found ways of implementing popular music 1 content and adjusting their teaching methods and structures accordingly (e.g. Lebler & Weston, 2015). However, electronic music has become a growing part of popular music education over the past decade. When using the term electronic music in this article, we refer to music composed on or performed with technology traditionally associated with the recording studio. This builds on Eno's (2004) notion about the recording studio as a compositional tool, and his historical contextualization of how music technology developed the recording studio into a creative tool. Burgess makes a similar point when he recalls that "making records with the Roland MC-8 MicroComposer in the '70s, I realized I was constructing performances not capturing them" (Burgess, 2013, p. 240). We also draw on Knowles and Hewitt's (2012) discussions on threshold technologies and recordivity. They argue that threshold technology has diminished the difference between composing and performing music live, and show how practices from the recording studio are implemented on stage through recordivity, and how these practices, in turn, are brought back into the recording studio (Knowles & Hewitt, 2012). In other words, we include both the compositional and performing aspect when we use electronic music. We further emphasize electronic music within the popular music scene in t e a c h i n g a e s t h e t i c s 259 this article, including genres such as electronic dance music (EDM), hiphop, and disco. However, due to the nature of the particular practice in the study, we also leave the door open to less commercial music. Although electronic music has been around for a while in musical areas like art music, disco and hip-hop, there are some fundamental differences between the current trends and those of the past. These differences are due to the massive invasion of electronic dance music on the popular music scene fronted by artist-producers or auteur-producers (Burgess, 2013, p. 9) such as Skrillex and DeadMau5 in the 2000s and early 2010s. This, combined with an extensive democratization of audio technology (Pras et al., 2013) and

enhanced informal learning platforms, such as YouTube, have lowered the threshold for people to engage in making and performing the kind of music they are surrounded by every day. Further, this has created a large group of young musicians using digital audio workstations (DAWs) as a creative tool and/or instrument (Bell, 2018), needing little or no "traditional"1 musical knowledge. These aspiring musicians are now entering higher popular music education (HPME), creating similar challenges pinpointed by Green and likeminded researchers 15 years ago: a mismatch between the everyday musical reality and practices of the students compared to the music educational programs they attend. Folkestad (2006) shows how technology is deeply embedded in young people's musical lives, and Brown further argues that "educators need to accept contemporary musical practices (…), and teach the associated skills. There are many new opportunities available as a result of new technologies – and now education has to adapt to these new parameters" (2015, p. 5). Not all educators find this an easy task, as admitted by Ruthmann et al. (2017) and, according to Partti (2017), educators risk falling into either pedagogical fundamentalism2 or pedagogical populism.3 Nevertheless, 1 By traditional musical knowledge, we refer to the knowledge associated with playing "traditional" instruments like flute, violin, drums or electric guitar. Examples could be notation, harmonic theory, ear training etc. 2 Pedagogical fundamentalism implies a skeptical attitude towards technology, where teachers to a large extent ignore new technologies and how they affect their students' lives. 3 Pedagogical populism implies a glorification of new technologies, where technologies are put above the teaching, and the role of the teachers is often reduced. c h a p t e r 10 260 technology forces its way into music education as well as education in general, and teachers need to find their way. Burnard (2007) notes that whether seeing creativity being in relation to technology or creativity as emerging through technology, it is important to address such questions in education. Bell (2015, 2018) discusses the DAW specifically, addressing how the design of technologies mediates our creative practices. Røshol and Sørbø (2020) expand on this topic in Chapter six in this volume, and discuss the challenges of making and finishing music when using the DAW to create music. Buckingham takes a critical stance on the use of technologies in education at the time of his writing, and argues that "we need to be teaching about technologies, not just with or through them" (2007, p. viii, emphasis in original). A similar argument is made in Chapter eight in this volume by Sørbø (2020), who draws on Heidegger (1977) to argue that making the students reflect on their own relationship and engagement with technology will enhance their creative practices. Such critical examination of current practices relates to critical pedagogy as developed by Freire (2005), who further advocates that students and teachers may benefit from exploring together as equals. This study is a case study of how electronics are taught in one-to-one tuition by one of the teachers at the Department of Popular Music (DPM) at the University of Agder, to see how this practice could inform other similar practices. Our approach was initially exploratory without a predefined thesis or research question. However, it didn't take long before we recognized the potential of using Biesta's educational framework as a theoretical foundation, and we developed the following research question: how are technology and aesthetics balanced in this particular pedagogical practice, and how can this be related to and informed by Biesta's thinking on balancing educational purposes? Sørbø (2020) argues that teachers and program developers of electronic music education should strive to keep a meaningful balance of the educational purposes of educational theorist Gert Biesta4 and, in our opinion, we provide an example of a practice maintaining this balance in this chapter. It is also a response to Burnard in her discussion on musical creativities, where she notes that "critically, 4 These purposes will be explained in the coming sections of this chapter. t e a c h i n g a e s t h e t i c s 261 there is a necessity for documentation (in music education) of emerging practices" (2012, p. 324). After a short outline of the particular context at the University of Agder, we describe the

framework of Gert Biesta, and then our research design and method. Then we discuss the empirical findings along with relevant theory, focusing on three main categories detected when analyzing the interviews we conducted. We conclude that careful consideration with regard to both the teaching approach (how to teach) and the teaching of aesthetics (how to teach aesthetics) might contribute to what Biesta calls a balanced education. We further argue that through a mentoring approach and an emphasis on what we term unique artistic expression it is possible to facilitate subjectification in these programs, which is central to Biesta's thinking. Educational Context To better understand the context from which this article emerges, this section provides a short outline of how the Department of Popular Music (DPM) at the University of Agder approaches HPME and electronic music, followed by a short outline of Biesta's educational framework. DPM was established in 1991 and is one of two courses that the University Board defined as a signature study in 2013, meaning a course that "truly excelled, and that was the very hallmark of this university" (Tønsberg, 2014, p. 29; emphasis in original). It is a performance-based program, and many students become participants at the highest level in the Norwegian popular music scene after finishing their Bachelor, Master's or PhD program. Due to technological developments in the music industry, DPM introduced specialization in electronic music in 2013, offering students electronics (most commonly laptop) as an instrument. Though it has some independent courses, the electronic music specialization is an integrated part of the performing popular music program, which further suggests a performative approach to the use of the laptop and other electronics, aligning with our usage of electronic music described in the former sections. This, in turn, has tended to open the door towards the realm of art music, and the tension between popular electronic music c h a p t e r 10 262 and electronic art music often creates an interesting interface for exploring musical ideas. Further, every electronic music student has one-to-one tuition with a teacher, a practice that has been a cornerstone at DPM since its beginning. We will refer to the teacher of this particular one-to-one practice as "TEM" (Teacher of Electronic Music). Let us now turn to the educational theory of Gert Biesta5 which we will apply to the practice that is object of this study. Biesta is a major contributor to the critique of what he calls the Technological6 approach to education. By Technological, he refers to how educational policy makers tend to "make the connection between inputs and outputs as secure as possible so that education can begin to operate as a deterministic machine" (Biesta, 2015, p. 16). It further illuminates how this relates to the question of normative validity, that is, of "whether we are measuring what we value, or whether we are just measuring what we can easily measure, thus ending up valuing what we (can) measure" (Biesta, 2010, p. 13). The Norwegian context is, as in most western countries, heavily influenced by this Technological approach to education, also in music education (Varkøy, 2013). This is manifested in learning by objectives that permeates almost every aspect of educational practice. Though the importance of social competences and "life skills" has been acknowledged, both in the past and in the present/future (Council Recommendation of 22 May 2018, 2018; OECD, 2005; Department of Education and Research, 2019), both the framework and the will to properly place value on these aspects of education has failed so far. These are some of the reasons why we turn to Biesta and his educational thinking. We concur with him that the purpose of education is crucial, and that education is about more than merely qualifying for a job (Biesta, 2013), which we find particularly relevant in the context of art education. Biesta's educational framework consists of three main purposes of education, where the balance between these purposes is crucial. Firstly, there is qualification, that has to do with the acquisition of knowledge, skills, and dispositions. Secondly, socialization has to do with the ways we 5 This educational framework is developed through four books (Biesta, 2006, 2010, 2013, 2017b). 6 To distinguish between Technological as used by Biesta and technological when discussing technology, we will use a capital T when

referring to Biesta's term. t e a c h i n g a e s t h e t i c s 263 become part of existing traditions and ways of doing and being. Lastly, subjectification has to do with the interest of education in the subjectivity or "subject-ness" of those we educate. It has to do with emancipation and freedom and with the responsibility that comes with such freedom (Biesta, 2013, pp. 4–5). Such subjectification can only occur when the students are given time and space to expose themselves both as musicians, citizens, and human beings, and to achieve this they must engage in activities that by nature have an unpredictable outcome. It is "not about the educational production of the subject – in which the subject would be reduced to an object – but is about bringing the subject-ness of the child or young person 'into play'" (Biesta, 2020, p. 95). At this point it becomes clear that a purely Technological approach to education, which defines expected outcomes according to a given input and aims for effectiveness, is in conflict with this line of thought. The objective of this article is to investigate how one-to-one tuition in electronic music education can be related to these three educational purposes (with an emphasis on subjectification), and to search for alternative ways to educate than that of the Technological, hence the prominence of Biesta's framework. Method As this study is about the practice of one teacher with a limited number of students, a qualitative approach was the obvious choice. The study is designed as an unusual single-case study, as we argue that the teachings of TEM contain some elements that are out of the ordinary, recognizing the case as one that is "deviating from theoretical norms or even everyday occurrences" (Yin, 2018, p. 85). In the study, the case is the one-to-one practice of one teacher in one program at one University. Though we had some broad reflections about why we wanted to investigate this particular practice, we did not initially have a clear hypothesis or research question, making this an explorative approach. However, it did not take long before we recognized the potential of using Biesta's educational framework as a theoretical backdrop, so we have leaned towards his theories more than what is necessarily the norm in exploratory studies. In other words, we started with a clear inductive approach, but ended up with a more c h a p t e r 10 264 deductive study. Though the case study itself is rather limited in terms of the number of participants, the findings will probably be transferable to similar practices, and some of them will hopefully be pertinent to higher electronic music education (HEME) in general. The selection of participants was given in advance: we contacted all of the students currently having one-to-one tuition with TEM. This resulted in seven participants in the study: six students and the teacher himself.7 All of the students were on the Master's program, and most of them had several years of experience with the teaching of TEM. We conducted semi-structured interviews (Kvale, 2007) of 40 minutes on average. Interviews were the preferred method because we wanted the students' long-term experiences and reflections regarding the teachings of TEM, making, for example, observation too comprehensive. The interviews were transcribed, and the quotes referred to in this article were translated and sometimes slightly altered for a more fluent reading experience. Further, the authors independently read and categorized the material using content analysis (Kvale, 2007, pp. 101–119), using the stages suggested by Norton for thematic analysis (2009, pp. 115–123). As these stages indicate, we first created multiple categories, then deleted the ones not relevant before merging the remaining categories into three themes. Then we reread the transcriptions through the lens of these themes to search for further connections in the material and, finally, we started making links between the themes, as will be presented in the results and discussion sections. As always in qualitative research, the bias of the researchers is important to address. Both of the authors were familiar with the teachings of TEM in advance8 which, on the one hand, is a prerequisite for doing good qualitative interviews but, on the other hand creates challenges regarding our roles as researchers (Kvale, 2007, pp. 33–50). Further, the questions asked in the interviews are grounded in the background and educational thinking outlined in previous sections. Though our intention throughout the design, interviews and analysis was to

remain open-minded to the 7 We contacted eight students in total, but two didn't reply. 8 Røshol was a student of TEM for 3 years until 2018, and Sørbø wrote his Master's thesis based on TEM's instrument setup. t e a c h i n g a e s t h e t i c s 265 incoming data, it would be naïve to claim a neutral position. Another important aspect to illuminate is that at DPM the students often choose their one-to-one teacher themselves. This case study represents a way of teaching electronics that focuses on expanding and developing the student's musical expression regardless of how this expression relates to mainstream popular music. However, there are different approaches to teaching electronics in one-to-one tuition represented at DPM as well, some more vocational and some more popular music oriented, so this is not the only practice. Hence, the students that attend the teachings of TEM have chosen to do so themselves and do not necessarily represent the average popular music student. There are some ethical dilemmas to consider as well. The authors are PhD Research Fellows, investigating the practice of a teacher who is both a current colleague and a potential decision maker when we apply for work after the completion of our theses. This will arguably prevent us from being firmly critical to the practice in question. However, we chose this particular practice as an object of study because we, as mentioned, were familiar with the teaching approach, and believed it could provide interesting perspectives to teaching electronic music. Further, as one of the authors was recently a student himself and knew most of the students personally, the interviews were conducted exclusively by the other author to prevent personal attachments from influencing the answers. Lastly, the relatively small number of participants suggests that both the teacher and fellow students might recognize statements made by students in the interviews, so we had to choose quotes that were not clearly distinctive of particular students. Results and Discussions As we now turn to our results and discussions we will structure them according to the three themes of our analysis, as mentioned in the method section. The themes detected were: (1) the teaching approach, (2) the teaching of aesthetics, and (3) music making as a means to uniqueness. Starting with the theme "teaching approach", the first object of discussion is that of one-to-one tuition. c h a p t e r 10 266 One-To-One Tuition in Electronic Music – The Teaching Approach This practice is rooted in individual music instruction that was formalized with the advent of conservatories in the nineteenth century and has traditionally been about the acquisition of practical know-how through "modeling, demonstration, imitation and application" (McPhail, 2010, p. 34). It is about learning the techniques and aesthetic philosophy of the teacher, which can be traced to the zone of proximal development (Vygotsky, 1978). This approach, which might be termed instructivist, has been problematized for several reasons, some of which we will address in this chapter. The first critique has to do with how the focus on skill development can result in a "lack of emphasis on the development of ownership and independence in students" (McPhail, 2010, p. 34). The second critique concerns the vast and potentially negative influence the tutor has on the student, due to "lecturers' inflexibility, insensitivity to individual needs, unreasonable demands and dominance" (Persson, 1996, p. 303) and lack of transparency (Burwell et al., 2019). This is especially relevant when the teacher is a renowned performer with no formal educational training, as is the case with TEM. These critiques are all raised in publications regarding the education of classical musicians, but the pitfalls are the same in popular music and electronic music as well. It is worth mentioning in this regard that there is no consensus as to whether or not one-to-one tuition is a practice suited to popular musicians and how they learn; there are multiple examples of popular music education programs that have both abandoned and continued this practice (Gavin et al., 2017). When analyzing the interviews in this research we quickly detected an open-minded approach and a high level of student autonomy that seemed to solve much of the critique addressed previously. The students could shape the sessions themselves, which further enabled them to focus on areas they were interested in and wanted to develop: Participant 2:

My experience is that that I've had the freedom to do what I want, and he has always said "have your focus wherever your focus is now, on what's important to you now," regardless of what that is. t e a c h i n g a e s t h e t i c s 267 This freedom will arguably amplify the students' ownership to the sessions, which is central to developing student motivation and autonomy (McPhail, 2010, 2013; Pink, 2011). Though one reason for structuring the teaching this way is that it solves some of the critique of the one-to-one practice mentioned above, it might also be looked at as a necessary way of structuring such sessions in electronic music. This is due to the fact that when one-to-one tuition is continued into electronic music education, not all aspects are directly transferable from the classical tradition, or even from popular music. One of these differences is that electronics/ laptops are not one instrument in the same sense as the violin or the electric guitar. Further, electronics and laptops have a much shorter history as played instruments and, consequently, there are no firm structures or traditions for how to teach these instruments (Thompson, 2012). In addition, the interviews showed a vast variety in the students' musical backgrounds: one participant started off as a classical violin player, one was an experienced music teacher interested in improving his technological skills, one was running a commercial studio, one initially approached music through PlayStation and had never played a "traditional"9 instrument, and some had backgrounds from performing popular music studies. The technological skill level was equally varied, stretching from one participant who had recently started using electronics to complement his instrument to a former winner of the Norwegian "Grammy" in the category of Electronica. 10 Naturally, this leads to an open-minded teaching practice individually adapted to each student, as such different backgrounds and artistic goals can hardly be captured within one specific method or framework.11 Such aspects might contribute to explaining why many teachers, among them TEM, tend to take the role of a mentor in these forms of sessions: 9 By "traditional" instruments we refer to historically established instruments like keyboards, violins, electric guitars, trumpets etc. 10 The Norwegian equivalent of a Grammy is called Spellemannprisen. 11 Though similar approaches are common in the tuition of other instruments as well, we find the degree of diversity in electronic music to be unique. c h a p t e r 10 268 Participant 3: We basically never work on particular stuff in lessons, it's only a conversation. Imagine two producers having a coffee and I show one of my productions and he (TEM) goes "cool, I liked this, and I didn't like that, maybe you should work on this and maybe you should work with that. And listen to this music, maybe you can find some inspiration." (…). I feel very equal, and it's very open (…) It feels very little like a school-thing, more like a mentoring-thing. A mentor is traditionally described as a person with absolute authority and wisdom, an "all-knowing guru who the mentee looks up to unconditionally" (Keinänen & Gardner, 2004, p. 169). However, in their study on choreography mentoring, Keinänen and Gardner provide an alternative way of mentoring to this authoritarian approach, "emphasizing instead individual exploration of creativity and artistry" (2004, p. 182). Though their work concerns dancers and choreographers, we find many similarities to the teachings of TEM: "to cultivate a sense of individual responsibility, the choreographers allow their mentees a high degree of freedom in their exploration" (Keinänen & Gardner, 2004, p. 184). This instantly resonates with how TEM reflects on his own practice: TEM: I very much believe in freedom, both in educational and professional settings. That one opens up by giving freedom. Then, based on the result, one might start to shape things; to peel off the things the students, or the professionals, don't necessarily need. The two ways of mentoring described in the study of Keinänen and Gardner represent two opposites that have clear similarities to Biesta's discussion on the role of the teacher: on the one hand, you have progressive education focusing on the freedom of the students where teachers are moved to the back of the classroom and reduced to fellow-learners. On the other hand, if teachers want to stay in front of the classroom because "they

believe that that is their proper place and the position from which they can make sense of their unique responsibility" (Biesta, 2017b, p. 97), they are "out of date." Biesta argues for a third approach where the teacher has an essential role to play in an education that still emphasizes t e a c h i n g a e s t h e t i c s 269 the freedom of the students: where the students are viewed as subjects, not objects. The teaching style of TEM seems to contain aspects of what Biesta is searching for, as students describe him both as a peer and as a highly-respected professor and musician. When TEM, from the position of both an authority and a peer, contributes with his opinions and aesthetic judgments to the music presented by the student, he does so from a unique position. We will return to some possible implications of this uniqueness shortly, in light of how Biesta approaches the term. Teaching of Aesthetics – Not Technology The second issue we find interesting from the analysis is the almost total lack of focus on technicalities: Participant 1: TEM doesn't care about the technical aspects, it's like fuck that, you'll figure it out, let's not spend time resolving that now, right? Which is great, really, but it requires the people you allow to enter the program to know what the hell they're doing. (…) But there are also many great aspects in the way he puts that technical part aside; if the students are motivated, they'll go home and figure it out. This clearly differs from educational programs in electronic music offering the students training in specific software and technologies. Further, in literature concerning electronic music education there is a clear emphasis on how the affordances12 of technologies used in the making of music mediate both creative processes and the music that is being made (e.g. Brown, 2015; Eno, 2004). Musical choices are built into the very design of the DAWs, and if students don't develop a conscious relationship to the technologies they are using, they might miss important aspects of their own agency and practices (Bell, 2015; Sørbø, 2020). TEM partly addresses these challenges by not addressing them at all; he raises the discussion from being about technicalities to being about aesthetics. The benefit 12 When using the term affordances in this chapter, it will be as done by Hutchby (2001), developed from Gibson: "affordances are functional and relational aspects which frame, while not determining, the possibilities for agentic action in relation to an object". c h a p t e r 10 270 of this approach is that he, to a lesser extent, allows the affordances of the technology to set the premises for how the music is being discussed, which might be an issue if, for example, the music is discussed with the DAW session open.13 It further makes sense when teaching electronic music to leave technical obstacles to be solved by the student, as they are usually familiar with using online resources (like forums or YouTube) for such purposes (Bell, 2014). However, this presupposes that the students already have a certain technical and musical understanding so that they know how to find solutions effectively, and that they are motivated. This might not always be the case, and several students mentioned this lack of technical focus as partly frustrating: Participant 2: I think it was very frustrating throughout the whole program that we had such few guidelines, it was tough to figure out yourself all the time. (..) My big problem was that I never quite got going (with playing live electronics), because I never quite finished setting up and making my instrument do what I wanted (…). With TEM we never got down to the tool-stuff, that's one of the things I missed a bit. Further, the question concerning the students' conscious relationship to the technologies isn't necessarily addressed. Though it would be possible in such practices to discuss and reflect on how technologies mediate both the music, the creative processes and our thinking about music, this does not seem to be on the agenda of TEM. It could, of course, be discussed whether such reflections are more suitable for courses dealing with groups of students, and some of the students mentioned this to be the case. However, we still argue that at least parts of such reflections might be more properly addressed in a one-to-one setting when discussing original recorded music created by the student. This further addresses another issue recognized at DPM that is due to how students sometimes search for technical solutions to problems that

