*Music Education (3500 words)*

* What is research in this field?

Process and product are equally important, especially in regards to data collection/curation.

What is research in music education? How is it different from research in the other music disciplines? Phelps et al. define research in the context of music education as “(1) identification and isolation of a problem into a workable plan, (2) implementation of a plan to collect the data needed, and (3) presentation of the collected data into a format to be made available to others” (p.2). This chapter will briefly cover “implementation of the plan to collect data,” and spend the majority of the time discussing “presentation of the collected data into a format to be made available to others.” Traditionally this presentation has taken the form of published articles, but increasing interest is being paid to the presentation of the raw data for others to analyze and reuse. We will examine what this data looks like, and where the data can be found and shared.

Music education research incorporates research methods and techniques from the education research discipline, social sciences in general, as well as the music disciplines. Additionally, music education practitioners research teaching techniques using arts-based research methods. Music educators in the school setting collect and use data, but do not have incentives to formally publish or share their findings. This type of research is often called arts-based research, and those practicing it are called researchers in practice. According to Bartell (Bartell, chapter 9 Colwell, p.347), “research design is generally a data acquisition and analysis plan for the purpose of developing knowledge.” Bartell (chapter 9, Colwell, p.344) also identifies two “mega trends” in education research: “the use of technology and the increasing complexity in all facets of the process.”

According to Heller and O’Connor (chapter 2, Colwell), there are three types of music education research: “historical (mostly qualitative in technique), descriptive (qualitative or quantitative), and experimental (mostly quantitative).” Other music education scholars classify research into different categories, with Philips (p.7) outlining three different classes of research: historical, philosophical, and behavioral/empirical. Regardless of how research is classified, these commonly accepted types of research all rely on three methods of data collection: quantitative, qualitative, and mixed methods.

In additionally to these traditional research methods, an emerging type of music education research has been written about frequently since the early 2000s, and is referred to as classroom practice-in action research, or arts-based research (Eisner 2006). These conversations are also being held in other arts fields, including music performance and dance performance. This research is sometimes referred to as a “third paradigm” research method, with quantitative and qualitative methods being the first two paradigms. Arts-based research was first written about by Eisner when he “felt a tension between the protocols set down by the research strategies of the Social Sciences and his observations of the way the arts lead to fresh insights and new knowledge production” (Haseman chapter in Fleming book, p. 334). In this new perspective on research, credit is given to researchers as practitioners, and practitioners as researchers. Advocates “believe the significance of the methodological innovations introduced by artists, designers and others who have been researching in and through their practice is undervalued if they are consigned to the fringe of qualitative research” (Haseman chapter, p. 336). In arts-based research, practice is an object of research, and problem formation is an iterative process rather than a clearly defined one. A musical performance or score is evidence of research, and is also data to be preserved in the same way as a dataset or research paper. Research is reported through material forms of practice (Haseman chapter) by a teacher-researcher. If data is a symbolic form of knowledge representation, then written or performed music is data in this paradigm.

Historically, education research used quantitative research data often found in psychology and other social science fields. Examples include results from tests, measures, instruments, scales, surveys, statistics, and structured observations and interviews. The field has evolved in the past 50 years to include qualitative data, including narratives, perspectives, focus groups, and less structured interviews and observations. Mixed methods research uses quantitative and qualitative data gathering techniques. “The quantitative paradigm supports investigation of how reality exists independently of us” (Bresler and Stake, 78). “In the qualitative paradigm there is a range of positions, from the idealist belief that social and human reality are created, to the milder conviction that this reality is shaped by our minds” (Bresler and Stake, 78).

High quality quantitative and qualitative research meet certain criteria set by others in the discipline. Quantitative research should be valid, replicable, reliable, and generalizable. Bryman et al. also found that social science researchers consider explicitness and transparency, appropriateness to the research question, and understandability and relevance as other significant quantitative research criteria. Qualitative research criteria is less well-defined, and these criteria are not as strict as quantitative research. According to Flinder and Richardson, qualitative studies are “a systematic form of empirical inquiry that usually includes some type of fieldwork” and “usually assume an interpretive focus” (p. 314). Qualitative researchers “usually work with small samples of voluntary participants” and “are expected to do more than mechanically record their observations” (p. 314). When analyzing data, “strategies in qualitative research are typically thematic and sometimes emergent throughout the course of a study” (p. 314). (Flinder and Richardson, from Colwell, 314).

