Collaborative Research for Game Development

Research in Collaboration: theories, methods, practices and ethics

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A short note before we start

As I am quite early in my PhD journey, I have yet to find myself in a position wherein I have the opportunity to work with a collaborative case. As such, I asked for the opportunity to reframe the essay from a case I have been part of to instead focus on the challenges within *Games Research* and how, given the chances, *Collaborative Research* could be used to overcome a significant gap.

This text is a result of this reframing and, as such, is more of a theoretical idea – a refocus of a field that has a hard time asserting itself. The first section of this text is dedicated to present *Games Research*, *Warpefelt's Framework* and, lastly, *The divide between academia and industry*. The second section is then focusing on *reframing* Warpefelt's Framework to work closer with the game industry through *Collaborative Research*.

1 Games Research

Games research is said to by nature be an interdisciplinary field [1, 2, 3]. As games are created inside a multifaceted industry with roots in many different disciplines, it is hard to even speak of games research it as a single research field. The disciplines that game development encompass are in the academic world seen as vastly different fields – software engineering, psychology, humanities, business management to name a few [1]. Engström argues that the academic "home" for the different disciplines are rarely clustered together inside academic institutions and may, in fact, even be "incompatible" from an academic point of view [1]. There are many different communities within games research that contributes to the field – all of them giving different views that combines to the understanding of the field [1]. Due to these divergent communities, the research on and around games has grown steadily since the turn of the millennia [1, 2, 3]. However, not all of this research is done in conferences or journals tied to games research. Deterding argues that researchers within the field are pulled back to their respective "home" disciplinary field due to success of games research in establishing games as interesting to study within other fields [2]. It is therefore hard to get a holistic view of the interdisciplinary development of a game at a game development studio regardless of size.

Another problem regarding the multidisciplinarity of games research field is the possibilities of an academic career [1, 3]. Lawley points out that another possibility to the "pulling back" of researchers to their "home" disciplinary fields can be a result of expectations within institutions – "...new faculty should adhere to the culture and norms associated with tenure and promotion..." [3].

Kindly note that through this text the word *game* refers to digital games for entertainment – that is to say games that are meant to be played during leisure time. Games that are of an – as Engström puts it – of "utilitarian" purposes (for instance educational games or excercise games) [1] are excluded in this essay – although Warpefelt's framework discussed in section 1.1 indirectly touches on these topics. For these "utilitarian" games, and their development, research exists and is continously conducted within different constellations [1, 4]. However, these results are rarely applicable to game development focused on digital games for entertainment.

As a result from all of this, little research has been done on game development – as Engström puts it – "in the wild" [1]; and that is also what this essay will focus on.

1.1 Warpefelt's Framework

Warpefelt divides games researchers in two distinct camps: The *What* and the *Who* [5]. Those academics "aligning" with the *What* camp focuses on the technical and technological aspects of a game while those "aligning" with the *Who* camp focuses on the human and social part of a game. In both of these camps, developed games – artifacts – are important. In the *What* camp, how these artifacts are composed are of importance. It is of more importance for the *Who* camp how players interact with the game and, through it, with each other, the cultural and historical views of the game, and games as digital media. In Warpefelt's framework, he bridges these two camps through the *Bridge of How* [5]. This bridge is "...composed of research that aims to take the activity-based understanding from the *Who* camp, and to realize it using artifact-based understanding of the *What* camp." [5]. A visualisation of this framework can be seen in Figure 1. Note that Warpefelt does not divide different scientific disciplines to the different camps, and I quote "This was done intentionally, as to not cast any aspersion about which field is allowed to perform certain kinds of research."

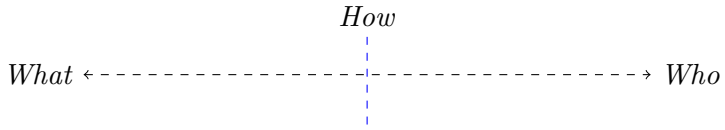

Figure 1: *What* represents the games research camp looking at technological parts of a game, while the *Who* represents the players and social parts of a game. The *How* is the design, bridging the gap between these two camps.

The framework presented by Warpefelt leans heavily onto research in an *academic* setting – including developing prototypes that are intentional in design [5]. There is nothing wrong with this in and on itself – after all, research is often done in a purely academic setting. This point is further driven home in the ending remarks of Warpefelt's paper: "This paper is intended to be a call to action for scientists to broaden their scope, break out of their silos, and to collaborate in ways are inherently both inter- and transdisciplinary." [5]. It is worth noting here that the collaboration that Warpefelt talks about is between *academic* disciplines, safely staying within the comforts of the university.