are of a musical and aesthetic nature. For example, a student that struggles with a song could sit for hours searching for the perfect synth sound to "solve" the 13 Which was not the case in the sessions of TEM, who preferred .wav or .mp3-files. t e a c h i n g a e s t h e t i c s 271 problem, while the problem might be a poor melody or chord structure. In other words, when technologies become such an integrated part of the creative practice, it is hard to distinguish technological decisions from aesthetic decisions. It might even be impossible at times to make this distinction, as articulated by Frith and Zagorski-Thomas: "In the studio technical decisions are aesthetic, aesthetic decisions are technical, and all such decisions are musical" (2012, p. 3). Hence, we argue that a conscious relationship to the technologies and the way its affordances mediate our creative processes can contribute to making accurate and meaningful distinctions, and that such distinctions will be valuable: Participant 2: To many of us (electronic music students), me being one of them, it's very easy to dig into the technical stuff and get a little lost, and that's when it's smart of TEM to get our focus back to what's more important. This quote sums up much of the above while also taking us back to the aesthetic focus and how these conversations about the music itself are at heart of TEM's teaching. One objective in these conversations seems to be the development of the students' ability to express themselves verbally, and be clear and accurate when explaining their aesthetic choices. Due to the lack of formal training many of these students have, in combination with the fact that "a comprehensive formal theory of electronic music seems far away," (Roads, 2015, p. 6), this was quite a challenge t o many: TEM: The minute we talk about tools they have a clear language for it, as in how long the predelay is on the reverb, what kind of processing you're using, or what synth is being used (…). But regarding the musical language, it's often quite poor. It starts with good or bad, this was nice, or this was not. However, it is clear through the interviews that the aim of these conversations was not only to discuss the aesthetics of any music, but that it mattered which and whose aesthetics were discussed. This brings us to the last theme. c h a p t e r 10 272 Music Making as a Means for Uniqueness The third discussion we want to raise is that of using music making, that is, making original music, as a means to develop unique artistic expression. The usage music making as an educational tool in popular music education is fairly common (e.g. Lebler & Weston, 2015; Moir & Medbøe, 2015; Tobias, 2013), though it is usually referred to as composing or recording.14 We recognize this approach in the teachings of TEM, who is clearly conscious about making the students present original material. This, in turn, enables reflections on patterns and connections within their music, helping the students to become aware of similarities in their own aesthetics and eventually start to articulate their unique artistic expression: TEM: They present material they don't perceive as connected in any way, they just make music, right? And then maybe I can point out that there is a connection between these things, that they are not that far apart. And when they realize this themselves, it happens. Then things really start to happen. By making students present recorded versions of their original material he puts them in a position where they must expose their aesthetic values and judgments, which enables discussion regarding the presented material. The interviews suggest that this makes the students reflect upon their own practices in new ways which, in turn, opens up for new approaches and new practices. It also helps the students develop and articulate their unique artistic expression as these reflections concern their own creative works: Participant 2: He [TEM] was very good at making me think outside my box, to view things differently. The most important was maybe the attitude, the attitude that it's not that big of a deal, don't be afraid. (…). Many of our conversations have been what has shaped me; the philosophy around making music and what we're doing. 14 We prefer music making, since electronic musicians often don't associate themselves with the term composer. t e a c h i n g a e s t h e t i c s 273 To further explore the implications of this, we once more turn to Biesta to show how his notion of "unique" and "expression" opens up possibilities to

approach the students as subjects. He distinguishes two ways to understand the term unique: uniqueness as difference and uniqueness as irreplaceability (Biesta, 2013, pp. 19–22). Uniqueness as difference is the way uniqueness is usually understood, that is, what makes one student different to another student, or one artist different to another artist. When we claim that TEM uses music making as a means to develop the unique artistic expression of the student, this is the kind of uniqueness we refer to: Participant 4: In TEM's teaching, that was the main focus; the distinctiveness, what are your practices (…), and what do these practices look like in their purest, most extreme form? (…) Another clear difference from other teaching I've had, is that this distinctiveness or your personality, and your musical expression, are two sides of the same coin to a much larger degree, and that this distinctiveness and personality gets more space in the teaching. This quote takes us from the understanding of uniqueness as difference to an alternative notion of uniqueness. Biesta invites us to see uniqueness as irreplaceability, which has to do with the unique relationship we have with every other person, and the inherent responsibility15 within this unique relationship. The way this responsibility inevitably is a part of every relationship is key to Biesta's notion of subjectivity. Further, this might be a useful way to illuminate what was mentioned earlier about the unique position from which TEM could make suggestions and statements about the music presented by the student. Our argument is that the search for and development of unique artistic expression that we recognize in his teaching approach contains a double potential. Not only does it search for and develop uniqueness as difference, that is, unique artistic expression, but it can also facilitate uniqueness as irreplaceability, which has to do with subjectification. When discussing the uniqueness of the student, 15 Responsibility here refers to an ethical responsibility, not one consciously chosen. In other words, we can't choose our responsibilities, we can only choose how we respond to them. For further elaboration on Biesta's usage of this term, see Biesta (2006, pp. 50–52). c h a p t e r 10 274 though it is initially and intentionally about music and aesthetics, such discussions might contribute in addressing the student as a subject. One last angle from which we want to look at unique artistic expression is that concerning expression. Biesta criticizes what he refers to as educational expressivism, which has to do with the emphasis in arts education to make students express themselves (Biesta, 2017a, pp. 55–59). Although this is obviously an important aspect of art in education, and most certainly in the teachings of TEM and in the argument of this chapter, Biesta argues that expression in itself is never enough; teachers need to engage in the quality of the expression put forward. Quality in this regard does not refer to aesthetic quality, but to whether what is being expressed has the quality of making students "exist well, individually and collectively, in the world and with the world" (Biesta, 2018, p. 15; emphasis in original). This might suggest that teachers should engage the students in the purpose and value of their art and music and illuminate its possible moral and political implications. Again, such discussions would reach beyond music and aesthetics, and represent yet another opportunity to facilitate subjectification. In other words, we find the same potential for encountering subjectivity when engaging with expression as when dealing with uniqueness. Conclusion In this chapter we have examined the practice of a teacher in HEME teaching one-to-one. We have illuminated some common challenges in electronic music education, and also addressed some common critiques to the use of one-to-one teaching in this field of education. We find that the teaching approach of TEM negates many of the critiques of one-toone teaching. By putting the student at the center of the practice and building the course around the student's uniqueness, the students are empowered and encouraged to shape their own learning environment in the classes. Further, by focusing on the teaching of aesthetics instead of technology (where lectures, flipped-classroom approaches or informal learning platforms often are sufficient), the time can be spent focusing on developing the student's unique artistic expression. TEM's focus on the t e a c h i

n g a e s t h e t i c s 275 student's music making is one strategy that facilitates aesthetic discussions concerning this unique artistic expression. When focusing on the student's music making in the one-to-one setting, it gives the student and teacher artistic objects for discussion which, in relation to Biesta`s educational framework, can be related particularly to subjectification. This is especially true since TEM's teaching focuses on original material. When further relating this practice to the educational framework of Biesta we have argued that teaching of aesthetics combined with the development of unique artistic expression can open up for some interesting possibilities. The way students have to articulate both the objectives and aims within their music and the objectives and aims of their music contributes to developing a terminology to talk about aesthetics, but also opens up for discussions reaching beyond aesthetics. Following this, we have applied the thinking of Biesta to develop a dual understanding of both uniqueness and expression, and we argue that these understandings can be helpful in addressing subjectification in HEME. By doing so we hope to contribute to a meaningful balance between Biesta's three educational purposes in HEME: qualification, socialization and subjectification. Balance is central to our argument, and we do not argue that this necessarily should be the only way to teach electronics. Obviously there are prerequisites, assumptions and pitfalls in this way of teaching that makes it unsuitable to be the only approach in every setting, and the students of TEM also gave examples of other methods that were used in his teaching. However, we argue that this approach might work in virtually every setting as an important and valuable variation on ways of teaching, and that most students of electronic music will benefit from having at least one semester with similar approaches. References Beauregard, J. (2019). Popular music in the high school: Crafting and implementing a curriculum. In Z. Moir, B. Powell, & G. D. Smith (Eds.), The Bloomsbury handbook of popular music education (pp. 289–300). Bloomsbury Academic. Bell, A. P. (2014). Trial-by-fire: A case study of the musician – engineer hybrid role in the home studio. Journal of Music, Technology & Education, 7(3), 295–312. c h a p t e r 10 276 Bell, A. P. (2015). Can we afford these affordances? GarageBand and the doubleedged sword of the Digital Audio Workstation. Action, Criticism & Theory for Music Education, 14(1), 43–65. http://act.maydaygroup.org/articles/Bell14_1.pdf Bell, A. P. (2018). Dawn of the DAW: The studio as musical instrument. Oxford University Press. Biesta, G. (2006). Beyond learning – Democratic education for a human future. Routledge. Biesta, G. (2010). Good education in an age of measurement – Ethics, politics, democracy. Routledge. Biesta, G. (2013). The beautiful risk of education. Routledge. Biesta, G. (2015). On the two cultures of educational research, and how we might move ahead: Reconsidering the ontology, axiology and praxeology of education. European Educational Research Journal, 14(1), 11–22. Biesta, G. (2017a). Letting art teach. ArtEZ Press. Biesta, G. (2017b). The rediscovery of teaching. Routledge. Biesta, G. (2018). What if? Art education beyond expression and creativity. In C. Naughton, G. Biesta, & D. R. Cole (Eds.), Art, artists and pedagogy – Philosophy and the arts in education (pp. 11–20). Routledge. Biesta, G. (2020). Risking ourselves in education: Qualification, socialization and subjectification revisited. Educational Theory, 70(1), 89–104. https://doi.org/10.1111/ edth.12411 Brown, A. R. (2015). Music technology and education: Amplifying musicality. Routledge. Buckingham, D. (2007). Beyond technology: Children's learning in the age of digital culture. Polity Press. Burgess, R. J. (2013). The art of music production: The theory and practice. Oxford University Press. Burnard, P. (2007). Reframing creativity and technology: Promoting pedagogic change in music education. Journal of Music, Technology & Education, 1(1), 37–55. Burnard, P. (2012). Commentary: Musical creativity as practice. In G. E. McPherson & G. F. Welch (Eds.), The Oxford handbook of music education (Vol. 2, pp. 319–336). Oxford University Press. Burwell, K., Carey, G., & Bennett, D. (2019). Isolation in studio music teaching: The secret garden. Arts & Humanities in Higher Education, 18(4), 372–394. Council of the European Union. (2018). Council

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Technical exercise practice: Can piano students be motivated through gamification? Heather J. S. Birch | Earl Woodruff 32 Journal of Music, Technology & Education INTRODUCTION Training to be a piano player is a process not unlike training to be an athlete (Martin 2008). Physical skills must be developed in order to execute piano pieces, in the same way that physical skill development is necessary to succeed in athletic endeavours. The time that a piano student spends with a teacher in weekly lessons, often ranging between 30 and 60 minutes, is not enough time for those students to develop the physical skills necessary to become accomplished players. Practice is defined as the process of systematically engaging in experiences or exercises in order to learn; it is defined as fundamental for achieving musical success on an instrument (Schatt 2011; Austin and Berg 2006). While a piano teacher can employ strategies and techniques to increase student engagement within the piano lesson, what happens outside of lessons is crucial and more difficult for the teacher to influence. This study was undertaken to explore how children might be motivated to practise more between weekly piano lessons. As researchers, we were aware of the importance of student practice (McPherson and Williamon 2006; Bloom and Sosniak 1985; Ericsson et al. 1993) and of the challenges commonly faced by students when practising between weekly lessons (Bonneville-Roussy and Bouffard 2015; Jorgensen 2009; Jorgensen 2000; McPherson and Renwick 2001). One of us (Heather), as a piano teacher, saw firsthand how students found it difficult to practise regularly and consistently between lessons. This is corroborated by other studio music teachers who report that students routinely do not practise as much as expected or do not use effective practice techniques (McPherson and Renwick 2001; Oare 2012). In response to these factors, we designed a set of game elements which would operate in coordination with student practice. Our hypothesis was that these game elements, functioning as a type of 'game layer' over top of the students' music learning experience, would provide motivation which would result in increased student practice and thereby increase musical achievement. The importance of technical exercises Technical exercises, such as scales, chords and arpeggios, are an important part of regular practice which teachers often assign for students to practise between lessons. These exercises are important for warming up the fingers so they will be at maximum flexibility before tackling intricate, complex pieces. The exercises consist of patterns that develop a musician's ability to control the interaction between their physical self and their instrument (Green 2006). Practicing technical exercises provides opportunities to develop fingering techniques such as learning to quickly tuck fingers under, stretch fingers, reach to distant notes and play many notes at a time using the correct fingers – techniques that lead to an easy dexterity and command over the piano keyboard (Bastien 1977). Since music is often based on scale, chord and arpeggio patterns, practicing technical exercises provides opportunities for student success when a student tackles a piece which contains one of the patterns. Even though technical exercises are important, students often do not enjoy practising them. According to a study by Cooper (2001), 564 piano players who had taken lessons at many different ages consistently rated technical exercises as their least favourite part of piano study. During graded examinations in which students are asked to perform ear tests, pieces and technical requirements, the technical requirements are often the weakest of the three and cause great frustration for students (McCormick and McPherson 2006). Technical exercise practice www.intellectbooks.com 33 Technical exercises were chosen as a focus of this research study due to their importance for music learning, as well as the unique obstacles they present for students as they practise. In addition, a standardized set of technical exercises can be defined and counted in order to assess student achievement. Gamification proposed as a motivator The current research study was inspired by the importance of technical exercise practice, and the hope that a strategy could be devised and implemented to increase student motivation to practise technical exercises, as well as improve student attitudes towards this type of practice. The chosen

strategy is gamification, which is defined as ‘the use of game design elements in non-game contexts’ (Deterding et al. 2011: 9). The game design elements which were implemented in this study to test for an effect on student motivation included awarding points and virtual trophies for beating levels, the use of avatars and the sharing of student progress online. It was anticipated that gamification could, in fact, motivate students to practise technical exercises, which would result in increased practice time, and therefore be indicated by improved student achievement. Researches in many learning domains, including music, have shown that both quality and quantity of practice positively correlate with achievement (Ericsson et al. 1993; Williamon and Valentine 2000; Bonneville-Roussy and Bouffard 2015; Barry and Hallam 2002). This study does not distinguish between practice quality and quantity as factors which are influenced by motivation. Notably, Sloboda et al. (1996) demonstrated that in the case of 8- to 18-year-old students, practice quantity on its own is a predictor of musical achievement. This research study was designed to address the question of whether the game elements of narrative, replayability, recognition, social sharing and player agency have the potential to influence students’ practice of technical exercises within the private piano lesson environment. First, a search for existing digital tools for motivating technical exercise practice was conducted. At the time, no websites or apps were found which specifically facilitated the practice of technical exercises and included the gamified environment we were interested in exploring with the students. Keeping in mind that not all the participants in the research study had personal devices, and wanting to move ahead with the research study in a timely manner, the decision was made to develop a website; using web design allowed us to promptly create and implement a set of game elements for use in the context of piano lessons with students ages 10 through 17. Our vision for the gamified environment was that it would provide students with additional motivation to practise technical exercises such that, instead of practicing technical exercises from a written-out list, students would practise technical exercises as a means of moving through a narrative. This narrative involved a journey to the top of ‘Technique Tower’. As students mastered technical exercises and earned points, they would level up, and figuratively move to the next floor of the tower, until they finally reached the summit. Reaching the top of the tower was held out as a motivational goal for students to strive towards, in addition to learning to play a series of exercises. LITERATURE REVIEW In the context of private music studios, students commonly learn in one-onone weekly lessons with a teacher. The importance of independent practice is heightened, since most of the musical learning takes place outside of the Heather J. S. Birch | Earl Woodruff 34 Journal of Music, Technology & Education lesson (Ericsson et al. 1993; Pitts and Davidson 2000). This study conducts research in the context music learning within the private music studio and is informed by the literature about motivation, self-regulation and gamification. Motivation Intrinsic and extrinsic motivation Reinforcement theory (Skinner 1965; Kimble 1956) was a type of behaviourism which considered extrinsic motivation to be a powerful motivator for predicting and controlling behaviour. This theory viewed motivation as an integrated construct which varies only in quantity (Ryan and Deci 2000). Bruner (1966) acknowledged that a decision either to act or not to act was much more complex than that which could be explained by the result a positive or negative stimulus. A more accurate picture of motivation acknowledges it as a complex phenomenon; not only do learners experience either more or less motivation, they also experience different types of motivation; these types of motivation are determined by the root causes that lead a learner to act (Ryan and Deci 2000). Intrinsic motivation Lepper (1988) defines intrinsic motivation as leading to ‘behavior undertaken for its own sake, for the enjoyment it provides, the learning it permits, or the feelings of accomplishment it evokes’ (292). This type of motivation leads to the pursuit of a genuine interest, a desire to learn or a desire to be challenged (Alderman 2008). Intrinsic motivation can cause learners to focus on the degree of fun and pleasure they

experience when doing something (Barry 2007). McPherson and McCormick (1999) reported that among piano students, those with greater amounts of reported practice tended to express more intrinsic interest in learning an instrument. Extrinsic motivation Extrinsic motivation leads learners to action based on reasons external to themselves (Alderman 2008: 252). It compels students to focus on future goals such as awards and good marks (Barry 2007) and can cause students to act based on opportunities to demonstrate their skills, in order to gain recognition from their peers, teachers or parents. Acting based on extrinsic motivators has been shown to weaken intrinsic motivation, thus reducing opportunities for learners to be curious and pursue tasks for interest's sake (Deci et al. 1999). However, not all extrinsic motivators are created equal, and it is too simplistic to say that all must be avoided (Deci 1971). As Lehman, Sloboda and Woody (2007) contend, during any specific music making session, a music learner is likely acting as a result of more than one source of motivation, some sources being intrinsic and others, extrinsic. Motivation and achievement Motivation can also be described in terms of mastery orientation and performance orientation. As described by Elliot and McGregor (2001), the mastery approach refers to learners who are motivated to track their own personal improvement and achievement of goals in order to continue moving forward and avoid moving backward. The performance approach describes learners Technical exercise practice www.intellectbooks.com 35 who compare their own growth and accomplishment with others to demonstrate success or avoid appearing incapable. Both mastery and performance orientations motivate learners to take on musical challenges and persevere during difficulty (Dweck 2000; Elliot and McGregor 2001), while mastery orientation has been shown to result in greater levels of learning success. Motivational learning theories Self-regulation Self-regulation theory, as a way of understanding how a person undertakes the learning of music, was first identified by McPherson and McCormick (1999) and Zimmerman (2000). Self-regulated learning is described as a set of cyclical steps including deciding to take action, defining goals, attaining goals, engaging in self-reflection and adapting (Zimmerman and Campillo 2003). While a learner is engaged in making decisions about goals and actions to take, known as the forethought phase, motivation has a particularly distinct influence (Zimmerman and Campillo, 2003). Motivation is one of the factors that inspires learners to set out on a path towards learning, based on their personal belief that the learning goal is achievable, that they have the skills needed to achieve the learning goal, and that they have a certain autonomy in progressing towards achievement of the learning goal (Zimmerman 1986). Gamification The idea of gamification as a pervasive phenomenon was first predicted by Jesse Schell at the February 2010 DICE (Design Innovate Communicate Entertain) conference. In his presentation called 'The Future of Games', Schell (2010) shared his vision that game elements will gradually encroach upon more aspects of our daily lives until they are ubiquitous. Gamification, in educational contexts, has the goal of increasing student motivation and student learning. While the term 'gamification' is sometimes used to refer to online or mobile games that teachers invite students to play in order to develop skills, gamification is more commonly described as occurring outside the context of an actual game (Di Serio et al. 2014). Gamification asks the question of how non-game contexts can be made more game-like, in order to motivate learners. Game elements are added to a learning environment in an effort to increase engagement and increase behaviour which leads to learning. Gaming elements Gaming elements which have the potential to increase motivation and learning, as defined by Kapp (2012) include story, characters, recognition, chance, replayability, aesthetics, time and continual feedback. In the context of this research study, some of these specific elements were chosen as potential motivators and applied to the experience of learning piano in the form of a game-like experience known as 'Technique Tower'. As students practised the piano, they had opportunities to experience game elements including story, replayability, recognition, social sharing and player agency.