Mixed methods research is characterized by using methods from both quantitative research and qualitative research. Although criteria for both methods are defined above, there is some agreement in the field that mixed methods research should have some additional criteria in addition to the separate criteria of quantitative and qualitative research. According to Bryman et al. “relevance to research questions; transparency; the need for integration of mixed methods findings and a rationale for using mixed methods research” are additional criteria researchers find important for mixed methods research.

Because arts-based research is a relatively new paradigm of research methods, criteria have not been well established for this method. It is typically considered to be an iterative process that is not replicable, and is based on general questions that become better defined as the research progresses, instead of well-defined questions guiding the research. Unlike formal music education research, this type of research is not well documented due to the focus on classroom results and ensemble performances, and not on peer-reviewed articles. These practitioner-researchers may not have time or incentive to write up their findings, but may store the data and be willing to share with others, if there was an easy and accessible way to do so. This data might be quantitative or qualitative, structured or unstructured. Due to the informal nature of this data, it is unlikely to have metadata or other documentation.

Several in the field have been critical of the quality of music education research, with Heler and O’Conner (p. 46) stating, “often the conclusions reported in published research articles are not appropriate to the evidence provided. Some research reports generalize far beyond what the data analysis allows.” By making data openly available for future reuse and analysis, music education researchers can hold themselves more accountable to their research findings, thus creating more relevant and respected research reports.

In the classroom, arts-based music education has been aided by the use of technology since the arrival of the Apple II in schools in the 1980s. Music technology (e.g. MIDI) and computer technology combined for the use of CAI (computer-aided instruction), and allowed for highly structured computer teaching of music. With this approach, students are able to work at their own pace for music instruction in the classroom. However, the passive approach to learning is often criticised, with the potential of music education tools being much greater. “Music technology is most effective when it is used as a transparent resource, for completing music-based tasks such as solving genuine music problems, or for exploring and creating sounds” (Crawford, p. 164). This generates potential music education research data, but many classroom-based teacher do not have incentives or the means to share the data. Even with these weaknesses, sharing of this data gathered during instruction can help other classroom-based instructors, and the music education community in general, expand on already existing technologies to enhance music learning.

* What is data in this field?

Data in music education is comprised of information artefacts gathered during research. “All forms of external representation can be regarded as “data” and therefore recorded and analyzed” (Bartell, chapter 9 Colwell, p. 350). External representations are “the way we represent our knowledge to communicate it to others.” Research methods and the data collected may be qualitative, quantitative, of a mixed-method (both qualitative and quantitative), or arts-based. When researchers consider their data to be useful to others, they may choose to deposit the data in a repository or other online platform. Other times, the researcher may not be aware that the information artefact is considered data, or has value to others, as in the case of qualitative or arts-based data. Data that is not available online may be stored on personal devices, and the data may not be available for further research and study without directly contacting the researcher.

Quantitative research data is often numerical and gathered using structured research instruments. The data is based on large sample sizes, is replicable, and is in the form of numbers and statistics. The numbers are often presented in tables and charts, visualizations, and other non-textual forms. Statistics can be used to help process and understand quantitative data. File types can include text files (including tab delimited), spreadsheets, comma separated values (csv) files, and proprietary formats produced by the research instrument or software (e.g. SPSS). When possible, files made available for sharing should be in a non-proprietary or open format to guarantee reusability by future researchers. If this isn’t possible, the next best option is standard programs and file types used universally (such as SPSS, Microsoft products, Adobe products, etc). See the data chapter for more information.

Qualitative data, on the other hand, is often text-based, and the researcher may not realize that it is considered data, or that this data can also be shared. Even though it’s normally not replicable, the data may still be useful to other researchers as secondary data, or as another perspective on their topic. Researchers may feel a stronger ownership over qualitative data due to the personal, creative aspect of its design, and may fear that others may claim it as their own, making them less likely to share it. Additionally, there may be constraints (including IRB mandates) on sharing personal information revealed in qualitative settings. However, this type of data can be very useful to others, and when possible, researchers should try to make it available for reuse after redacting personal information or obtaining permission from the people involved. Creswell lists examples of types of data collected in qualitative research: observations (field notes), interviews, documents (newspapers, meeting minutes, reports, personal journals, letters, emails), and audio and visual materials (photographs, art objects, videos, audio). Other types of data include coded documents, recordings (music and spoken word), and spreadsheets. Again, the best file types are non-proprietary and open.