1.2 Through the Eyes of the Industry

There is, however, a problem with focusing exclusively on the academic side of a field. Passarelli et al. points at this in their work, in this context discussing the different time horizons for academia and game development: "As a result, games research risks being out of touch with the current reality of the game market..." [6]. This gap between academia and industry does, however, is seemingly hidden for many games researchers [1].

Truth to be told, a lot of research done within the field seem to never reach and/or affect the game development industry [6, 7, 1]. Results from research may not be applicable for developers for years to come [6] or may not even be done within the same rules that governs different disciplines within game development [1, 7]. An example of this is how academic AI (artificial intelligence) for games, governing non-player characters in a scene, is ignoring (at least) two "hard constraints" that exists for these systems within the game industry [7]. The first constraint is computing time limitations that is imposed on the AI system, making sure that any NPC takes action within a give timeframe, while the second constraint is the need of the system to be reliably modifiable for expected behaviour by a (game-level/combat/mechanic) designer. Without honoring these constraints, the usability for the AI systems developed within academia only becomes useful for niche games wishing to highlight that specific kind of system [6].

This, then, begs the question: How can game development "in the wild" guide academic research so that the results are not only applicable for the industry, but also make the research able to strengthen games research as a relevant field?

1.3 Bridging academia and industry

The acute reader might see where this is heading. Neither through this course nor through the previous section have I made any attempt to hide my stance: Academic games research generally lacks not only understanding of, but also relevance for, the game industry. This is not to say that I refute or deny the importance of purely academic research; I acknowledge that pure academic research is important to bring change and new thoughts to any field. However, when the field is not connected with the industry from which it came – nor understands their challenges, working practices, or the tacit knowledge theirin – how will it be able to inform and change the industry through its innovations?

I believe wholeheartedly that games research, as a field, must shift at its

core. Research must be conducted in such a way that understanding of the industry spread and becomes easier accessible for researchers – even those who only wish to perform purely academic endevours – in and out of the games research field. The lack of understanding that is shown in both [7, 6] – and further highlighted multiple times in the book by Engström [1] – should be overcome. For the rest of this essay, one possible way of bridging this gap will be discussed.

2 Extending Warpefelt's Framework

Warpefelt's framework as presented in "A Gap in Games Research: Reflecting on Two Camps and a Bridge" [5] is focused on a) developing and understanding technologies that a game is built up by, and b) how the finished game is interacted with and how it impacts those interacting with it. Neither of these camps are, explicitly, involving working together with, or using tacit knowledge from, the game industry [5]. Indeed, the framework is presented mainly as a way to bridge the gap that exists between two academic views of games research. However, through a simple extension, Warpefelt's framework can be used to include the kind of research I am requesting herein – that which encompass the industry.

Seeing the two camps, *What* and *Who*, as two *vertices* we can easily add a third vertex to the framework; *Practice*[1]. This camp, then, would encompass research "in the wild" as described by Engström [1]. Furthermore, *How* would now be reimagined as a barycentric point based on the influence by the three camps. For a visual representation of this extended framework, see 2. Worth to point out here is that some research that Warpefelt place "firmly" within either the *What* or the *Who* camp would in this new framework be positioned along the line connecting either *What* with *Practice* or *Who* with *Practice*. The works Warpefelt position as *How* would now either be a point along the *What* and *Who* camps or, alternatively, as a barycentric point[2] should the research conducted entwines industry developers or sources.

[1] I really wanted to use *How* here, but as it is already used in Warpefelt's original framework I opted for the clunky *Practice*

[2] A barycentric point inside a triangle can be seen as a coordinate specified by how much it is pulled towards each of the triangle's vertices. Should all vertices pull equally, the barycentric point is in the *middle* of the triangle. If one vertex is not pulling at all, the point will be placed on the line connecting the two other vertices.

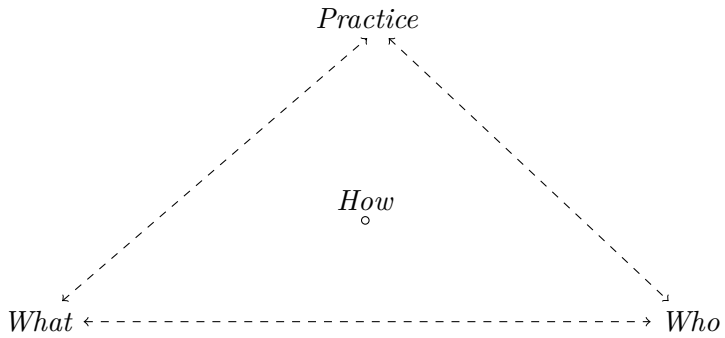

Figure 2: A reframing of the framework proposed by Warpefelt [5], adding *Practice* to cover the practical parts of game development "in the wild" as described by Engström [1]. *How* is here reimagined as a barycentric point based on the influence by the three camps.