These elements will briefly be described here, to highlight their motivational potential within proper games, and suggest their potential application as motivational factors in the non-game context of music learning. Story comprises the elements of characters, plot, tension, resolution and conclusion (Kapp 2012). Learning in the context of story comes naturally, Heather J. S. Birch | Earl Woodruff 36 Journal of Music, Technology & Education since the human brain is wired to resonate with narratives (Green and Brock 2000). Learners recall facts more accurately and are prompted to think more deeply when those facts are presented in a story, as opposed to presented in a list (Kapp 2012); these capabilities of story give learners increased opportunities for success (Green and Brock 2000). Replayability is inherent in video games, thus making failing and trying repeatedly not only commonplace, but expected. Mastery is developed as each game level is repeated and eventually beaten, allowing the player to move on to the next level. This is in contrast to learning environments which are characterized by a finite number of opportunities to acquire skills and demonstrate understanding before moving on to the next unit. For example, if a student receives a mark of 62 per cent on a music test, there is often not time in a structured course to provide opportunities for the student to learn and demonstrate their understanding of the other 38 per cent of the material before moving on to cover the next important topic. Getting it wrong in a videogame is often thought of as exploration and discovery; this reduces players' fear of making a mistake while engaged in a task (Gee 2003). Recognition is definitely an element of most games, although Kapp (2012) is hesitant to include points, badges and rewards in his list of game mechanics. He is wary of the view that gamification consists only of the awarding of points and badges and maintains that these rewards are actually the least important element of gamification. Kapp (2012) defends these types of rewards, suggesting that in an educational context, awarding points to learners, while allowing them to progress through levels with increasingly prestigious titles such as novice, apprentice and expert, can motivate learners make them feel safe, and result in powerful learning. Points, badges and leaderboards are among the most commonly used game elements (Dicheva et al. 2015; Hamari et al. 2014). Social sharing has been described as integral to the experience of games. Online games often feature this type of relational experience, and as Gee (2008: 33) explains, 'people find great pleasure, excitement, and fun in organizing themselves into cross-functional teams'. While social competition has been shown to decrease opportunities for student learning (Nebel et al. 2016), social collaboration and sharing can facilitate student engagement and learning (De-Marcos et al. 2016). Player agency is crucial for enjoyable game experiences; within a game, there are rules and conventions, but within videogames in particular, players often have several choices about where to go next, and in what order to attempt challenges. Agency has been defined by Bandura (2001). This gives players a sense of ownership. As Gee (2003: 34) explains, 'In good games, players feel that their actions and decisions [...] co-create the world they are in and shape the experiences they are having. Their choices matter. What they do matters'. Snow et al. (2015) showed how agency is important for motivation in learning contexts. These gaming elements, story, replayability, recognition, social sharing and player agency, having been identified as effective means for engaging players, were chosen to comprise the gamification environment in the current study in order to test their effect on student motivation to practise technical exercises. METHODOLOGY This research study took place over a nine-week period and involved quantitative inquiries into how a gamified environment might affect students' practice and mastery of technical exercises. A control group of students did not Technical exercise practice www.intellectbooks.com 37 experience the game elements, while an experimental group did; a comparison of the two groups provided the opportunity to consider the effect of gamification on music learning. The participants for this quasi-experimental study were recruited from two piano studios in a small community in Ontario, Canada. One studio was my own (Heather), while the other

studio was run by one of our colleagues, who will be known as Trudy. Trudy and I, the teacher-researcher, both place a high priority on technique as an integral part of learning to play the piano. When asked to describe her feelings about students practising technical exercises such as scales, chords and arpeggios, the participating teacher's answer echoed the perspective described in the Introduction section: It's a necessity; it's part of taking lessons that gives you the skills, tools and ability to play the pieces you want to play. If you want to play Fűr Elise, you'll have to know how to play all the arpeggios and chords in e minor. [My students] don't have an option. I don't present [technique] as a negative or a positive thing. I just present it as: this is how you learn to play. Another similarity between Trudy and I is that we both make use of the Royal Conservatory of Music (RCM) graded curriculum in our piano teaching. The RCM is a widespread, highly respected instructional program which represents a levelled approach to music learning. This type of approach is ideal for the context of this research study since it provides an indication of a student's progress as a music learner and specifies a sequential order in which technical exercises should be learned, detailing which keys and exercises should be mastered at each grade level. The student participants in this study, aged ten through seventeen, were organized into categories according to their level of experience playing the piano. In the Beginner Category (RCM Preparatory – Level 1), there were eight participants, while the Early Intermediate (RCM Levels 2–4) and Advanced Category (RCM Levels 5–9) each had six participants. These categories were defined based on the time commitment necessary for mastering technical exercises at different RCM levels. The student participants were cross-assigned randomly to either the control or the experimental group. Group 1 (Control group) practised technical exercises in a non-gamified environment, while Group 2 (Treatment group) had gaming techniques implemented in relation to their practice of technical exercises. Throughout the duration of the research study, data were collected about the participants' mastery of technical exercises on the piano. In order to determine whether mastery had been achieved, the teachers in the study used a performance measure rubric (see Appendix). This rubric was designed in consultation with three additional music teachers in order to help establish content validity. Ideas were pooled in order to come up with a comprehensive list of characteristics which would comprise mastery of technical exercises such as scales and triads. The rubric provided clear direction for students who needed to know how to achieve mastery, as well as a common reference point for teachers to assess mastery. In addition to counting the number of technical exercises that were mastered by students, the attitudes of participants were also measured in order to provide a broader picture of student motivation in the context of the study. The primary independent variable was type of instruction, with participants being divided into two groups of ten students each. Heather J. S. Birch | Earl Woodruff 38 Journal of Music, Technology & Education Procedure Group 1 (Control) Participants in Group 1 were assigned one key at each lesson, for example, C major or F minor, and were expected to spend one week practicing all the technical exercises related to that key that are specified in the RCM curriculum for their particular level. At the following week's lesson, the student was asked to play those technical exercises for the teacher, who used a performance measure rubric to determine whether mastery was achieved for each exercise. If students achieved mastery in any or all of the technical exercises they had practised throughout the week, the teacher provided positive verbal feedback and recorded the results; the teacher then asked the student to move on to another key for the next week. If the student did not achieve mastery in all the exercises, that same key was assigned for another week. After two weeks, whether full mastery was achieved or not, a new key was assigned. Group 2 (Experimental) Group 2 received the experimental version of technical exercise instruction, that is, gamification. During Week 1, participants were introduced to the gamified environment, which was known as Technique Tower. Figure 1 illustrates a screenshot of a

student's webpage and depicts an image of a tower with seven rows of windows. The purpose of the webpage is to depict the figurative climb up the tower which the student accomplishes through receiving points, and levelling up, indicated by the 'lights' turning on at each level, along with a virtual trophy appearing. Bonus stars, another type of achievement, were surprises awarded by teachers for other impressive musical achievements. Figure 1: Screenshot of a Technique Tower webpage – Alias 'Starlycool', http://technique-tower.blogspot. ca/p/starlycool.html. Technical exercise practice www.intellectbooks.com 39 Points, trophies and stars were earned as the result of mastering designated technical exercises and are the way in which the game element of recognition becomes part of the experience of music learning. Starting at the bottom of the tower and gradually moving towards the top represent the game element of narrative; this gives students a story to be part of as they learn to play technical exercises, in contrast with achieving mastery over exercises as they move through a list of tasks to practise. In addition, each student's webpage featured an avatar and an alias which represented them, suggesting the narrative element of character. Game players were given a comprehensive chart detailing all of the specific technical requirements for their grade level, and players were encouraged to choose any technical exercise to work on at any time, in any order. This chart was provided as a way to maximize student agency with regard to technical exercise practice, mimicking the game element of player agency. Once participants mastered a technical exercise, an audio recording of that exercise was created using a mobile application called SoundCloud and uploaded to the player's web page for parents, other students, teachers and members of the public to listen to and comment on (see Figure 2). This design element of the webpage was intended to provide students with opportunities to share their success with others, as would happen readily within a game context. Data collection The teachers in this research study kept track of the progress of students in both the control and experimental groups by documenting information on a record sheet designated for each music learner. This record sheet indicated the student's assigned ID number, gender, age, Royal Conservatory grade level and e-mail address. Throughout the research study, teachers logged which technical exercises students played, along with a rating indicating whether each exercise was mastered. Subsequently, the weekly point total for Group Figure 2: Playlist of technical exercises a player has mastered embedded on her webpage, http://techniquetower.blogspot.ca/p/missy.html. Heather J. S. Birch | Earl Woodruff 40 Journal of Music, Technology & Education 2 participants was entered into an online spreadsheet which automatically updated each player's webpage to reflect their achievements. The attitudinal measure consisted of an online questionnaire which was administered at the end of the study and featured ten statements which participants responded to by choosing from five-point Likert scales. The statements were developed by the researcher, who invited feedback from three other music teachers regarding their potential to effectively gauge students' attitudes towards practicing technique. A consensus was reached concerning the questions on the scale and their ability to provide insight into student attitudes. During the final week of the study, participants in the treatment group were invited to fill out an additional survey which featured ten questions designed to elicit information about the nature of gamified environment experience. Not all participants chose to fill out the survey, but those who did were asked to describe the range of feelings they experienced throughout the playing of the game, and then to rate the game in the areas of fun, fairness and effectiveness. They were also asked to comment on their perception of experiencing Technique Tower. RESULTS Mastery of technical exercises The hypothesis that the participants in the experimental group, as a result of the gamification environment, would master more technical exercises in a nine-week period than the participants in the control group was tested. The Mann–Whitney U-test was chosen to compare the difference in the achievement scores between the groups, since it is well-suited for use with small sample

sizes, that is, five to twenty participants (Nadim 2008). Proportional achievement scores for the experimental group (Mdn = 0.99) were higher than for the control group (Mdn = 0.32). A significant effect of group was found, with the mean rank of the Control Group being 6.4 and the mean rank of the experimental group being 14.6; U = 9.0, p = 0.002. Figure 3 illustrates the total number of exercises mastered by each group, showing that according to these results, gamification does have a positive effect. While the number of students in this research study limits the generalizability of the results, this specific case suggests that over the short term, piano students who learn technical exercises in a gamified environment master more technical exercises than those who are not in a gamified environment. Effects on attitude At the end of the study, to determine whether gamification had an effect on attitudes towards practicing technique, Likert scale data were collected and summed to represent each participant's attitude (ATT) score. Again due to small sample size, the non-parametric Wilcoxon signed-rank test was performed to compare the ATT scores of the control and treatment group, assuming that if gamification had an effect, a significant difference would be detected. However, the test did not show a statistically significant difference between the ATT scores of the control and experimental groups. A marginal effect was indicated, with the mean rank for the Control Group being 7.9 and the mean rank for the Experimental Group being 11.1, z = −1.29, p = 0.198. Technical exercise practice www.intellectbooks.com 41 Student experiences To assess whether the experience of playing the game Technique Tower was perceived to be enjoyable and effective by the players, an online survey was conducted. This survey was optional for the ten participants in the treatment group, of whom eight chose to participate. Positive comments about the game written by players included, 'We LOVE teqnice [sic] tower!!!!!:)', and 'This game is really fun We like it'. One of the survey questions invited participants to rate the Technique Tower game by assigning various scores out of 10. The mean fun score was 7.67, SD = 2.29, the mean fairness score was 8.00, SD = 2.06 and the mean effectiveness score was 7.75, SD = 1.83. Participants were also asked to select which of the following emotions, if any, they felt when they received points, beat a level or earned a trophy in the game: happy, powerful, safe, selfish, strong, confident, greedy, sad, confused, competitive, excited or angry. Happy was mentioned seventeen times, followed by excited, ten times; confident, eight times; competitive, five times and strong, four times. Proud and powerful were also mentioned once each. DISCUSSION The main purpose of this study was to discover the effect of gamification on piano students' motivation to practise technical exercises, and on their attitude towards this type of practice. As described above, student motivation was measured by tracking achievement, since motivation to practise a musical instrument is closely linked with achievement levels (Schmidt 2005). In this particular study, gamification was found to have a significant positive effect on the number of technical exercises students mastered, while students' attitudes towards practicing technique showed a modest positive effect. Students' experiences in the gamified environment were largely positive, although not all of their descriptions were favourable. Figure 3: Achievement scores showing the number of technical exercises mastered. Heather J. S. Birch | Earl Woodruff 42 Journal of Music, Technology & Education Increased mastery of technical exercises Gamification had a positive effect, with students in the experimental group attaining mastery of significantly more scales, chords and arpeggios than those in the experimental group. This research suggests that, in order to motivate piano students to practice technique, using gamification might be an effective motivator. These findings concur with studies in other learning contexts about the ability of game elements in non-game context to influence student motivation and student learning (Burguillo 2010; Shin et al. 2012). The Technique Tower website was designed as an online environment that tracked students' mastery of technical exercises and shared their accomplishments with them and their families. Each game webpage displayed a player's username and avatar, along with their

current point total, level and earned bonus stars and trophies. In addition, the webpage functioned as a hub for collecting artefacts that represented players' progress. Some of the game elements which were part of Technique Tower that may have contributed to increased achievement levels in players include story, replayability, recognition, social sharing and player agency. Story Admittedly, the game used in this study did not feature any tension and resolution, two crucial ingredients of story. However, it did feature characters, a simple plot and a conclusion. Each game player was represented online by a character which they named and designed using an avatar creation website (AbiStudio.com). Some of the avatars designed by the players in this game appear in Figure 4. Each of these game characters began at the bottom of Technique Tower and gradually climbed up by earning points and levelling up. Figure 5 shows Technique Tower with varying degrees of achievement depicted; the ultimate goal was to beat all seven levels and reach the top of the tower. Replayability Technique Tower players spent time practicing technical exercises; they worked towards earning points by playing exercises for their piano teacher during the first five minutes of each lesson and having the teacher rate them as mastered. Realistically, this short time period was not long enough for a player to repeat a scale an unlimited number of times. However, if players did not demonstrate mastery on the first try, they could continue practicing it at home and play it for the teacher each week until they achieved mastery and earned points. Figure 4: Selection of avatars designed using Otaku Avatar Maker, © AbiStudio.com. Technical exercise practice www.intellectbooks.com 43 Recognition Technique Tower rewarded players with ten points for each technical exercise they mastered, and a certain number of points resulted in the earning of a virtual trophy. The point score and number of trophies for any player could be viewed on their webpage which tracked their progress in the game. Weekly e-mail updates about players' progress were sent as notifications and reinforcements of the rewards given. While players could compare their personal progress with others' in the game, all players had the opportunity to 'win' the game or to complete the game by achieving the maximum number of points and reaching the top of the tower. Social sharing The social context of Technique Tower was provided by the online webpages which tracked players' progress and provided opportunities for visitors to leave audio and text comments. This online context was designed to shift the students' achievements from the confined environment of a one-on-one piano lesson to an open platform, accessible by anyone, but in particular by the students' family and other students in the studio. While crossing paths between piano lessons, game players were heard discussing their progress with fellow students, and eagerly showed their webpages to one another, using their phone or iPod. Player agency Technique Tower supported autonomy and student agency over choices by encouraging players to learn to play technical exercises in any order. While a non-gamified approach to learning technical exercises may be sequential, Figure 5: Three iterations of technique tower depicting various levels achieved. Heather J. S. Birch | Earl Woodruff 44 Journal of Music, Technology & Education with direction by the piano teacher, the gamification environment in this study gave control to the student in an effort to encourage ownership and decision-making. Marginal attitudinal effects Attitude was marginally affected by gamification. Over the course of the study, levels of the participants did increase within the experimental group which received the gamified condition. Perhaps the limited length of the study was a factor which inhibited gamification from effecting a significant influence. Extended exposure to music learning, and a series of successful achievements over years of piano study, might reveal more robust attitude changes. Then again, perhaps an extended experience within the gamified environment might also negatively influence music learners' attitudes towards practicing. Nonetheless, on the basis of this research study with a small sample size, a difference in attitude towards practicing technique can cautiously be accounted for by gamification. If gaming elements can indeed positively affect even some piano

students' attitude towards technical exercises, this is a powerful finding. The positive attitude a student has towards technique has the potential to stay with them long after the game is over, throughout months or even years of piano study. While achievement levels may only be affected while the gamification environment is present, positive attitudes may be a lasting legacy. Further research is needed to test this hypothesis. Mixed student experiences Student participants rated Technique Tower fairly high on fun, fairness and effectiveness. Several positive comments were heard as students excitedly shared their progress with their colleagues, sometimes with reference to how many technical exercises they had mastered, and other times with mentions of how far up the tower they had travelled. Positive comments about Technique Tower which were written by students on the final survey included, 'I think this game is fun and educational for people to practice and achieve our goal/ level. I hope this game will last forever!!' (Kristie, age 10), 'I am proud' (Sasha, age 9) and 'When I get to the top of Technique Tower, I will say I'm king of the tower!!!!!!!!:)' (Motaywo, age 14). However, not all of the reactions to Technique Tower were so affirmative. One participant, Cheryl, indicated that she felt happy, excited and powerful when she earned points, but when asked about the effectiveness of the game for getting students to practise technique, she wrote, 'It's sort of not a good way to get them to practice because you don't actually get the real trophies'. A follow-up question about whether she would practise more if she got real trophies elicited a bold 'Yes!' Another scenario which revealed a mixed reaction to Technique Tower occurred when Chloe successfully reached the top of Technique Tower. After practicing a lot to master each technical element required for her grade level, she was invited to play again to help motivate her to practise the technical requirements for the following grade level. She declined and said she would rather just practise the next grade-level technique in the regular way, instead of playing Technique Tower. When asked why, she said she was not sure. Technical exercise practice www.intellectbooks.com 45 Missy, age 17, reported feeling happy, confident and excited when she received points in the game. Yet, she also expressed frustration that in order to climb the tower, she had to master longer and more difficult technical exercises than some other students in her studio who were in less advanced levels. In addition, Missy, as well as other participants, expressed either confusion or resentment when the points on their webpage did not immediately update to reflect their achievements. The piano teachers in this research study found that while the motivational benefits to practicing may have been valuable for students in the experimental group, the extra time commitment required to keep track of students' points and update individual webpages was difficult to maintain. After the nine-week study, an invitation was extended to continue facilitating Technique Tower; however, the participating piano teacher, Trudy, was not inclined to do so. The teacher–researcher (Heather) also felt that the manual labour required was onerous, and even at times, threatened the teacher's ability to remain absolutely focused on students' playing and student learning within the weekly lesson. Increased achievement levels in the context of the gamified environment definitely suggest the potential for this type of initiative in the context of piano practice; however, automated solutions are more realistically useful to teachers for long-term use. CONCLUSION The findings from this study are applicable to private piano teachers who seek to motivate their students to practise technical exercises more often and more regularly. They may benefit from the use of gamification to increase student motivation to practise technique. Parents of private piano students may also be interested in how elements of gamification can influence their child's piano practice time and experience. Ultimately, students can benefit from a gamified environment if their playing improves based on their increased practice of technical exercises. As Starlycool, age 12, described, 'As soon as you've got the chords and the scales you can play songs a lot easier'. While this study represents data collected from private piano studios, it is likely that the results could be used as a model for studios which provide lessons

for other instruments such as guitar, violin or flute. It may also provide a model for other scenarios in which student learners must spend time outside of class to consistently practise skills to gain mastery, such as home reading programs designed to develop reading fluency and numeracy programs designed to increase accuracy and speed of math facts recall. Overall, this study has shown that gamification can be successfully implemented in an educational context. Further study is necessary to determine the long-term effects of gamification on students' piano practice and to isolate and identify specific gaming elements which may maximize student motivation and achievement. If a web or mobile application can be developed which automates the process of gamifying technical exercise practice, this will more easily be adopted and enjoyed by both piano teachers and students.

Motivational Effects of Gamification of Piano Instruction and Practice

by

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A thesis submitted in conformity with the requirements for the degree of Master of Arts

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Motivational Effects of Gamification of Piano Instruction and Practice

Abstract

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2013

Gamification refers to the process whereby game design and game mechanics are applied in non-game contexts to influence behaviour. This research study explores the effects of gamification on piano students' practice of technical elements such as scales, chords, and arpeggios, within the private lesson environment. A control and a

treatment group of 10 piano students each were formed across two different private piano studios. A game called *Technique Tower* was designed for the treatment group, in which the players experienced game elements such as rewards (points, badges, and levels), avatars, and the sharing of their progress in an online social context. Gamification was found to have a positive effect on the number of technical elements students mastered, and on their attitude toward practicing technical elements, while self-efficacy levels were not affected. The educational implications for this finding are discussed.

Dedications and Acknowledgments

To my piano students, who give me great joy when they grow musically.
To my colleague, Dawne, who is incredibly musical, and willingly participated in this

study, giving wise, thoughtful feedback throughout.
To my mom, Rebecca, for blazing a trail as an excellent teacher and lifelong learner, and

for enthusiastically cheering me on when I was in desperate need of

encouragement.
To my children, Wilson, Clara, Ella and Daisy, for their faith in me and for teaching me

so much about how kids learn.
To my husband, Jake, for his constant love and support, for the innumerable sacrifices he

made so I could pursue a research degree, for never doubting that I would succeed, and for providing tea and peanut butter cups at timely intervals.