Both quantitative and qualitative data are often analyzed with software designed to help find trends or patterns that may not be obvious otherwise. Software can be helpful for searching texts and transcribed interviews (including text mining), reformatting texts, creating visualizations, consolidating and co-locating research notes, identifying themes, building codebooks, and creating theoretical models. Software can help with consistency, speed, representation, and consolidation (Weitzman). There are five types of software that are often used with qualitative research: text retrievers, textbase managers, code and retrieve programs, code-based theory building programs, and conceptual network builders (Weitzman). Commonly used software includes ATLAS/ti for qualitative data analysis (including coding and annotating audio and video files) and NVivo, SPSS, and SAS for qualitative analysis.

When using software to help analyze music education data (or any other data), Weitzman & Miles (1995) propose four questions to help determine best computer software for analysis. Although technology has changed significantly since 1995, these questions are still worth considering:

1. What kind of computer use am I?
2. Am I choosing for one project or for the next few years?
3. What kind of project(s) and database(s) will I be working on?
4. What kinds of analyses am I planning to do?

Other issues:

1. How important is it to you to maintain a sense of “closeness” to your data? (Computers can limit amount of text viewable at any time, vs. “deep immersion” of handling paper text. Some software creates ways around this.)
2. What are your financial constraints when buying software and the hardware it needs to run on?

Arts-based data in music education is gathered by a researcher-practitioner, normally within a classroom or lesson setting. The data is used to improve future teaching methods. It may or may not be documented, will often contain personal information from underage students, and most likely the researcher/teacher/practitioner will not think about sharing it. Examples include recorded performances (audio or video), student journals, self-reflections, practice logs, student recordings, etc. This type of data may be useful for others in the field, especially new music education majors as they learn about techniques and lived experiences of seasoned practitioners, but personal information must be redacted from this data. The Family Education Rights and Privacy Act (FERPA) protects sensitive information about the student from being made publically available. Files may include audio and video files, scanned text, spreadsheets, etc. Another type of data and technology used in music education classrooms is MIDI (Musical Instrument Digital Interface). MIDI makes composition and experimenting with sounds accessible to more people, including those with limited musical backgrounds. Although most music education in a school setting is focused on ensemble performance, composition is increasingly seen as an alternative way in which students can become engaged with music. Eisner says, “musical problems are best, but not exclusively, addressed in the context of musical composition. Yet we have little musical composition going on in schools. Its virtual absence is rooted in traditions of performance. . . . yet the act of creation in music . . . is vitally important in promoting forms of thinking that demand attention to the ways in which sound or other qualities are modulated and organized.” MIDI can help encourage music composition due to simple interface designs and no requirement for understanding music notation. The resulting files and data are non-proprietary and easy to store due to limited size. Because this type of practitioner-researcher is not planning to publish their research and findings, they may not consider archiving files. However, as music research data experts, we can encourage saving and archiving this data, as appropriate, for others to use in future research.

In addition to qualitative, quantitative, mixed methods, and arts-based research, some music education research summarizes reports, studies, trends, current thinking, and/or standard practices in the field. This type of research requires extensive literature reviews, and, as in the musicology chapter, data is represented by the texts read and the bibliographic citations. Citation managers can be used to help manage documents and citations, including Zotero and Endnote.

Secondary data can also be a useful source in education research. Secondary data refers to data that was gathered for reasons other than education research, and includes census data, population studies, public opinion polls, and even other researcher’s data gathered to answer a different question. It may be qualitative or quantitative. In order to be useful, secondary data must be discoverable and in a useful form.

* How is data found and shared? (Find example of reused/shared data)

Traditionally, results of music education research studies have been published in journals and books. The *Journal of Research in Music Education, Music Educators Journal, International Journal of Music Education,* and *Music Education Research* are the top journals in the field and publishes results of research based studies. Some research, including studies from the *Journal of Music Education Research*, is synthesized in books such as *The Handbook of Research on Music Teaching and Learning*, published in 1992, *The New Handbook of Research on Music Teaching and Learning*, published in 2002, and *Update: Application of Research in Music Education* (online). However, datasets from these research studies are often more difficult to locate, or, in many cases, are not available. However, reproducibility and replicability of data are key to the research process and quantitative data studies. If the data was made available, future researchers would possibly be able to replicate studies, or build on the data. Qualitative data, while not easy to reproduce should be available for others to understand how conclusions were drawn.

Often, data is presented in a research study or article in a visual format, including tables, charts, graphs, etc., but the original data behind the visualizations is not included. If another researcher is interested in examining the data behind a visualization, they would have to contact the author directly and ask for a copy of the data. The original researcher may or may not have current access to the data. They may be able to locate it quickly, find it after some time, or not locate it at all. It may be stored on an easily accessible drive, an older drive that’s no longer used, a damaged drive, reside with a graduate student who has moved away, or simply be lost. In the best case scenario, the data may be openly available in a repository.