"I was pushed hard, so that I was falling, but the Lord helped me." (Psalm 118:13 English Standard Version)

I would like to express deep appreciation and thanks to my supervisor, Dr. Earl Woodruff, who was willing to supervise me, even from the start, though I was unsure of the research path I wanted to take. He, along with Dr. James Hewitt, provided crucial input and valuable guidance.

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CHAPTER 1: INTRODUCTION

Training to be a piano player is a process not unlike training to be an athlete (Martin, 2008). Physical skills must be developed in order to execute piano pieces, in the same way that physical skill development is necessary to succeed in athletic endeavours. The time that a piano teacher spends with students in weekly lessons, often ranging between 30 to 60 minutes, is not enough time for those students to develop the physical skills necessary to become accomplished players. Regular practice is essential to becoming proficient. Practice is defined by Austin and Berg (2006) as the process of "learning through systematic experience or exercise" (p. 535). It is referred to as "one of the most fundamental musical behaviors necessary to achieve success on a musical instrument" (Schatt, 2011, p. 2). While a piano teacher can employ strategies and techniques to increase student engagement within the piano lesson, what happens outside of lessons is crucial and more difficult for the teacher to influence.

The Importance of Technical Exercises

Technical exercises, such as scales, chords, and arpeggios, are an important part of regular practice which teachers often assign for students to practice between lessons. These exercises can be likened

to stretching before a sport in that they are important for warming up the fingers so they will be at maximum flexibility before tackling intricate,

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complex pieces. The exercises consist of patterns that develop a musician's "physical control over the interface between their body and their instrument" (Green, 2007, p. 84). This skillful technique cannot be developed by playing technical exercises just once per week during lessons.

Practicing technical exercises is a significant part of a balanced piano instruction program. Such practice provides opportunities to develop fingering techniques such as learning to quickly tuck fingers under, stretch fingers, reach to distant notes, and play many notes at a time using the correct fingers; techniques that, with practice, lead to an "ease and control over the keyboard" (Bastien, 1988, p. 130). Bastien additionally lists the following benefits of practicing technical exercises: developing balance between the hands, developing hand coordination and independent function, developing a balanced tone, developing dynamic control, and developing the ability to anticipate what comes next. Since music is often based on scale, chord, and arpeggio patterns, practicing technical exercises provides opportunities for student success when a student tackles a piece which contains one of the patterns. As an example, the E-flat major scale appears in this Haydn sonata, where players must strive for a smooth, even, rhythmic execution (See Figure 1). Practicing the E-flat major scale with the right hand, in isolation, will facilitate student success in this circumstance.

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Considering the importance of practicing technical exercises, it is problematic when students avoid practicing them regularly; students find them boring, repetitive, useless, or difficult. According to a study by Cooper (2001), 564 piano players who had taken lessons at many different ages consistently rated technical exercises as their least favourite part of piano study. During graded examinations in which students are asked to perform ear tests, pieces, and technical

requirements, the technical requirements are often the weakest of the three, and cause great frustration for students (McPherson & McCormick, 2006, p. 333).

Gamification Proposed as a Motivator

The current research study was inspired by the unique role of these vital and profitable technical exercises that are frustrating to, and viewed negatively by students. This complicated scenario prompted the consideration of a strategy that could be used to increase student motivation to practice technical exercises, and also improve student

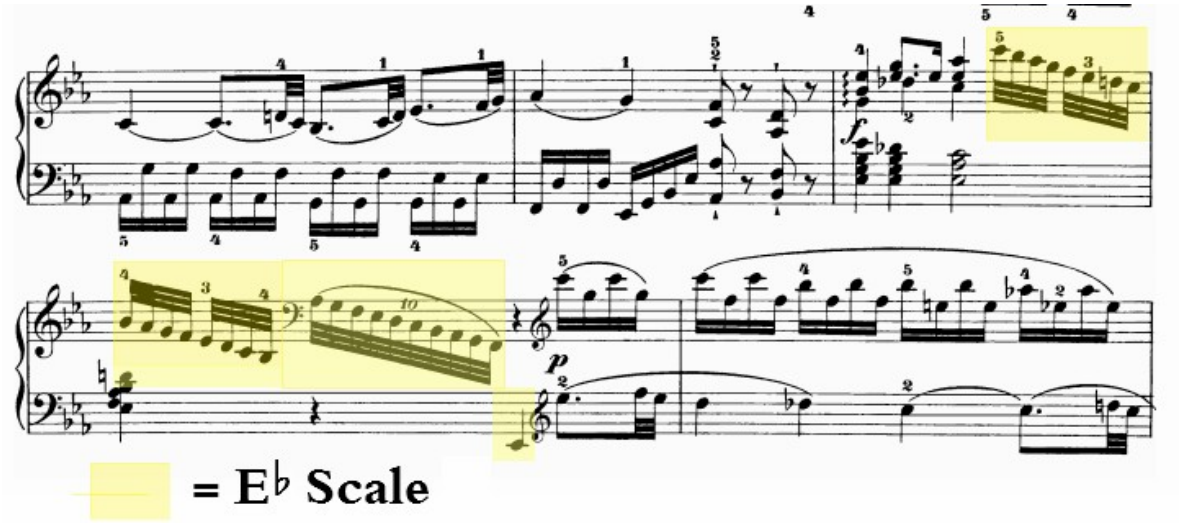

Figure 1. Piano Sonata No. 62 Hob. XVI:52, E-flat major (Haydn, Joseph), Public Domain.

Listen: http://soundcloud.com/heather-birch1/e-flat-scale

attitudes toward this practice. The strategy chosen is known as *gamification*, which is defined as "the use of game design elements in non-game contexts" (Deterding, Dixon, Khaled, & Nacke, 2011, p. 9). The game design elements which were implemented in this study to test for an effect on student motivation included awarding points and virtual trophies for beating levels, randomly awarding bonus stars for special achievements, the use of avatars, and the sharing of student progress online. It was anticipated that gamification could, in fact, motivate students to practice technical exercises, which would result in increased practice time and be indicated by improved student

achievement.

The case of a music teacher employing a strategy to motivate students to practice is certainly not new. Publications such as *American Music Teacher* and *Canadian Music Teacher* feature many articles dedicated to examples of this, where teachers describe practices such as posting student awards on the classroom wall, and rewarding positive behaviour with treats. However, this study is unique because it a) fulfills the need to do formal research on this type of strategy, particularly in the context of private piano study, b) considers a non-game context, i.e. private piano lessons, as linked with an online environment where student progress is tracked, shared, and commented on, and c) uses only intangible rewards as motivators.

This research study was designed to address the question: Does gamification have an effect on students' practice of technical exercises within the private piano lesson environment? The sub-questions to be asked include: 1) Does gamification affect piano students' motivation to practice technical exercises? 2) Does gamification affect the self-

efficacy levels of piano students? 3) Does gamification affect the attitude of piano students towards practicing technique? 4) Is gamification perceived as an enjoyable and effective motivator?

Literature Review

Much of the research about student practice habits and motivation in the context of music education is done in schools, where students learn their instrument in a classroom setting, alongside numerous other students (Jorgensen, 2008; St George, Holbrook, & Cantwella, 2012). Music education research conducted in the context of private music studios is less common. In these settings, students learn in one-on-one weekly lessons with a teacher where the importance of independent practice is heightened, since they do not have multiple classes throughout the week to interact with their teacher (Ericsson, Krampe, & Tesch-Römer, 1993; Pitts, Davidson, & McPherson, 2000). These students, together with their parents, can decide at any time to stop attending lessons, and they have no compulsion to continue until the end of the year or semester.

Music education takes many forms including school music programs,

bands, choirs, community music schools and private studios. While these various music education environments likely share commonalities, there is little research available that discusses these similarities. Jorgensen (2008) observes that values representing political, religious, family, commercial, and professional interests may differentially influence each specific environment. She suggests that “although music education thrives in situations that are sometimes regarded as remote from, distinct from, or tangential to school music

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programmes, these instances also need to be thought of as central to music education and studied by its researchers” (Jorgensen, 2008, p. 333). This study conducts research in one of these alternate environments, that is, a private music studio environment, and considers the impact of gamification.

Gamification

The idea of gamification as a pervasive phenomenon was first predicted by Jesse Schell at the February 2010 DICE (Design Innovate Communicate Entertain) conference. In his presentation called, “The Future of Games,” Schell (2010) shared his vision that game elements will gradually encroach upon more aspects of our daily lives until they are ubiquitous. The term gamification has since become popular with the publishing of books such as "Game Based Marketing" by Zichermann (2010), and “For the Win” by Hunter and Werbach (2012). In these books, gamification is described in business and marketing contexts, for the purposes of building brands, increasing employee productivity, and selling products and services (Hunter & Werbach, 2012; Zichermann, 2010).

In comparison, gamification in educational contexts is done with the intent to increase student motivation and student learning. Notably, the process of gamification in an educational context does not consist of adding a game in order to teach knowledge or skills; rather, it consists of integrating characteristics of games that are engaging, and which have the potential to facilitate student learning, into an existing learning domain. Game elements are added to a learning environment

in an effort to increase engagement and increase desired behaviour.

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Emerging research on video games makes bold claims concerning their potential to enhance learning. Video games are purported to increase learning (Bavelier, Green, Pouget & Schrater, 2012), facilitate learning skill transfer, (Green & Bavelier, 2012), and promote prosocial behaviour (Whitaker & Bushman, 2012). Game-playing is also shown to increase a player's sense of self-efficacy in an academic context (Barab, Thomas, Dodge, & Carteaux, 2005). In response to these powerful claims, educational researchers have just begun to explore the elements which comprise games that make them effective learning tools, and how those same elements can be harnessed in traditional, non-game learning contexts (Deterding, Dixon, Khaled, & Nacke, 2011, p. 9). Some critics of gamification are concerned that the term is just a new name for a practice that has been used in education for many years (Kirk & Harris, 2011). This would be the case only if the term gamification was mistakenly applied to a simple one-dimensional system where a reward is offered for performing a certain behaviour. Indeed, this has been tried in many learning contexts with varying rates of success. Gamification, however, takes into consideration the variety of complex factors which make a person decide to do something; it is a multifaceted approach which takes into consideration psychology, design, strategy, and technology (Werbach, 2012).

Gaming Elements

Gaming elements which have the potential to increase motivation and learning, as defined by Karl Kapp (2012) include story, characters, recognition, chance, replayability, aesthetics, time, and continual feedback. In the context of this research study, a game called *Technique Tower* was designed for the control group to play. The mechanics

integrated into this game included story, replayability, recognition, social context, and control. Previous research suggests how each of these elements has the potential to positively affect motivation.

Story

Story comprises the elements of characters, plot, tension, resolution, and conclusion (Kapp, 2012). Learning in the context of story comes naturally, since the human brain is wired to resonate with narratives (Green & Brock, 2000). Learners recall facts more accurately and are prompted to think more deeply when those facts are presented in a story, as opposed to presented in a list (Kapp, 2012; Green & Brock, 2000); these capabilities of story give learners increased opportunities for success (Green & Brock, 2000).

Replayability

In a game environment, failing and trying repeatedly is often commonplace. In order to reach mastery, repetition of each level is expected before moving on to the next learning challenge. This is in contrast to conventional learning environments which are characterized by a limited number of opportunities to acquire skills and demonstrate understanding. Game environments are not easy, however. Video games, for example, are often extremely challenging, and take a long time to play (Gee, 2003). But scaffolding is also part of the environment, such that players are not on their own to figure things out; within the game, they get tools and have access to technologies that are ideally suited to their goals, and that help them achieve mastery of content and effectively solve problems

(Gee, 2003, Vygotsky, 1933/1978). The idea of getting something wrong, in a game, is often thought of as exploration and discovery, and not characterized as failure. This reduces participants' fear of making a mistake while engaged in a task. Players get as much time as they want to practice and to apply their learning to other similar situations, as well as new and unfamiliar situations (Gee, 2003). Players move up from one level to the next, just as they are ready to encounter the next level of difficulty.

Recognition

Kapp (2012) is hesitant to include recognition elements such as points, badges, and rewards in his list of game mechanics. He is wary of the view that gamification consists only of the awarding of points and badges, and maintains that these rewards are actually the least important element of gamification (Kapp, 2012). Woodruff (2012)

defends these types of rewards, suggesting that, in an educational context, awarding points to learners, while allowing them to progress through levels with increasingly prestigious titles such as *novice*, *apprentice*, and *expert*, can motivate learners and make them feel powerful, important and safe (personal communication, July 28, 2012).

Social Context

Alderman (2008) suggests that a sense of belonging in a social community is an opportunity for developing student motivation. Many online games feature this type of relational experience, and as Gee (2003) explains, "people find great pleasure, excitement, and fun in organizing themselves into cross-functional teams."

Control

In a game, players follow rules and conventions, but often have many choices about where to go next, and in what order to attempt challenges. This gives players a sense of ownership; as James Gee (2003) explains: "In good games, players feel that their actions and decisions... co-create the world they are in and shape the experiences they are having. Their choices matter. What they do matters" (p. 34).

These gaming elements, having been identified as effective means for engaging players, were chosen to comprise the gamification environment in the current study in order to test their effect on student motivation to practice technical exercises.

Technical Exercises

According to Davidson, Moore, Sloboda, and Howe (1996), successful musicians who achieve their musical goals are inclined to practice technical exercises such as scales, chords, and arpeggios, significantly more than musicians who are less successful. However, they also mention that these high achievers additionally spend time on informal pursuits such as improvising and creating. A sole emphasis on technique, then, is unnecessary and could potentially alienate students, so a balanced program is needed. The emphasis on technical exercises in the current study does not mean to suggest that this

method is the only, or even the predominant, means for developing students' technical ability, but rather, one critical element of a balanced music program. Although a qualitative study of 14 professional musicians indicated that most were self-taught and did not systematically practice technical exercises (Green, 2007), teachers should not

abandon the expectation that their students will practice these exercises. In fact, Green (2007) proposes that learning music informally causes musicians to miss out on the acquisition of certain knowledge and skills, explaining that "many popular musicians feel keenly their lack of formal education" (p. 216). This study is positioned as a means to investigate formal piano education and how maximum benefits for students might be achieved. The varying degrees to which students engage in practicing between each formal piano lesson will be informed by a consideration of motivational theory.

Student Engagement and Motivation

Motivation is an extremely important factor when it comes to music learning (Hruska, 2011). In the 1950's, much research about motivation was dominated by theorists such as B. F. Skinner (1958), who claimed that the facts and practices associated with reinforcement theory "have increased our power to predict and control behavior" (p. 94). Kimble (1956) endorsed the prevailing theory of that decade when he proposed a solution to the problem behaviour of Paul, a child who exhibited moodiness, aggression and stealing. Kimble suggested methods for motivating Paul to change his behaviour which were "implicit in the methods available for eliminating the bar-pressing response in the rat" (p. 113). He suggested: "Either one can feed the rat. (In this case that would mean giving Paul the affection he is striving for.) Or one can withhold reinforcement and alter the subject's undesirable habits" (p. 113).

Whether it was a new discomfort with the notions of controlling and altering behaviour, or whether it was failed attempts at controlling and

altering people, the 1960's saw a new

perspective emerge. Researchers such as Bruner (1961) acknowledged that a decision either to act or not to act was much more complex than that which could be explained by the results of experiments on animals. They recognized that a motivational theory needs to consider the cognitive component of the uniquely human experience. They suggested that a more accurate picture of motivation acknowledges it as a complex phenomenon; not only do learners experience either more or less motivation, they also experience different types of motivation (Deci & Ryan, 2000). These types of motivation are determined by the root causes that lead a learner to act (Deci & Ryan, 2000). Learners have certain attitudes and specific, unique goals that determine their actions (Deci & Ryan, 2000).

Motivating learners, then, does not simply consist of thinking up ways to get them to practice the piano, or to get them to persist without giving up when a technical element is difficult. Rather, it is about discovering the reasons behind why a student chooses to practice or not practice, or to abandon or persist through a difficult task, and then using those insights to structure a motivating environment for learners. Alderman (2008) puts responsibility on teachers, saying they must "help students cultivate personal qualities of motivation that can give them resources for developing aspiration, independent learning, achieving goals, and fostering resiliency in the face of setbacks" and should "establish the climate for the development of optimal motivation" (p. 3). In the current study, gamification is proposed as a way piano teachers can work toward achieving the goal of providing an optimal environment for student motivation. Four prevailing motivational theories, in particular, provide insight into students' practicing habits, and imply several

ways in which the implementation of gaming techniques may influence and increase motivation. The relevant theories include self-efficacy, expectancy-value, flow, and self- determination theory.

Self Efficacy Theory

The theory of self-efficacy considers how learners' beliefs about themselves relate directly to their ability to achieve specific goals. Bandura (1977) defines it as "the conviction that one can successfully execute the behaviour required to produce the outcome" (p. 79). If students believe they are good at a certain task, that belief has a positive effect on the effort they put into the task, the perseverance with which they meet the task, their thought patterns about the task, and their emotional reactions to the task (Barry, 2007). Self-efficacy is distinct from self-concept in that it refers to a specific task, as opposed to belief about one's ability in a general domain (Ritchie & Williamon, 2011). In other words, self-concept refers to learners' views of themselves as musicians or as piano players, while self-efficacy refers to their belief that they can get through a difficult technical passage in a certain piece (Bong & Skaalvik, 2003). These specific beliefs are extremely powerful predictors of what a learner is capable of achieving (Bandura, 1997). Cooper (2001) found evidence that piano students who "rated their keyboard skills as 'very good' and 'pretty good' during childhood years were more likely to report enjoying lessons, liking to play better, and enjoying practicing" (p. 163).

Expectancy-Value Theory

Expectancy-value theory focuses on the worth that learners assign to various endeavours,

as influenced by their social context (Pintrich & Schunk, 1996). It assumes that if a learner places value on something they will be motivated to engage in it, and as a result, make the choice to continue learning (Ghazali & McPherson, 2009). The constructs within this theory delineate four ways in which learners assign value, and how that affects their motivation. These include attainment value, intrinsic motivation, extrinsic motivation, and perceived cost.

Attainment value. Attainment value explains how students focus on a specific task and decide its value (Barry, 2007). For example, the task of performing in an upcoming recital leads them to think about who will be in the audience, and how they want to be perceived by that audience. Based on those thoughts, they decide how important it

is to spend time practicing.

Intrinsic Motivation. Intrinsic motivation is activated when learners engage in activities for their own sake, without being coerced, and they do so in pursuit of a genuine interest, a desire to learn, and/or a desire to be challenged (Alderman, 2008). Intrinsic motivation can cause learners to focus on the degree of fun and pleasure they experience when making music (Barry, 2007). Lepper (1998) defines it as "behavior undertaken for its own sake, for the enjoyment it provides, the learning it permits, or the feelings of accomplishment it evokes" (p. 292). Intrinsically motivated learners may choose to act based on feelings of curiosity, the desire to take on a challenge, or the desire to meet a personal mastery goal (Lepper, 1988, p. 295).

These considerations of intrinsic motivation suggest that if students experience a feeling

of enjoyment while practicing the piano, they will be more likely to perform the task than if they find it boring or have no meaningful connection to the activity. Intrinsic motivation is valuable since it results in learners bringing their own specific kind of attention and mental concentration to a task (Lepper, 1998). It has been shown to lead to high-quality learning, and creative expression (Deci & Ryan, 2000, p. 55). Gee (2003) describes how "humans and other primates find learning and mastery deeply, even biologically, pleasurable under the right conditions" (p. 24).

Extrinsic motivation. Extrinsic motivation leads learners to action based on reasons external to themselves (Alderman, 2008); it can cause students to act based on opportunities to demonstrate their skills, in order to gain recognition from their peers, teachers, or parents (Alderman, 2008). This compels piano students to focus on future goals such as trophies in competitions, good marks on exams, and scholarships, all of which can elicit approval from their peers, parents, and music teacher (Barry, 2007). Virtual rewards such as points and trophies on a webpage also fall into the category of extrinsic rewards.

Perceived Cost. Perceived cost compels learners to focus on the

investment necessary to learn to play and whether it is worth it to them to spend the time required, especially in relation to other activities they value (Barry, 2007). Piano students will estimate how much time they will need to dedicate to practicing a certain piece or technical element, and decide if they are prepared to make that sacrifice. The sacrifice will include less time to spend doing other things, such as homework, sports or connecting with friends.

Flow Theory

Flow theory, put forth by Csikszentmihalyi (1990), describes what happens when a learner takes on a challenge which is at the ideal developmental level. "The concept describes a particular kind of experience that is so engrossing and enjoyable that it becomes autotelic, that is, worth doing for its own sake even though it may have no consequence outside itself" (Csikszentmihalyi, 1999). The task is challenging, yet achievable. Some of the elements that allow for learning in a state of flow include clear goals, specific feedback, focused concentration, and a feeling of control (Csikszentmihalyi, 1999, p. 825). Learning in a state of flow is highly motivational because it causes the learner to lose track of time as well as the environment outside the learning context (Csikszentmihalyi, 1999, p. 824).

Self-Determination Theory

Deci & Ryan (2008) acknowledge that it is difficult to pinpoint the exact effect of an intrinsic or extrinsic motivator on any one student behaviour. According to the self- determination view, the relationship between intrinsic and extrinsic motivation is not a dichotomy. Rather, the two forms of motivation can be considered on a continuum, on which various motivational factors can be described, ranging from autonomous and integrated characteristics, through to externally controlled motivators (Deci & Ryan, 2008). The two forms of motivation can also exist simultaneously (Lepper, Corpus & Iyengar, 2005). Harter (1981) introduced a measurement scale which became widely used to determine whether students self-identified as either more intrinsically or extrinsically motivated. The scale measured students' actions as motivated by "challenge vs preference

for easy work, curiosity/interest vs teacher approval, independent mastery attempts vs dependence on the teacher, independent judgment vs reliance on the teacher's judgment, and internal vs external criteria for success/failure" (Harter, 1981, p. 300). In 2005, Lepper, Corpus and Iyengar used that scale, but changed it so that students would not be forced to choose between intrinsic and extrinsic motivations; rather, they asked students the "degree to which both intrinsic and extrinsic reasons independently accounted for their academic behaviors in the classroom" (p. 186). They found examples of students who enjoyed activities, while at the same time paid attention to the marks they would receive for their performance during those activities (Lepper et al., 2005). In discussing the implications of their study, Lepper et al. (2005) suggest the following: "Seeking only immediate enjoyment with no attention to external contingencies and constraints may substantially reduce a student's future outcomes and opportunities. Conversely, attending only to extrinsic constraints and incentives can substantially undermine intrinsic interest and the enjoyment that can come from learning itself" (p. 191). This balanced view of intrinsic and extrinsic motivation takes practical considerations into account, and describes how extrinsic means often co-exist with intrinsic needs (Deci & Ryan, 2000).

Balancing Intrinsic and Extrinsic Motivation

Effective strategies to facilitate intrinsic motivation in student learners include: providing challenging activities (Lepper, 1998; Csikszentmihalyi, 1990), increasing curiosity levels in students (Lepper, 1998), providing authentic learning opportunities (Bruner, 1966), giving feedback as learners progress toward a goal (Lepper, 1998), allowing students some control or self-determination, (Lepper, 1998), and enhancing students' self-efficacy

through providing opportunities for success (Alderman, 2008). Alderman (2008) explains how although "telling a student 'you can do it' is a widely used strategy, the effect on increasing efficacy expectations is likely to be weaker than feedback that comes from direct or vicarious experience" (p. 73). For example, a student can be

told they can learn to play an arpeggio, but actually playing an arpeggio has more influence on whether they feel able to take on the task.

If learners find tasks interesting, they will be intrinsically motivated to engage in them (Blumenfeld, 1992). One role of gamification, then, is simply to present learning tasks in ways that students are likely to find interesting. Alderman (2008) provides a list of strategies for increasing interest level in tasks in a classroom: a) provide students with a choice of topics and activities to engage in, and with a choice of ways in which they can demonstrate their learning, b) use various instructional techniques including the incorporation of illustrations and analogies, c) help students make connections to their existing knowledge, and ask them to apply what they learn, d) push students to justify their answers, consistently evaluating to check to understanding, e) frame questions so that the entire class can answer, for example, through voting on answers, d) scaffold learning, through the use of examples, modelling, and encouraging collaboration, and e) allow students to repeat assignments and tests until they have achieved learning goals (p. 242). While these examples are given for classes with multiple students, they are also applicable to teachers and students relating one-on-one in a private music lesson.

Dreeben (1968) proposed that it is “crucially important for students in school to be

occasionally forced to complete projects in which they have no particular interest and for which they have no particular aptitude” (p. 42). Whether or not this is crucially important, it is likely necessary. For students who do not naturally enjoy practicing technical elements, or for those who find them a great challenge to play, extrinsic motivation has unique value; it can be used as a sort of spark to ignite intrinsic motivation (Lepper, 1988). Students may be lacking intrinsic interest only because they have misjudged the nature of a task, or incorrectly assumed that they do not have the ability to do the task. Once an extrinsic motivator prompts them to approach a task, that motivator may gradually be withdrawn as the learner begins to acquire knowledge about how to perform the task, and gains the self-

assurance that they can succeed at the task (Lepper, 1998).

Based on the review of the existing literature, gamification in the context of private piano study is a timely, distinctive topic for study. Gamification, as a relatively new phenomenon, is a propitious topic for consideration as a potential student motivator; it continues to make inroads into increasingly more situations such as government programs to encourage recycling, vehicles that display dashboard graphics of a plant growing in coordination with responsible driving, and mobile and web applications that reward and broadcast healthy eating and exercise habits. If gamification is to similarly pervade the educational landscape, research concerning how to effectively implement it is crucial. As suggested by Fu, Su and Yu in 2009, learners today, for whom rapid technological change is commonplace, already assume that games will be included in their learning environment. While games designed to teach musical knowledge and skills are prolific and include popular examples such as MusicAce and Rock Band for Wii, this

study, in contrast, brings the world of game playing into the context of private piano lessons.

CHAPTER 2: METHOD

This research study took place over a 9-week period in the fall of 2012. All of the participants were familiarized with the nature of the study at their Week 1 piano lesson when the teacher read a description from a script (see Appendix A). This script structured and standardized the initial experience of the study for all participants. Two unique versions were used: one for the control group and one for the experimental group. During Weeks 2 through 9 of the study, data were collected in order to determine the effects of gamification on student motivation to practice technical exercises outside of lessons. All procedures were conducted in accordance with University of Toronto ethical review protocol 28065.

Variables

This 9-week study measured students' motivation to practice technical

exercises on the piano. Notably, it did not track the amount of time students practiced, since this is done outside of lessons and is difficult to determine with accuracy. Instead, students' motivation to practice was measured by the number of technical exercises mastered, on the assumption that mastery of an exercise can be attributed to repeated practice of that exercise (Ericsson, 1993). In a study of instrumental music students by Schmidt (2005), musical achievement was shown to correlate significantly with motivation. In order to

measure student motivation to practice, then, achievement levels were used as the indicator; in addition, to broaden the picture of student motivation in the context of the study, the attitude and self-efficacy levels of participants were also measured. The primary independent variable was *type of instruction*, with participants being divided into two groups of 10 students each. Group 1 (Control group) practiced technical exercises in a nongamified environment, while Group 2 (Treatment group) had gaming techniques implemented in relation to their practice of technical exercises. Potential covariates considered were *gender*, *age*, *amount of experience as a piano student*, and *studio*.

Participants

The participants for this quasiexperimental study were recruited from students aged 7 through 17 among the piano students of the researcher and the piano students of teachers in the local branch of the Ontario Registered Music Teachers' Association (ORMTA). The age range specified is the typical range found at most private piano studios where students are engaged in studying the Royal Conservatory of Music (RCM) graded curriculum.

The RCM was chosen as a common curriculum base from which participants would be recruited since it is a typical standardized method for which large numbers of music students prepare and complete examinations. Widespread, highly respected instructional programs like the RCM are valued "by many in the profession who use them as an indication of a developing child's musical ability"

(McPherson & McCormick, 2006, p. 322). The RCM curriculum is also ideal for the context of this study since it specifies a

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sequential order in which technical exercises should be learned, detailing which keys and exercises should be mastered at each grade level.

An email invitation was sent to all teachers in the local ORMTA branch, asking them if they were willing to assist with recruitment of piano students as well as data collection for the study. One teacher who agreed to participate was asked to provide her students and their parents with prepared letters of invitation that indicated the purpose of the study and asked parental permission for each child to participate in study tasks. Once she had recruited a number of her students, this participating teacher fully engaged in data collection procedures involving her students in both the control and experimental groups.

The method of randomly assigning participants to the control group and the experimental group was done by counterbalancing piano studio, and experience playing the piano. It should be noted, however, that participants from the same family were placed in the same group to avoid the tension or confusion that could arise within a home if one family member was in the control group, and one was in the experimental group.

The participants were 14 females and 6 males aged 7 to 17 years ($M = 11.3$, $SD = 2.64$). For the purpose of creating three groups of comparable size, participants were categorized into three developmental groups, age 7-10, age 11-13, and age 14-17. The study began with 21 participants, 11 from the studio of the researcher (Studio A), and 10 from the studio of the participating piano teacher (Studio B). One participant from Studio B withdrew from the study during Week 4, leaving 20 participants in total. The piano- playing experience of the participants ranged from beginner to advanced piano players,

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with 8 participants in the Beginner Category (Preparatory - Grade 1), 6 participants in the Early Intermediate Category (Grades 2 – 4), and

6 participants in the Advanced Category (Grades 5 – 9).

Procedure

Group 1 (Control)

Participants in Group 1 were assigned one key at each lesson, and were expected to practice all the technical exercises required for that key for 1 week. At the following week's lesson, the student was asked to play those technical exercises for the teacher, who used the Performance Measure Rubric (See Appendix B) to determine whether mastery was achieved for each technical element. For example, a participant studying at the Grade 4 Royal Conservatory level might receive the following written instructions at their lesson:

"This week, practice technique in the key of D major. The required technical exercises are:

Scale, hands together, two octaves
Staccato scale, hands separately, two octaves
Chromatic scale, hands separately, one octave
Solid and broken triad and inversions, hands separately, two octaves
Solid and broken triad and inversions, hands together, one octave, with cadence Arpeggio, hands separately, two octaves"

During Week 1 or Week 2 of the study, a message was sent to the contact email address that each Group 1 participant had provided. This email message contained a link to an exemplar video, demonstrating how the required technical exercises for their grade level were to be performed. An example can be viewed here: http://www.youtube.com/watch?

v=5sTcSRi6aJo&feature=plcp. If students achieved mastery in any or all of the technical exercises they had practiced throughout the week, the teacher provided positive verbal feedback and surreptitiously recorded the results; the teacher then asked the student to move on to another key for the next week. If the student did not achieve mastery in all the exercises, that same key was assigned for another week. After 2 weeks, whether full mastery was achieved or not, a new key

was assigned.

Group 2 (Experimental)

Group 2 received the experimental version of technical exercise instruction, i.e. gamification. During Week 1, participants were introduced to the game *Technique Tower*. See Figure 2 which illustrates a screenshot of a game webpage, or visit a live game webpage here: http://www.techniquetower.com/p/missy.html. The goal of *Technique Tower* is to reach the top of the tower by "climbing" up each of its 7 levels. This is done through mastering a designated number of technical requirements for the appropriate grade level, according to the Royal Conservatory of Music graded curriculum specifications. Game players were given a comprehensive chart detailing all of the specific technical requirements for their grade level, an example of which is shown in Appendix C. These participants were also sent links to the relevant exemplar videos. Players were encouraged to choose any technical element to work on at any time, in any order. When they demonstrated mastery of any technical element, the piano teacher declared that they had received 10 points. Their game webpage was then updated to reflect their point total; a certain number of points resulted in beating a level, for which a virtual trophy was earned.

Table 1 details the unique number of points which players in each RCM grade level need to earn in order to beat each level, and eventually reach the top of Technique Tower.

Figure 2. Screenshot of a *Technique Tower* webpage – Alias "Starlycool." Retrieved from: http://www.techniquetower.com/p/starlycool.html.

Table 1

Requirements for Beating Levels in the Game, "Technique Tower"

Preparatory	3
Grade 1 Grade 2 Grade 3 Grade 4 Grade 5 Grade 6 Grade 7 Grade 8 Grade 9	
4 4 5 6 7 8 9 10 12	
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Grade	# of Technical Elements to Master to Beat a Level

The reason
game was simply that there are more technical requirements for higher RCM grade levels. Since the game was not a race to reach the

top, but rather an individual pursuit, it was thought appropriate that players in different grade levels would spend varying amounts of time working toward mastering technique, beating levels and finishing the game. According to RCM expectations, the higher the grade level, the greater the amount of time needed to spend practicing technical exercises, due to increased length and

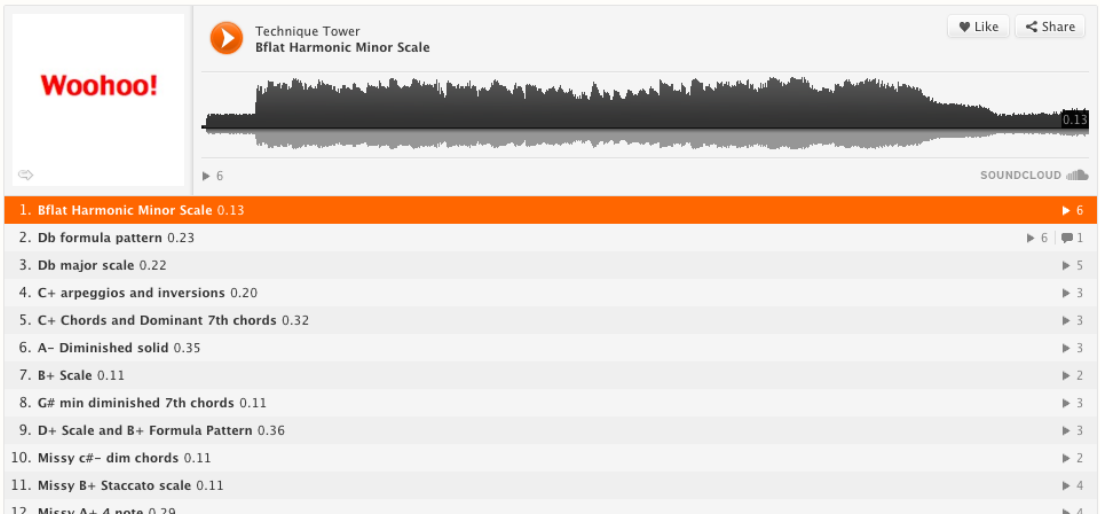
for requiring students in higher grade levels to achieve more points to win the

difficulty.[1]

All Group 2 participants had their own web page featuring an avatar they created and an alias they chose. The webpage listed the points they had achieved, as well as whether they were on Level 1, 2, 3, 4, 5, 6, or 7. Once participants mastered a technical exercise, using a mobile application called SoundCloud, an audio recording of that exercise was made and uploaded to the player's web page for parents, other students, teachers, and members of the public to listen to and comment on (see Figure 3).

Figure 3. Playlist of technical exercises a player has mastered embedded on her webpage. Retrieved from http://www.techniquetower.com/p/missy.html. Used with permission.

[1]The scoring system for *Technique Tower* had originally been designed to reflect that a player who reached the top of the tower had mastered every single technical element required for that grade level. However, a few weeks into the game, it became clear that participants in higher RCM grades found it unfair that they had more work to do to earn points and beat levels than players in lower RCM grades. The scoring system was then adjusted to allow participants to beat levels and reach the top of the tower without having mastered every single technical element required for the RCM grade. The requirement for players in higher grades to master more exercises per level was retained, in order to reflect an appropriate and comparable workload for each RCM grade level.



When players beat a level, they received a virtual trophy on their web page and an emailed message of congratulations, along with a link to their game webpage for easy click-through to view their progress. Bonus stars, another type of achievement awarded via email, were given to players if they demonstrated transfer of learning such that their skill in a particular technical exercise contributed to their success in another context such as playing a piece, or sight reading. For example, if a student mastered the D minor arpeggio, and then encountered an A minor arpeggio excerpt within one of their pieces and played it without hesitation, this deserved a Bonus Star. The shape and fingering pattern for these two arpeggios is similar, and so the practice of the one correlates with the success of playing the other. Students also received Bonus Stars for other impressive musical achievements. They were intended to surprise students for any reason of the teacher's choosing, which the teacher took note of on the Mastery Record sheet.

Instrumentation and Data Collection

Approval from the appropriate ethics board was gained (see Appendix D), and then informed consent from each participant and participant's parent was sought before any data were collected. The instruments used to collect data in this study included a Mastery Record Sheet (guided by a Performance Measure Rubric), a Self-Efficacy Measure, an Attitudinal Measure, a Teacher Interview Protocol, and an Online Interview Protocol. The text and audio comments left on the

Technique Tower web pages throughout the period of the study were also considered to be collectable and analyzable data.

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Mastery Record Sheet (See Appendix E)
This is the recording sheet that teachers used to keep track of student progress throughout

the 9-week study. During Week 1, the students' assigned ID number, gender, age, Royal Conservatory grade level, and email address were recorded here. During Weeks 2 through 9, teachers recorded which technical exercises students played for them, along with the total number of points awarded. For Group 1 participants, the key assigned for practice each week was also written down. For Group 2 participants, the point total each week was entered into an online spreadsheet which automatically updated each player's webpage to reflect their achievement.

Performance Measure Rubric (See Appendix B)
A rubric was used to help assess whether students had achieved mastery on each technical

exercise. This rubric was designed in consultation with three other music teachers in order to help establish content validity. Ideas were pooled in order to come up with a comprehensive list of characteristics which would comprise mastery. The rubric provides clear direction for students needing to know how to achieve mastery, and a reference by which teachers could decide how many points to award to a participant. The development and use of this rubric was crucial for ensuring consistency since data were collected by more than one person. The two teachers who used the rubric as a scoring tool first discussed each aspect to ensure common understanding, and agreement about the significance of each requirement for mastery.

While collaborating to create this measure, the teachers involved defined three levels according to which a student performance could be rated. For Group 1, these levels were

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named *Still Working on It*, *Getting There* and *Got It*. For Group 2, the

same three levels were called *Recruit*, *Veteran*, and *Master,* to represent more game-like category names. These three achievement levels (AL1, AL2, and AL3) allowed teachers to award 5 points to a student who performed a technical exercise at AL2, and then another 5 points to that same student when they raised their performance quality up to AL3. In contrast to waiting until students achieved mastery to award a full 10 points, this scaffolded scoring method increased the number of goals players could work toward in the game, and increased the frequency at which they would be awarded points.

Self-Efficacy Measure (See Appendix F)
This measure was used pre- and post-study, during Week 1 and again during Week 9.

Student participants filled out this questionnaire to indicate their feelings and beliefs about their ability to learn to play technical exercises through practice. This Likert scale questionnaire was based on a tool developed by Ritchie and Williamon (2011) known as the "Self-Efficacy for Music Learning Scale." A scale to measure self-efficacy was chosen since, in musical education research contexts, self-efficacy has been connected with levels of persistence and levels of achievement (Eccles, Wigfield, Harold, & Blumenfeld, 1993; Schmidt, Zdzinski, & Ballard, 2006). When tested, Ritchie and Williamon's 11-question scale was shown to have internal consistency, as well as to effectively confirm a single underlying factor, through the process of factor analysis (Ritchie & Williamon, 2011). It was administered twice to the same participants within a period of nine months, and consistent scores demonstrated its reliability (Ritchie & Williamon, 2011). Permission from the authors was obtained to use the scale with small

changes made to reflect the unique context of this study, that is, learning to play technical exercises.

Attitudinal Measure (See Appendix G)
This online questionnaire which was administered at the end of the study, during Week 9,

featured ten statements which participants responded to by choosing from five-point Likert scales. The statements were developed by the

researcher, who invited feedback from other music teachers regarding their potential to effectively gauge students' attitudes toward practicing technique. A consensus was reached concerning the questions on the scale, and their ability to provide insight into student attitudes.

Online Interview (See Appendix H)
During Week 9 of the study, participants in the treatment group were interviewed by way

of an online questionnaire. The ten questions were designed to elicit information from the game players to determine the nature of their experience in the gamified environment. They were asked to describe the range of feelings they experienced throughout the playing of the game, and then to rate the game in the areas of fun, fairness, and effectiveness. They were also invited to comment on various aspects of the game.

Teacher Interview Protocol (See Appendix I)
This instrument was designed to collect information from the participating teacher in the

study. The interview was conducted in two parts, Part 1 (Questions 1-6) during Week 1 of the study, and Part 2 (Questions 7-10) during Week 9. Part 1 questions were designed to gather information about the values, beliefs, and practices of the participating teacher in

regard to the teaching of technical exercises. It was anticipated that if the participating teacher and teacher-researcher held distinct values and used distinct strategies for motivating students, this could have an affect on the achievement levels of their students throughout the study, thus becoming a confounding variable. Part 2 questions were asked to allow the participating teacher an opportunity to mention any interesting phenomena she noticed, to comment on any facet of the study, or to give ideas for further research. While there is only one official researcher in this proposed study model, the other participating piano teacher was invited to contribute insights from her own unique perspective through which she experienced the research method and data collection process.

CHAPTER 3: RESULTS

This chapter summarizes results from the analyses which were conducted to answer the research question of the study: Does gamification affect students' motivation to practice technical exercises such as scales, chords, and arpeggios within the private piano lesson environment? The chapter begins with the participants' demographic information indicating gender, ages and experience levels. Then the inferential analyses, for which an alpha level of .05 was used to establish statistical significance, are outlined. These quantitative analyses provide answers to the following subquestions: 1) Does gamification affect the self-efficacy levels of piano students? 2) Does gamification affect the attitude of piano students towards practicing technique? 3) Is gamification perceived as an enjoyable and effective motivator?