Grant applications often include a section on data management. Data management plans for music education research should include: descriptions of the types of data, information about how the data will be documents (metadata, etc.), policies for sharing/keeping confidential the data, recommendations for reuse of the data, information about how and where the data will be archived. Although not required, these sections can be generated by the DMP (Data Management Planning Tool) created by the California Digital Library. (See the data management chapter for more information).

Education data mining is a new field in education research. “Educational data mining (EDM) is concerned with developing, researching, and applying computerized methods to detect patterns in large collections of educational data that would otherwise be hard or impossible to analyze due to the enormous volume of data within which they exist” (Romero and Ventura, p. 12). MORE HERE

Akers and Doty (2013) found that, while social science researchers (including education researchers) at their institution shared data over email more often than other methods, they were “least likely to share data via email” (p.9) when compared to researchers in other disciplines. Other methods of sharing data, in order of preference, include “supplementary material linked to journal articles,” via a university website, or via a repository or personal website. Because music education researchers may come from either an education background or an arts background, we should also understand how arts researchers share data. In the same study by Akers and Doty, “no arts and humanities researchers share their data via data repositories or databanks” (p. 10). This might be due to a misunderstanding/disagreement of “data” or “data banks”. If data is not clearly defined to include art-based data, the arts researcher may not be aware that they are working with data. Also, a researcher may not consider platforms like SoundCloud or YouTube as “data banks” (see the performance chapter for more discussion about this topic). Akers and Doty also found that few researchers are willing to share data with a general audience, although arts and humanities researchers are more likely to than those in other fields. Data containing personal information and not getting credit for their work are the reasons most often cited for not sharing. Knowing the disciplinary culture, motivations, and inhibitions around sharing data can help music librarians better understand music researchers.

Bartell (chapter 9, Colwell) mentions “dissemination complexity” as a new trend in research. He posits that in the past, music education research was only shared among the music education academic community. However, more people are expecting access to research results in all disciplines, including music education. These people include music education researchers, researchers in other disciplines, users of research (teachers, etc.), advocacy groups, the music industry, and the public. Weitzman (writing in 2003) hopes that in the future that there will be “more and better tools for sharing analyses and raw data, perhaps by allowing posting of project databases, with analytic markups, links, and memos, to the World Wide Web. . . .” (p. 337). Although there have been many developments in the past 18 years in data curation and research data services, and research is much easier to find than it was in 2003, full access at the level he describes is still limited to a minority of projects. This is most likely due to the significant amount of resources that providing this level of access requires of a project, library, or institution. If resources at your institution make this level of access prohibitive, consider other types of support for music research data, discussed in more detail in the conclusion chapter.

What data is kept and ultimately shared by education researchers? Although several studies have examined data practices of scholars in diverse disciplines (summarized in Palmer and Cragin), these studies generally examine specific science disciplines (e.g., biology, physics, etc.), but humanities and social sciences are only looked at broadly. While there are not many studies focusing specifically on education data practices, many studies (cite appropriate articles from this chapter) do go into great detail about education research methods, including quantitative methods, qualitative methods, and mixed-methods.

Unlike some of the other music disciplines, music education research data that is publically available is relatively easy to find and share. Data repositories of social science and education data, as well as databases of statistics useful for education research, are well known and established. For example, ICPSR (Inter-university Consortium for Political and Social Research) is a well known repository that includes social science (including education) data, and NCES (National Center for Education Statistics) holds a vast array of education data. Other data sources include EdStats (World Bank), Data.gov, DARIAH-EU, the Roper Center ([www.ropercenter.cornell.edu](http://www.ropercenter.uconn.edu)) (public opinion survey research), the Higher Education Statistical Agency (UK) (<https://www.hesa.ac.uk/>), the Office for National Statistics (UK) (<https://www.ons.gov.uk/>), and the UK Data Service (<https://www.ukdataservice.ac.uk/>). Library databases can also been seen as a type of repositories indexing scholarly article citations, and often include the full text. Common databases in education include Education Research Complete, ERIC, and electronic theses and dissertation databases. Articles found in these databases often link to data stored in data repositories.

By developing robust data sharing services, librarians can help music education researchers make their data publically accessible. By providing data for others to analyze and reuse, music education researchers can validate their studies, and support their conclusions. This should help alleviate the idea that music education research is not as rigorous as research in other fields, and provide impetus for researchers to keep their conclusions relevant to the collected data. Perhaps with this type of validations, criticisms of the field lacking validity will fade away.