Mastery of Technical Exercises

The hypothesis that the participants in the experimental group, as a result of the gamification environment, would master more technical exercises in a 9-week period than the participants in the control group, was tested. It was recognized that students in higher RCM Grade levels would need to master more exercises per week than those in lower grade levels, in order to learn all the exercises required within the typical one year of piano study per grade. This recognition, along with the consideration that students in

higher grade levels have more experience playing technical exercises, led to the decision that a set of comparable, proportional achievement scores should be computed. Both the teacher-researcher and the participating teacher in the study agreed upon a Teacher Expectation Score (TES) unique to each of the three levels in the variable, *experience*, such that Beginner students were expected to master two technical exercises each week, Intermediate students were expected to master three, and Advanced students were expected to master four. This TES was divided by the actual number of technical exercises mastered each week, generating a weekly proportional score for each

participant.

The Mann-Whitney *U*-test was chosen to compare the difference in the achievement scores between the groups, since it is well-suited for use with small sample sizes, i.e., 5 to 20 participants (Nadim, 2008). Proportional achievement scores for the experimental group (*Mdn* = .99) were higher than for the control group (*Mdn* = .32). A significant effect of group was found, with the mean rank of the Control Group being 6.4 and the mean rank of the experimental group being 14.6; *U* = 9.0, *p* = .002. Figure 4 illustrates the total number of exercises mastered by each group, showing that gamification does have a positive effect. Specifically, this result suggests that when piano students learn technical exercises in a gamified environment featuring an online social context, points, levels, and achievements, they master more exercises than those who are not in a gamified environment.

Point-biserial Pearson correlations were conducted to determine if the variables *gender* or *studio* were related to the number of technical exercises that participants mastered. The working hypothesis regarding these potential covariates was that they might, in fact, correlate with the number of exercises achieved. For *gender*, participants were coded as either male or female; for *studio*, participants were coded in two separate groups representing the two different piano teachers from whose studios they came. No significant relationship was indicated between *gender* or *studio* and the achievement scores of participants in the control and treatment groups, as illustrated in Table 2.

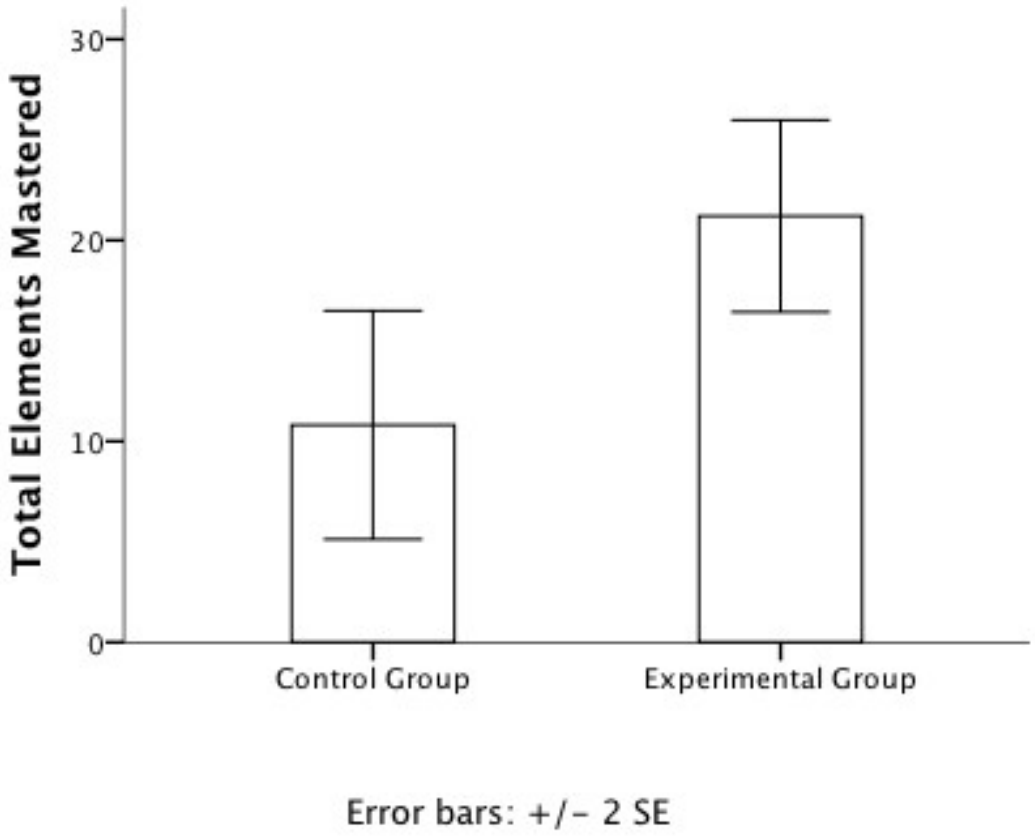

Figure 4. Achievement scores showing the number of technical exercises mastered.

Table 2

Correlations between number of exercises mastered and potential covariates.

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Interaction

Proportional score x

gender studio

[a]n = 10. [b]n = 10.

r value

-0.34 -0.22

Control[a]

0.337 0.536

Treatment[b]

p value

0.345 0.936

p value

r value

-0.34 -0.03

No significant correlation with regard to *gender* among the control and treatment groups suggests that achieving mastery of technical exercises is equal among male and female piano students. The result that *studio* showed no correlation allows this analysis and the following discussion to proceed on the assumption that even though the participants came from two different piano studios and had different piano teachers, they can be considered as one homogeneous sample group of piano students. This assumption coincides with the data collected using the Teacher Interview Protocol. During the interview, the participating teacher expressed her views about technique and described her usual methods for motivating students to practice; her views and methods were found to be similar to those of the teacher-researcher. Both teachers placed a high priority on technique as an integral part of learning to play the piano. When asked to describe her feelings about students practicing technical exercises such as scales, chords and arpeggios, the participating teacher's answer echoed the perspective described in the

Introduction section: “It's a necessity; it's part of taking lessons that gives you the skills, tools, and ability to play the pieces you want to play. If you want to play Fűr Elise, you'll have to know how to play all the arpeggios and chords in e minor. [My students] don't have an option. I don't present [technique] as a negative or a positive thing. I just present it as: this is how you learn to play.”

The variables *age* and *experience* were also hypothesized to not have

an affect on achievement scores. To test this assumption, a Kruskal-Wallis one-way ANOVA was performed on the results from the three age groups, as well as the three experience groups. For *age*, no significant effect was discovered in the control group $F(2, 10) = 2.24$, $p = .326$, nor in the experimental group, $F(2, 10)$ 2.42, $p = .299$. *Experience* also showed no significant effect in the control group, $F(2, 10) = 1.67$, $p = .435$, nor in the experimental group, $F(2, 10) = 2.42$, $p = .299$. These results suggest that gamification has a similar effect on achievement levels among piano students of various ages and experience levels.

Gamification and Self-Efficacy

To test if gamification had an effect on piano students' self-efficacy, a questionnaire was administered to participants twice, once at the start of the study, T_1, and again at the end of the study, T_8. The survey, modelled closely after the Self-Efficacy for Music Learning questionnaire developed by Ritchie and Williamon (2011), had 11 questions, and required participants to provide responses on a 7-point Likert scale. Participants' responses were summed to calculate an initial SEML (Self-Efficacy for Music Learning) score for each

participant at T_1, and a follow-up SEML score at T_8. If gamification could uniquely affect self-efficacy in a positive way, then a raised SEML score at T_8 for the experimental group would be expected, while the SEML score at T_8 for the control group would be projected to remain the same. Or perhaps both the experimental and control groups would score higher on SEML at T_8 due to the maturation effect, but the experimental group would indicate substantially higher self-efficacy levels. A paired samples Wilcoxon rank sum test was conducted to determine if there was an effect on self-efficacy scores over the time period of the study. The analysis revealed that within the control group, participants' SEML scores decreased marginally over time, with the mean rank at T_1 being 6, and the mean rank at T_2 being 3, $z = -.84$, $p = .400$. But the SEML scores of the treatment group also failed to indicate a statistically significant change from T_1 to T_8, $z = -.26$, $p = .798$, with the mean rank at T_1 being 5 and the mean rank at T_2 being 6. Since SEML scores remained fairly

consistent throughout the period of the study in both groups, this suggests that gamification did not have a significant effect on the self-efficacy of piano students, as hypothesized (see Figure 5 & Figure 6).

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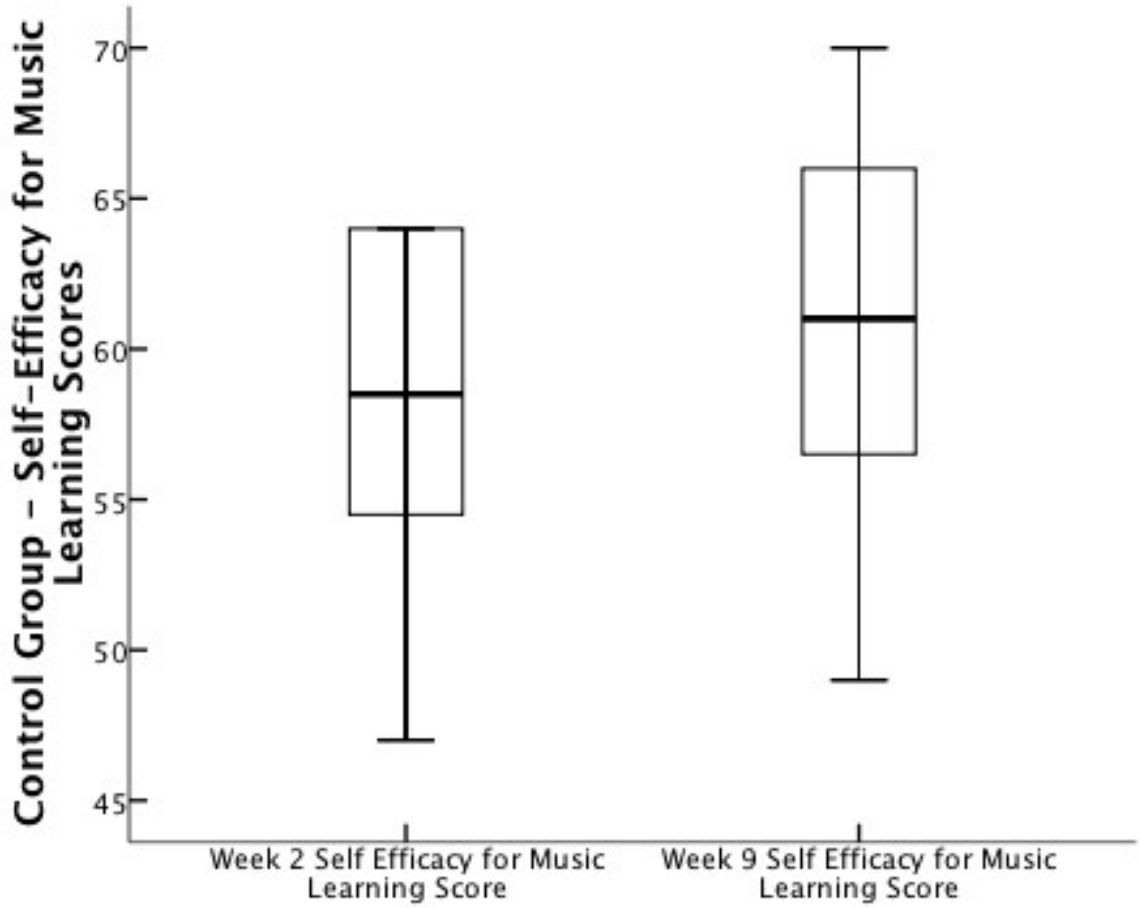


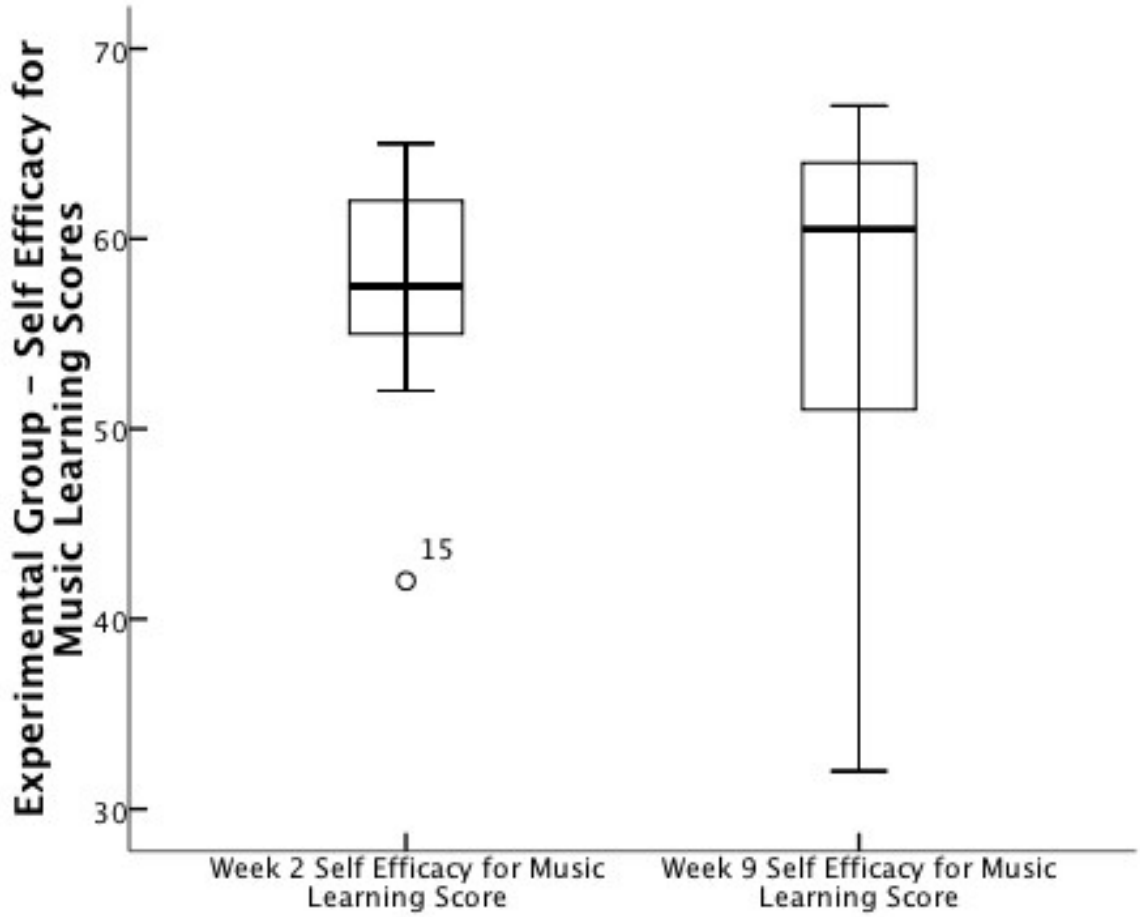
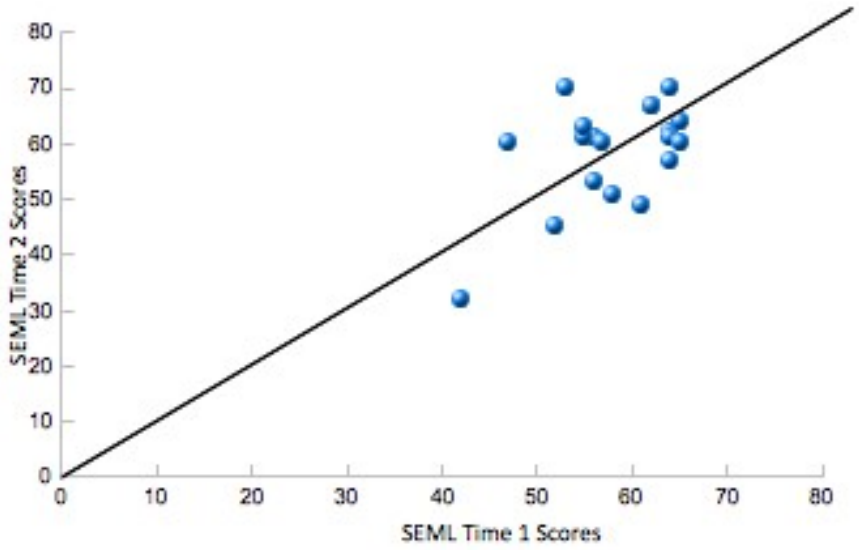


Figure 5. Self-Efficacy scores of Control and Experimental Groups at Week 2 and Week 9.

Figure 6. Comparison of self-efficacy scores of each participant at Time 1 and Time 2.

Another hypothesis related to the SEML scores of participants was that SEML scores would positively correlate with their achievement scores. Spearman correlations were conducted to test whether there was an interaction between participants' final SEML score at T_8 and the sum of their proportional achievement scores. No significant



correlation was discovered between the mean SEML score of the control group and their achievement score, r = -0.07, n = 9, p = .821. Nor was any significant correlation discovered between the mean SEML score of the treatment group and their achievement score, r = -0.34, n = 10, p = .337. In other words, self-efficacy was not shown to be positively correlated with how many technical exercises the piano students mastered. The self-efficacy levels of all the participants in this study remained consistent throughout the 9-week period, regardless of the fact that the treatment group achieved mastery on a significantly higher number of technical exercises.

Gamification and Attitude

To determine whether gamification had an effect on attitudes toward practicing technique, Likert scale data were collected at T_8 and summed to represent each participant's attitude (ATT) score. A Wilcoxon signed rank test was performed to compare the ATT scores of the control and treatment group, assuming that if gamification had an effect, a significant difference would be detected. However, the test did not show a statistically significant difference between the ATT scores of the control and experimental groups. A marginal effect was indicated, with the mean rank for the Control Group being 7.9, and the mean rank for the Experimental Group being 11.1, z = -1.29, p = .198. A visual comparison between these attitude scores is depicted in Figure 7.

Figure 7. Mean Attitude Scores for Control and Experimental Group.

The Experience of Gamification

To assess whether the experience of playing the game *Technique Tower* was perceived to be enjoyable and effective by the players, an online interview was conducted. This interview was optional for the ten participants in the treatment group, of whom eight chose to participate. Positive comments about the game written by players included, “I LOVE teqnice [*sic*] tower!!!!! :)”, and “This game is really fun i like it.” Table 3 shows all the comments that participants chose to contribute.

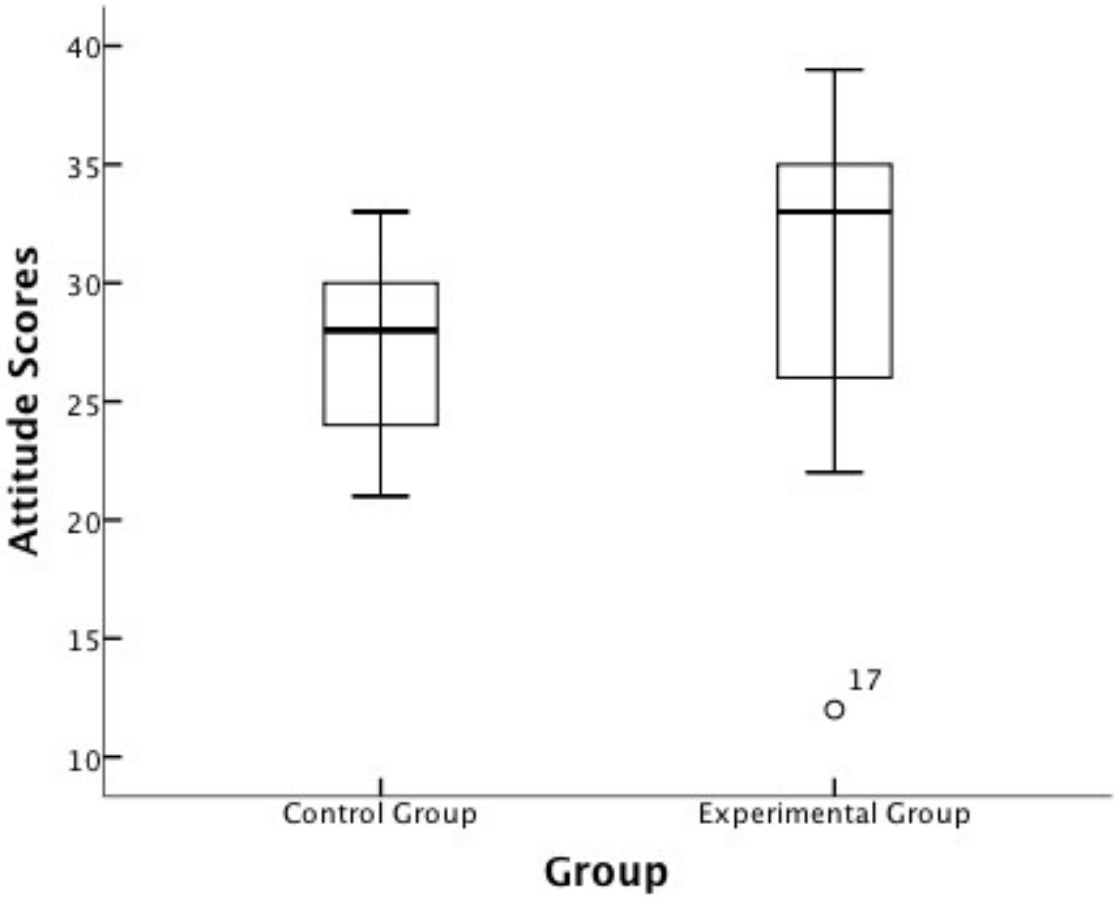


Table 3

Participants answered the question, “Do you have any comments about the game?”

Responses

This game is really fun i like it.
I like it because it motovates [sic] kids to practice more

Some comments i have are that...I think this game is a fun and edgecational [sic] for people to practice and achieve our goal/level. I hope this game will last forever!!

IT RULES and I love it!

One of the interview questions invited participants to give *Technique Tower* a fun score, a fairness score, and an effectiveness score, out of ten. Table 4 shows the results of these ratings.

Table 4

Ratings of the game, "Technique Tower" by players

Fun Score* Fairness Score* Effectiveness Score*

879 686 335 7 9 10 10 8 10 798

10 9 9 8 10 6

* Scores are out of 10.

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The mean fun score was 7.67 out of 10, *SD* = 2.29, the mean fairness score was 8.00 out of 10, *SD* = 2.06 and the mean effectiveness score was 7.75 out of 10, *SD* = 1.83. While it has already been established that the variable *studio* did not have an effect on participants' achievement scores, Pearson correlations were conducted to determine if there was a relationship between the variable *studio*, and the way players rated the game. *Studio* was carefully observed since half of the game players had never met the game creator, while half of them were piano students of the game creator. It was assumed that if no significant correlation between *studio* and game ratings was found, the ratings could be acknowledged as true representations of the

players' opinions. One of the eight respondents to the online interview chose to remain anonymous, so it is not known which piano studio that person's responses represent. Analyzing the other responses revealed no significant correlation between *studio* and *Technique Tower* ratings, $F(6) = -.45$, $p = .367$. From this result, it can be accepted that the participants from the studio of the game creator were not influenced by the desire to please their piano teacher in such a way that their ratings were inflated beyond expected levels.

Interviewees were asked to select which of the following emotions, if any, they felt when they received points, beat a level, or earned a trophy in the game: *happy, powerful, safe, selfish, strong, confident, greedy, sad, confused, competitive, excited, or angry*. *Happy* was mentioned 17 times, followed by *excited,* 10 times, *confident,* 8 times, *competitive*, 5 times, and *strong*, 4 times. *Proud* and *powerful* were also mentioned once each. Other comments about the game are included here in Table 5.

Table 5

Participants were invited to finish the sentence: "When I get to the top of Technique Tower:"

Responses I learned a lot and it has been really fun

I am proud
I will still have a lot of work to do before my exam

I will feel like I know a lot of my scales and my chords, and have done so much and know so much. As soon as you've got the chords and the scales you can play songs a lot easier.

I will be very proud of myself for practicing a bunch. I'll be proud that I practiced a lot.
I will say I am king of the tower!!!!!!!!! :)

One aspect of the game which was rated negatively by most interviewees, was the game character, Technique Turkey (see Figure 8). This talking cartoon turkey was featured in weekly emails to game

players, reminding them to practice technique, and encouraging them as they beat levels in the game and moved up *Technique Tower*. Participants were asked whether the messages from the turkey actually reminded them to practice technique. While one respondent said yes, the rest answered with *sort of*, *not really*, or *sometimes*. Two participants had never heard of Technique Turkey, while one said she tried to listen to the message from Technique Turkey every week, but when she clicked on the link to hear the message, nothing happened. One player joked that the reward for getting to the top of *Technique Tower* might be a roast turkey dinner, while two other players commented that the voice of the turkey was "creepy."

Figure 8. Screenshot of the talking avatar, Technique Turkey. Retrieved from: http://www.voki.com. Used with permission.

One interviewee who indicated she felt happy, excited and powerful when she earned points also expressed the following sentiment when asked about the effectiveness of the game for getting students to

practice technique: “It’s sort of not a good way to get them to practice because you don’t actually get the real trophies.” A follow-up question about whether she would practice more if she got real trophies elicited a bold “Yes!” Another scenario which revealed somewhat of a juxtaposition occurred when the first player successfully reached the top of *Technique Tower*. After practicing a lot to master each technical element required for her grade level at a rate faster than the other nine players, she was invited to play again to help motivate her to practice the technical requirements for the following grade level. She declined and said she would rather just practice the next grade level technique in the regular way, instead of playing *Technique Tower* again. When asked why, she said she was not sure.

Before the study began, it was thought that another rich source of data that could provide insight into how gamification affects piano students’ experiences of the game would be

the text and audio comments that were left on their webpages. It was anticipated that these comments would be left in response to their achievements such as points, trophies and stars, and in response to the recordings of them performing technique. However, very few comments were posted on the players’ webpages. One player did use the comment feature on her webpage to register two complaints about the game. The player wrote: “I don't understand why I have more points than other students, yet I'm at a lower level. I have to work harder on each technical requirement, they have to be faster and each one is much longer. Also, I have done 14 master technical requirements and only have 205 points.” The first two sentences here describe her frustration at the game being unfair. The last sentence indicates her disappointment upon checking her webpage and discovering that it had not yet been updated to reflect her current points and trophies earned. The implications of these findings, along with a discussion of all the results reported here, will be addressed in the following chapter.

CHAPTER 4: DISCUSSION AND

CONCLUSION

The main purpose of this study was to find out if gamification affects piano students' motivation to practice technical exercises. As discussed in the Method section, student motivation was measured by tracking achievement, since motivation to practice a musical instrument is closely linked with achievement levels (Schmidt, 2005). Gamification was found to have a significant positive affect on the number of technical exercises students mastered. Students' self-efficacy levels and attitude toward practicing technique were also measured. While self-efficacy levels were unaffected by gamification, attitude toward practicing technique had a moderate positive affect.

Mastering technical exercises is crucial, as described in the Introduction; ideally gamification would also positively affect self-efficacy levels and students' attitude toward practicing technique. In other words, optimal conditions would see gamification positively affect both the extrinsic and intrinsic motivation of piano students. Extrinsic motivation, in the context of this study, is reflected by achievement scores. *Technique Tower* was used to motivate students extrinsically by giving them opportunities to demonstrate their skills to their friends and family, and to the world, online; the game provided a goal-setting atmosphere where players earned trophies and bonus stars. Demonstrating their skills and earning rewards gave players the chance to receive

accolades from other players in the game, their teacher and family. Considering intrinsic motivation within the study environment, the self-efficacy and attitude measures are indicators. *Technique Tower* provided fun, enjoyment, and feelings of accomplishment for students. Following is a discussion of the successes and failures of *Technique Tower* to facilitate both extrinsic and intrinsic motivation in piano students.

Increased Motivation and Achievement

Clearly, gamification had a positive effect, with students in the experimental group attaining mastery of significantly more scales, chords, and arpeggios than those in the experimental group. This

research suggests that the use of gamification is an effective method for motivating piano students to practice technique. These findings concur with studies in other learning contexts about games and their ability to influence student motivation and student learning (Shin, Sutherland, Norris & Solway, 2012; Burguillo, 2010). Due to this finding, after the 9-week period of the study was complete, the gamification experience was also offered to the students in the control group so that they might experience the same potential benefit.

The *Technique Tower* website was designed as an online environment that tracked students' mastery of technical exercises and shared their accomplishments with them and their families. Each game webpage displayed a player's username and avatar, along with their current point total, level, and earned bonus stars and trophies. In addition, the webpage functioned as a hub for collecting artifacts that represented players' progress. Some of the game elements which were part of *Technique Tower* that may have

contributed to increased achievement levels in players include story, replayability, recognition, social context, and control.

Story

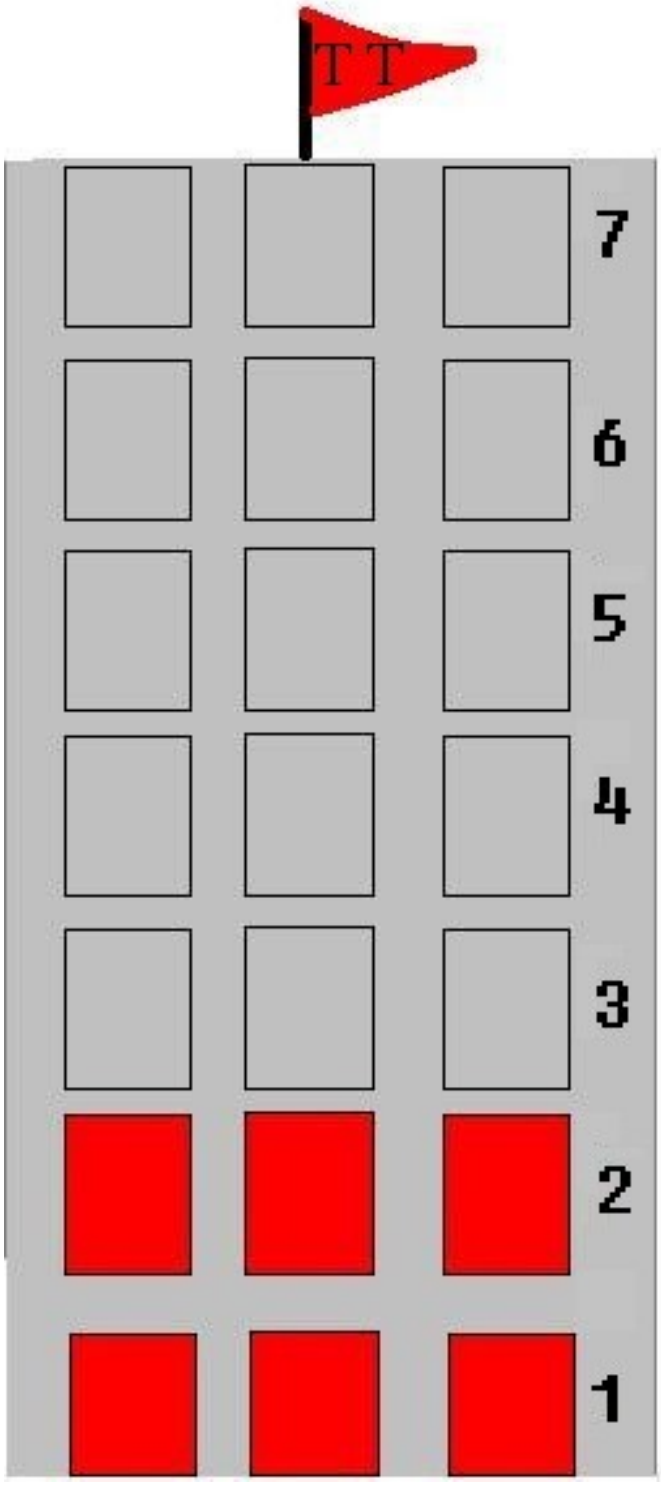
Admittedly, the game used in this study did not feature any tension and resolution, two crucial ingredients of story. However, it did feature characters, a simple plot, and a conclusion. Each game player was represented online by a character which they named and designed using an avatar creation website, http://www.moeruavatar.com/index_en.shtml. Some of the avatars designed by the players in this game appear in Figure 9. Each of these game characters began at the bottom of *Technique Tower* and gradually climbed up by earning points and beating levels in the game. Figure 10 shows *Technique Tower* with varying degrees of achievement depicted; the ultimate goal of the game was to beat all seven levels and reach the top of the tower.

Figure 9. Selection of avatars designed for the game, *Technique Tower*. Retrieved from http://www.moeruavatar.com/index_en.shtml. Used with permission.

Technique Tower players spent time practicing technical exercises; they tried to earn points for mastering each exercise by playing it for their piano teacher during the first five minutes of each lesson. Realistically, this short time period was not long enough for a player to repeat a scale an unlimited number of times. However, players did not demonstrate mastery on the first try they could continue practicing it at home, and play it for the teacher each week until they achieved mastery and earned points.

Recognition

Technique Tower rewarded players with 10 points for each technical exercise they mastered, and a certain number of points resulted in the earning of a virtual trophy. The point score and number of trophies for any player could be viewed on their webpage which tracked their progress in the game. Weekly email updates about players' progress were sent as notifications and reinforcements of the rewards given. While players could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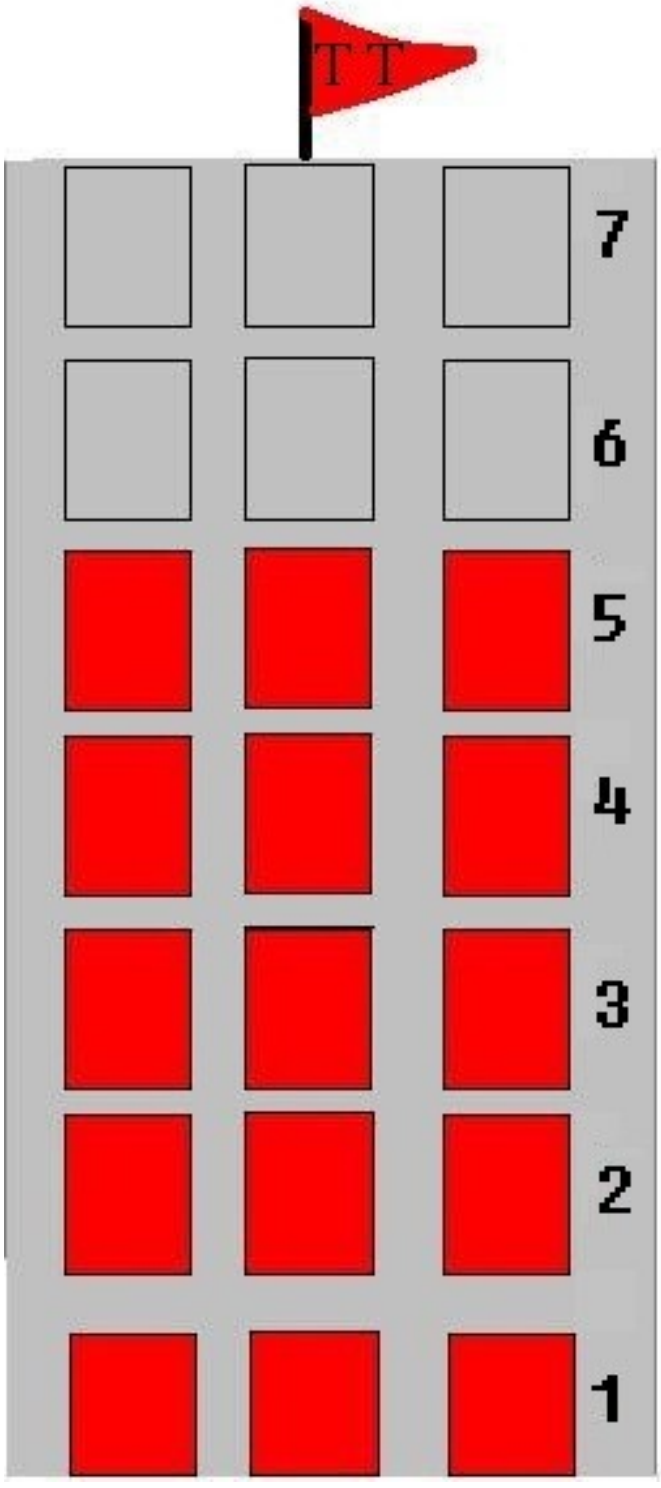
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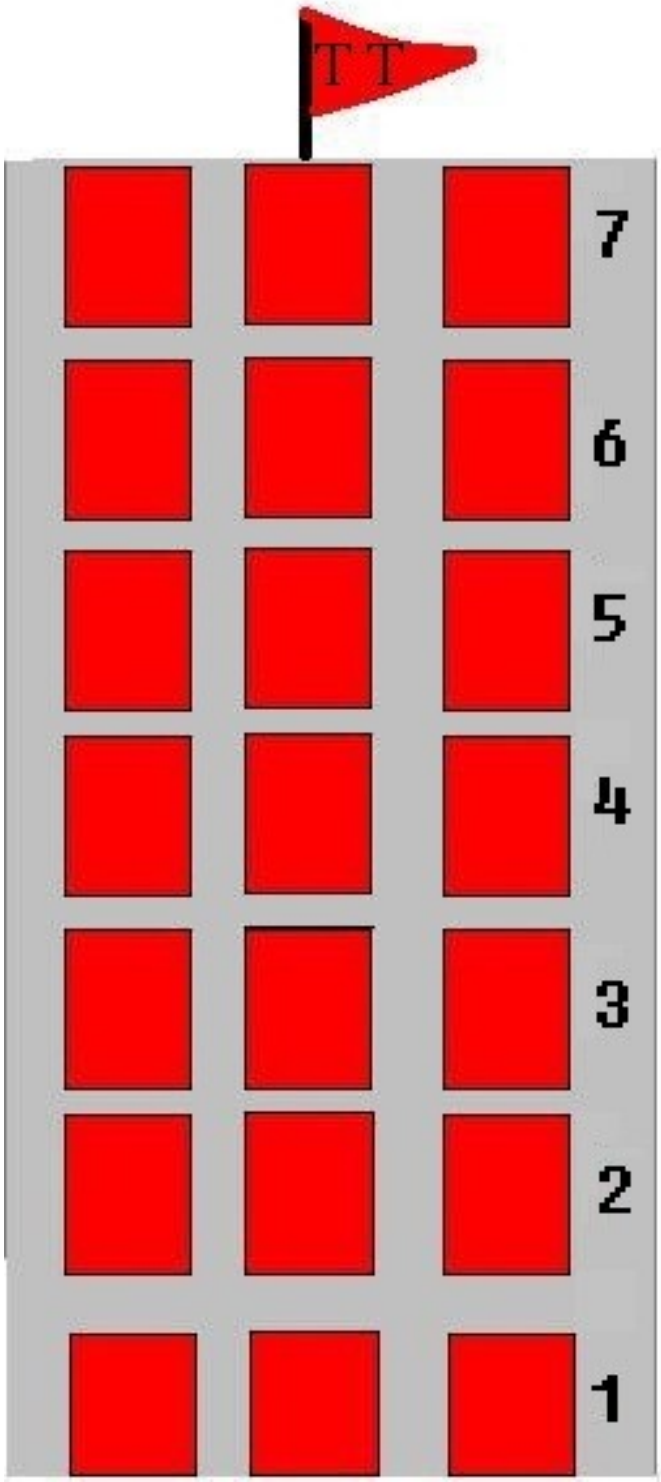

Figure 10. Three iterations of technique tower depicting various levels achieved. Replayability

compare their personal progress with others' in the game, all players had the opportunity to “win” the game, or to complete the game by

achieving the maximum number of points and reaching the top of the tower.

Social Context

While collaborating with other players to overcome obstacles was not part of *Technique Tower*, the social context of the game was provided by the online webpages which tracked players' progress, and provided opportunities for visitors to leave audio and text comments. This online context shifted the students' achievements from the confined environment of a one-on-one piano lesson to an open platform, accessible by anyone, but in particular by the students' family and other students in the studio. While crossing paths between piano lessons, game players were heard discussing their progress with fellow students, and eagerly showed their webpages to one another, using their phone or ipod.

Control

Technique Tower supported autonomy and student control over choices by encouraging players to learn to play technical exercises in any order. While a nongamified approach to learning technical exercises is often sequential and directed by the piano teacher, the gamification environment in this study gave control to the student, in an effort to encourage ownership and decision-making.

Scaffolding

All *Technique Tower* players who mastered a technical exercise received 10 points. To

provide more frequent opportunities to earn points, it was also specified that players who had obviously practiced an exercise, but were not quite at mastery level, could earn five points. At a subsequent lesson, when those players demonstrated mastery, they would earn the other five points, for a total of 10. Maximizing accessibility to point-earning correlated with the importance of clear, attainable goals as defined by flow theory, (Csikszentmihalyi, 1990), and with the importance of extrinsic motivation as outlined in expectancy-value theory (Pintrich & Schunk, 1996). In addition,

certain students, based on their piano playing experience level, or on physiological factors, would have found it extremely difficult to achieve mastery of a number of technical exercises during the time period of the study. Scaffolded scoring allowed more opportunities for these students to achieve points and progress in the game. However, it was an interesting occurrence when a few students were offered five points for partial mastery, but turned them down, wishing to wait until the next piano lesson to attempt to earn all ten points at once.

Self-Efficacy Levels Persist

With regard to self-efficacy, it was thought that gamification might have a positive influence. As referred to in the literature review, the theory of self-efficacy posits that what is most important about student achievement is learners' beliefs about their ability to attain a specific goal. As Bandura explained, specific beliefs are extremely powerful predictors of what a learner is capable of achieving (Bandura, 1997).

It was anticipated that gamification might increase self-efficacy by providing participants with opportunities for success, and providing them with direct evidence of their ability to

achieve mastery of technical exercises in the form of audio recordings on their webpage. Weekly updates were sent to all of the participants in the experimental group detailing information about their progress, and including a link to their personal webpage where their recordings could be heard, and also “seen” as waveforms. All of the uploaded recordings of technical exercises played by the participants can be viewed and listened to here: https://soundcloud.com/heather-birch1. Contrary to the expectation that gamification would have an effect, and despite the fact that achievement levels were significantly different, self-efficacy levels in the control and experimental group were indistinguishable. A consideration of why gamification appeared to have no effect is discussed in the following section.

Self-efficacy levels of the participants did not change over the 9-week period of the study as anticipated, in either the control or experimental

groups. Perhaps extended exposure to music learning, and a series of successful achievements over years of piano study, as opposed to nine weeks, would have revealed significant long-term changes. While gamification was not shown to affect self-efficacy levels in the context of this study, then, it could have a role in boosting the self-efficacy of piano students over a longer time period. Another potential explanation for the stability of self-efficacy scores across group is that piano students have high self-efficacy scores to begin with, leaving minimal room for improvement. Ritchie and Williamon (2011) have demonstrated that self-efficacy levels remain constant over time for those enrolled in music education programs, and that these levels are significantly higher than for children and adults who do not study a musical instrument.

Attitudinal Effects

Attitude was marginally affected by gamification. As in the case of self-efficacy, perhaps the limited length of the study was a factor which inhibited gamification from effecting a significant influence. Nonetheless, a difference in attitude toward practicing technique can cautiously be accounted for by gamification. If gaming elements can indeed positively affect even some piano students' attitude toward technical exercises, this is a powerful finding. The positive attitude a student has toward technique has the potential to stay with them long after the game is over, throughout months or even years of piano study. While achievement levels may only be affected while the gamification environment is present, positive attitudes may be a lasting legacy. Further research is needed to test this hypothesis.

Study Limitations Confounding Variables

While gender, age, experience playing the piano, and studio were all examined to ensure they were not potential covariates affecting the study results, another confounding variable was discovered after the study began. While some students were beginning a brand new grade level and would be experiencing technical exercises they had never seen before, other students who had been working on that grade level in the past would have had opportunities to hear and attempt those technical exercises before. Once the study was underway, it was discovered that this factor could cause those in the latter group to

master exercises faster than those in the former, yet it was too late to consider this as a

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confounding variable.

Game Design Issues

One student expressed frustration when the points on her webpage were not updated immediately after she achieved them. Unfortunately, a limitation of the game, *Technique Tower*, was that seeing your points updated in real time on your webpage was not feasible. Students did see their teachers record points in their notebooks, and this often prompted fist pumps and exclamations of "Yes!" or "Yay!" But if players went to visit their site immediately following their piano lesson, their points were not be updated until a couple of days later, when their piano teacher reported their point totals for the week.

One game player commented on her webpage: "I don't understand why I have more points than other students, yet I'm at a lower level. I have to work harder on each technical requirement, they have to be faster and each one is much longer." While this is the way the game was originally designed, students in higher grade levels did not appreciate this inequity. However, their perception of the game as unfair did not demotivate them from playing the game and continuing to try to earn points by mastering technical exercises.

One of the factors to be evaluated in this study was the social context in which the players' points, achievement level, and performances were posted. This information was accessible to them, and email updates on their progress were sent to them and their parents each week. It was the intent of the study to collect all of the comments that people made on the players' webpages, and to evaluate their content in order to assess their

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Another challenge within the study environment involved some

parents who chose not to pass along information to their children about the game. If a parental email address was the only one provided on the record sheet, then this was how game updates were distributed. Sometimes at their lessons, participants would express confusion or surprise, not knowing about events that had occurred in the game. Their parents had either chosen not to, or had forgotten, to share game updates with them. There is also a chance that some parents did not receive the game updates, potentially because the messages ended up in their email account spam folder, and went undetected. One parent described to her child's teacher how he was not motivated by extrinsic rewards. Perhaps this parent assumed that the gamification environment established for the study only provided extrinsic rewards, and this resulted in her devaluing the game updates, thereby seeing no reason to share them with her child.

Competition was an unexpected dynamic which emerged during the study. There was no formal leaderboard in the game where players were ranked according to performance. However, players who clicked on other players' webpages to view their points and trophies could easily determine who was moving up the tower faster or slower than they were. One student commented that others were beating him, and another student expressed a desire to “win” the game by getting to the top of the tower first, although that

potential effect on student progress in the game. However, not many comments were posted on the student webpages. Therefore, these could not really be evaluated to any significant extent.

was never presented to students as a scenario, and no reward was offered for such an achievement. Woodruff (2012) refers to competition, saying, “We naturally compare ourselves to others. Even if we say we don't like competition, we often mean, we don't like losing, and we are competitors.” Out of the 10 students playing the game, 6 expressed competitive tendencies, i.e. referring to the progress of other students in comparison to their own, and making statements about their desire to get more points or more bonus stars than other students.

Finally, the small number of students in this study is a limiting factor.

Additional studies are needed to better understand the wider impact of gamification in piano practice research.

Ideas for Future Research

Future research in the area of gamification could measure students' motivation to practice technique, as well as their self-efficacy levels and attitudes over a full year of piano study, to determine long-term effects. Similar studies with larger sample sizes could provide further evidence of gamification's role in motivating students. Integrating additional gaming elements such as chance and curiosity into *Technique Tower*, or further developing some of the existing elements, such as story and social interaction, could provide an even more effective gamification environment within which to test student motivation. Further study is needed on how the virtual nature of rewards in this study are able to motivate students, and on whether increased intrinsic motivation to practice technique remains once the gaming environment has been removed.

Conclusion and Educational Application

The findings from this study are applicable to private piano teachers who seek to motivate their students to practice technical exercises more often and more regularly. They may benefit from the use of gamification to increase student motivation to practice technique. Parents of private piano students may also be interested in how elements of gamification can influence their child's piano practice time and experience. Ultimately, students can benefit from a gamified environment if their playing improves based on their increased practice of technical exercises. While this study represents data collected from private piano studios, it is likely that the results could be used as a model for studios which provide lessons for other instruments such as guitar, violin, or flute. It may also provide a model for other scenarios in which student learners must spend time outside of class to consistently practice skills to gain mastery, such as home reading programs designed to develop reading fluency, and numeracy programs designed to increase accuracy and speed of math facts recall.

Overall, this study has shown that gamification can be successfully implemented in an educational context. Further study is necessary to

determine which gaming elements can maximize the impact on student motivation and achievement, and on whether both extrinsic and intrinsic motivation can both be influenced by gamification.

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Appendix A

Scripts for Lesson 1

Lesson 1 Script to read to Group 1 Participants (Control Group)

65

Hi _____ (student name). For the next two months you and I will be part of a research study which is set up to try to discover some ways to motivate students to practice. At each lesson I will give you a list of exercises to practice. On each lesson day, you (or your parents) will receive an email link to a video which shows someone playing those exact exercises. You can watch the video and listen for ideas about how to play those exercises. When you come back for a

lesson the next week, I will ask you to play those exercises for me, and we will write down which level you are at with each exercise - “Still Working On It”, “Getting There” or “Got it”. Does this sound OK with you? (Wait for response). OK, for next week I would like you to practice technique in the Key of _____. Do you have any questions?

Lesson 1 Script to read to Group 2 Participants (Experimental Group)

66

Hi _____ (student name). For the next two months you and I will be part of a research study which is set up to try to discover some ways to motivate students to practice. We are going to be playing a game called “*Technique Tower*.” Here is a list of all the technique for Grade _____ (student's grade level). (Give student the paper copy of the list). When you practice each of these exercises on this list, you will have the chance to earn points. If you earn ____ points you will go up to the next level in the tower. When you earn ____ points, you will reach the very top of the tower. That is how you win this game. You will get to choose an alias. (Let the student choose an alternate name for themselves and write it down on the Mastery Record Sheet. This can be a real name such as “John” or a username such as “Robot22”, but should not have their real name as part of it). All the players in this game have their own web page. Your web page will have an avatar that you will create, and also the number of points you have earned. You (or your parents) will receive an email link to a video which shows someone playing all of the technical exercises you have to practice to reach the top of the tower. You can watch the videos and listen for ideas about how to play those exercises. When you come back for a lesson the next week, I will ask you to play any exercises you want for me, and we will write down which level you are at with each exercise. Recruit Level means you have really just started working on it. That earns you 0 points. Veteran Level means you are experienced playing that exercise, and that earns you 5 points. Master Level means you have played it with precise musical skill, and that earns you 10 points. Does this sound OK with you? (Wait for response). OK, here is a list of all the technique you have to learn to make it to the top of “*Technique*

Tower.” Do you have any questions?

Appendix B

Performance Measure Rubric

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Group 1 Category Labels:

Learning Recruit

Almost There Veteran

Got It Master

Posture & Hand Position	slumps back, tension in fingers, hands, or forearms, flattens fingers	tension or incorrect hand position may arise at times during the exercise; elbow, wrist and hand may not consistently rotate freely as needed	sitting up straight, forearms straight, curved fingers, moves fingers up higher on the keys when needed to facilitate natural hand shape, hands and forearms are relaxed; elbow, wrist and hand rotate freely as needed
Notes	some incorrect notes	correct notes are known but not always reached on the first try	notes are correct

Fingering	problematic fingering causes errors, unnatural hand position, accuracy or rhythmic compromises	recommended fingering is known but not always used on the first try; challenging finger stretches or tucks cause slight hesitation	recommended fingering is used; challenging finger stretches or tucks are done seamlessly
Tempo	minimum tempo is not yet reached	tempo is close to the required speed	minimum tempo (or faster) is played evenly
Rhythm	rhythmic inconsistency, or rhythmic pulse is not evident	rhythm is mostly even with slight inconsistencies, or rhythmic pulse is not consistent	rhythm is even, with a good musical pulse
Tone	tone is uneven or fuzzy (notes overlap)	tone is mostly even, or tone is rigid	tone is balanced, clear and even; the exercise is shaped with a slight crescendo on the way up and diminuendo on the way down

Articulation

legato or staccato touch is not evident

legato or staccato touch is not consistent

legato or staccato touch is effective

Staccato Scales

Formula Pattern Scale Chromatic Scale

D, B♭ major
B, G minor
(harmonic)

C minor
(harmonic) 2 octaves
Beginning on D HS ♩ =104

1 octave

Appendix C

Example of a Chart Detailing the Required Technical Requirements for RCM Grade 4

HS ♩ =104 2 octaves

♫

♫

♫

Note Values

♫

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Scales* Keys Played Tempo Note Values				
Parallel Motion Scales	D, A, B♭, E♭ major B, F#, G, C minor (harmonic and melodic)	HT 2 octaves	♩ =92	♫

HT ♩ =92

*All scales are to be played *legato* unless otherwise indicated.

Chords Keys Played Tempo Note Values				
Triads (root position and	D, A, B♭, E♭ major	HS 2 octaves (no cadence)	♩ =76	

inversions) broken	B, F#, G, C minor	HT 1 octave (ending with V-I cadence)	♩ =60	
solid (blocked)	D, A, B♭, E♭ major B, F#, G, C minor	HS 2 octaves (no cadence)	♩ =132	
		HT 1 octave (ending with V-I cadence)	♩ =120	

Arpeggios

Tonic
(root position)

Keys

D, A major

G, C minor

Played Tempo

HS ♩ =72

2 octaves

Appendix D

Ethics Approval Letter

UNIVERSITY OF TORONTO

OFFICE OF THE VICE PRESIDENT, RESEARCH

PROTOCOL REFERENCE # 28065

August 27, 2012

Dr. Earl Woodruff
DEPT OF HUMAN DEVEL. & APPL.
PSYCHOLOGY
OISE/UT

Ms. Heather Birch
DEPT OF HUMAN DEVEL. & APPL.
PSYCHOLOGY
OISE/UT

Dear Dr. Woodruff and Ms. Heather Birch,

Re: Your research protocol entitled, "The motivational effects of the gamification of piano instruction and practice"

ETHICS APPROVAL	**Original Approval Date: August 27, 2012** **Expiry Date: August 26, 2013** **Continuing Review Level: 1**

We are writing to advise you that the Social Sciences and Humanities Research Ethics Board (REB) has granted approval to the above-named research protocol under the REB's delegated review process. Your protocol has been approved for a period of **one year** and ongoing research under this protocol must be renewed prior to the expiry date.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events in the research should be reported to the Office of Research Ethics as soon as possible.

Please ensure that you submit an Annual Renewal Form or a Study Completion Report 15 to 30 days prior to the expiry date of your current ethics approval. Note that annual renewals for studies cannot be accepted more than 30 days prior to the date of expiry.

If your research is funded by a third party, please contact the assigned Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your research.

Yours sincerely,

Margaret Schneider, Ph.D., C.Psych
REB Co-Chair

Sarah Wakefield, Ph.D.
REB Co-Chair

Dean Sharpe
REB Manager

Appendix E

Mastery Record Sheets

Record Sheet for Group 1 Participants

Participant Number: Gender: M / F

Birthday: (Month/Year) Email:

RCMGradeLevel: Prep 1 2 3 4 5 6 7 8 9

Key/exercises Assigned

Week 1 Date:	

Key Assigned

Key Assigned

Key Assigned

Still Working On It

Still Working On It

Still Working On It

Technical exercises played for the teacher Almost There

Technical Elements played for the teacher Almost There

Technical Elements played for the teacher Almost There

Got It

Got It

Got It

Week 2 Date:

Week 3 Date:

Week 4 Date:

Key Assigned

Key Assigned

Key Assigned

Key Assigned

Key Assigned

Still Working On It

Still Working On It

Still Working On It

Still Working On It

Still Working On It

Technical Elements played for the teacher Almost There

Technical Elements played for the teacher Almost There

Technical Elements played for the teacher Almost There

Technical Elements played for the teacher Almost There

Technical Elements played for the teacher Almost There

Got It

Got It

Got It

Got It

Got It

71

Week 5 Date:

Week 6 Date:

Week 7 Date:

Week 8 Date:

Week 9 Date:

Record Sheet for Group 2 Participants

Participant Number: Gender: M / F Birthday: (Month/Year) Email:

RCMGradeLevel:Prep 1 2 3 4 5 6 7 8 Alias: 9

Technical Elements played for the teacher

Technical Elements played for the teacher

Technical Elements played for the teacher

Total Pts

Total Pts

Total Pts

Bonus Star Awarded

Bonus Star Awarded

Bonus Star Awarded

Week 1 Date:

Week 2 Date:	Recruit (0 pts)	Veteran (5 pts)	Master (10pts)		Yes / No Reason:

Week 3 Date:	Recruit (0 pts)	Veteran (5 pts)	Master (10pts)		Yes / No Reason:

Week 4 Date:	Recruit (0 pts)	Veteran (5 pts)	Master (10pts)		Yes / No Reason:

Technical Elements played for the teacher

Technical Elements played for the teacher

Technical Elements played for the teacher

Technical Elements played for the teacher

Technical Elements played for the teacher

Total Pts

Total Pts

Total Pts

Total Pts

Total Pts

73 Bonus Star Awarded

Bonus Star Awarded

Bonus Star Awarded

Bonus Star Awarded

Bonus Star Awarded

Week 5 Date:	Recruit (0 pts)	Veteran (5 pts)	Master (10pts)		Yes / No Reason:

Week 6 Date:	Recruit (0 pts)	Veteran (5 pts)	Master (10pts)		Yes / No Reason:

Week 7 Date:	Recruit (0 pts)	Veteran (5 pts)	Master (10pts)		Yes / No Reason:

Week 8 Date:	Recruit (0 pts)	Veteran (5 pts)	Master (10pts)		Yes / No Reason:

Week 9 Date:	Recruit (0 pts)	Veteran (5 pts)	Master (10pts)		Yes / No Reason:

Participant ID: _____

1. I am sure that I can learn to play the technical requirements for this grade level.
2. I am sure I can practice when I should to learn the technical requirements for this grade level.
3. If I cannot play the technical requirements for this grade level at first, I will keep practicing until I can.
4. I can learn all the things I want to help me play the technical exercises for this grade level. 5. I am likely to give up practicing these technical requirements before I get really good at playing them.
6. If I find these technical requirements boring or tricky, I can stick to it until I learn them.
7. When I decide to learn these technical requirements I start to practice them right away. 8. When first practicing technical requirements, I soon give up if I can't play them right away.

10. I am likely to give up on working toward learning these technical requirements.
11. If I get stuck when learning these technical requirements, I can work it out.

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4

Appendix F

Self-Efficacy Measure

- Show students the overview of the technical requirements for their grade level.

- Ask students in both groups to rate these statements twice: At Week 2, and again

at Week 9.
• Do not let students see their previous answers.

Not at all sure

Completely sure

5 6 7 5 6 7

5 6 7 5 6 7

5 6 7 5 6 7 5 6 7 5 6 7

100 %

74

Week 2: (use red pen to circle numbers) Date _____ Week 9: (use blue pen to circle numbers) Date _____	0%	

9. The idea that I might make mistakes when playing technical requirements for my teacher makes me work harder to learn how to play them well.	1	2

4 5

1 2 1 2

36

3456 7 3456 7

7

Appendix G

Attitudinal Measure

75

1. I love practicing scales and triads.	Totally Yes!	Yes	Don't Know	Not Really	No Way!
2. I practice scales and triads because they help me become a better player.	Totally Yes!	Yes	Don't Know	Not Really	No Way!
3. I always practice my pieces first, and then scales and triads if I have time.	Always!	Most of the Time	Don't Know	Sometimes	Never
4. I do NOT enjoy practicing scales and triads.	Always!	Most of the Time	Don't Know	Sometimes	Never
5. Practicing scales and triads is fun.	Totally Yes!	Yes	Don't Know	Not Really	No Way!
6. I feel good after I have practiced scales and triads.	Totally Yes!	Yes	Don't Know	Not Really	No Way!
7. Practicing scales and triads is boring.	Totally Yes!	Yes	Don't Know	Not Really	No Way!
8. I practice scales and triads more now than I used to.	Totally Yes!	Yes	Don't Know	Not Really	No Way!
9. I feel happy when I practice scales and triads.	Totally Yes!	Yes	Don't Know	Not Really	No Way!
10. Scales and triads are awesome.	Totally Yes!	Yes	Don't Know	Not Really	No Way!

Appendix H

Online Interview Protocol

1. When you earn points in the game, Technique Tower, how do you feel?

□ happy □ selfish □ greedy □ excited

□ powerful □ strong
□ sad
□ angry

□ safe
□ confident
□ confused
□ competitive

□ other: _____

□ other: _____ (If no, go to Question 5).

2. When you earn a trophy in the game, how do you feel?

□ happy □ selfish □ greedy □ excited

□ powerful □ strong
□ sad
□ angry

□ safe
□ confident
□ confused
□ competitive

3. Have you earned a bonus star in this game? Yes / No

4. When you earned a bonus star, how did you feel?
   □ happy □ powerful □ selfish □ strong
   □ greedy □ sad
   □ excited □ angry

□ safe
□ confident

□ confused
□ competitive

□ other: _____ 5. Do you have any comments about the game that you would like to tell us?

6. Give *Technique Tower* a fun score out of 10. Choose one number.
   Most Boring Game Ever Totally Fun Game
   1 2 3 4 5 6 7 8 9 10

7. Give *Technique Tower* a fairness score out of 10. Choose one number.

Totally Unfair Game Very Fair Game

1 2 3 4 5 6 7 8 9 10

8. Do you think the *Technique Tower* game is a good way to get piano students to practice technique? Give it a score out of 10.

1 2 3 4 5 6 7 8 9 10

9. Finish this sentence. When I get to the top of technique tower...

10. Did messages from Technique Turkey remind you to practice technique? No Not Really Sort Of Sometimes Yes

Part 1 – Week 1

Appendix I

Teacher Interview Protocol – Parts 1 & 2

Introduction. Thank-you so much for agreeing to be part of this study. This is an opportunity for me to get to know some of your thoughts and feelings about technical exercises, and about how you motivate your students to practice. I will make an audio recording of this interview, and then type out your responses. I will email you a copy so that if there is anything you would like to change or add, you can let me know at that time and I will make the appropriate changes. Does all of this sound alright to you? (Wait for response). Great. Let's begin with question 1.
1. What are some of your usual methods for motivating students to practice?
2. What are your feelings about students practicing technical exercises such as scales, chords and arpeggios?
3. How do you usually assign technical exercises for students to practice?
4. If you ever have a student get upset in a lesson for any reason, how do you handle this?
5. Do you yourself regularly practice technical exercises such as scales, chords and arpeggios? Why or why not?

Part 2 – Week 9

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6. How do you reward student success?
7. Describe your students' typical attitude toward practicing technical exercises.

8. Did you have any interesting, frustrating, surprising or exciting moments throughout the period of the study that you would like to share about?
9. Did any of your feelings about practicing technical exercises change throughout the period of the study?
10. What changes could you suggest to the game "Technique Tower" to make it a more effective means for motivating students to practice technique?
11. Do you think the game "Technique Tower" could have applications in a broader context within piano instruction, i.e., to keep track of pieces learned and ear training skills?

Conclusion. Thank-you so much for your answers. I really appreciate the contribution you have made to this study. When I have finished analyzing the results, I would like you to read over the findings and discussion, and give your feedback. Have a great day.