2.1 The Importance of Industry Knowledge

The question is then, what is *Practice* in the context of the framework? As a counterpoint to both *What* and *Who*, *Practice* encompass the context, works, and knowledge that governs, and arise from, game development conducted in the industry – "the wild". Worth to point out is that this camp is not neccessarily only populated by those actively working in the industry; any scholar working close to or inside an industry context is probably conducting research connected to this camp. On the opposite spectrum, some of the research done within the industry are not connected to the *Practice* camp but rather the *What* or *Who* (or as a barycentric point somewhere in the triangle).

There is an argument to be made that the *Practice* camp can not exist as an academic field. In a way that may be true, but it is then of importance to discuss *tacit knowledge* [8]. Tacit Knowledge is knowledge gained through implicit learning [8], which can be hard to verbalise, and as such hard to formalise in a way suitable for "mainstream research". Despite this, Game developers contribute to sharing and promoting this tacit knowledge in a multitude of ways – although it would be hard to call it academic. Game Development Conference (GDC) and the websites Gamasutra (now Gamedeveloper) and Gamebiz [7] are different venues in which game developers share their knowledge to others. However, it is important to point out that the knowledge gained through most of these kind of venues are,

for good or bad, not precisely done in line with any formal research practices and, thus, may contain different kind of mistellings, embellishments, or factual errors. Some of these problems are discussed by Engström when he compares GDC to the academic conference DiGRA [4].

Despite this, these conferences and sites have been, amongst others not mentioned here, used in a multitude of studies within both the *What* and the *Who* camps identified by Warpefelt [5] to inform research in respecitve camp. The problems lined out due to the lack of research practices then risk to propegate down into the conducted research and, if unfortunate, be taken as a grounded truth for further research to build upon. Worse is that the studies done then becomes mostly observatorial studies, post mortems analyses, developer interviews, or studio studies. That is to say, studies wherein a scholar either looks into the room from the outside or join the room – but not the development – as part of their research and, in a way, only gets to see what the industry partner(s) decide to share. This, then, leads to other problems as a systematic dissection of the inner workings of the game industry will become impossible.

Thus, I beg the question; is it enough? Is it really enough to just observe and never engage with the knowledge creation as it happens during the development? Or should we aim for more? Perhaps a more collaborative approach could be utilized?

2.2 The Case of Collaborative Research

Deterding identified in his work that games research lacks methodologies and theories, especially those that organises researchers "across disciplines and paradigms" [2]. He, like Warpefelt, foucses on research-research problems, but truth is that perhaps the solution is the same for them as I herein present for academic-industry research. Worth pointing out here is that collaborative research is not a single framework. Indeed, there are a multitude of different frameworks – each with their own following, research foundation, and context for usage. However, in this essay they will be presented as a singularity – with what I believe important to games research as a field highlighted.

This, of course, comes with limitations. Most jarringly, what I believe to be of importance is based on my own understanding and research background – which may not be what is truely needed for the field at large. Furthermore, what can be done at this time is to draw parrallells between collaborative research and the field of games research and not much more. However, as will be apparent, there exists quite a few different similarities

that makes me believe that collaborative research merits further exploration.

Collaborative research is conducted jointly by academic researchers – within one or more disciplines – and non-academic stakeholders [9, 10, 11, 12]. This kind of research focuses on problems that – mainly – affects non-academic stakeholders, with the academic researchers sharing relevant knowledges and skills. Whatever the kind of collaborative research, the end goal is co-produced knowledge that is transferable to both the academic researchers and non-academic stakeholders [9]. It is however important to point out that not all collaborative research produce results that are reproducible or generalisable [12][3]. In fact, desirable results from collaborative research are learning processes for both researchers and stakeholders, as well as more informed decision making for the stakeholders [9, 12].

A central part of this methodology is that the *joint* research endevour needs to be grounded inside the context of the stakeholders [9, 10, 11, 12]. If applied to games research, part of the learning neccessary for the researchers must be the actual context of the game development. This, in turn, would most likely be unique for each collaboration – which is not uncommon for this framework [9, 10, 12]. It is, in essence, this grounding that connects collaborative research to the camp of *Practice* as defined in the extended version of Warpefelt's framework presented earlier (see Figure 2). Furthermore, as the joint problem is defined within the context of game development, this may also help overcome a significant barrier that is identified as hampering for academia-industry collaboration, and that is the low market applicability of games research [6]. As the game industry is a business and, as such, must work towards profit, research results which are not helping the profit in one way or another, risk being deemed as less useful for the company[4]. By working together, the joint problem is something of relevance for the stakeholders with results that will hopefully positively impact the business.

Due to the *iterative* process [9, 12] wherein the research problem and questions – and thus also methodologies – are refined througout the process, the participants are all "learning by doing" as they navigate their joint problem. As games are often developed in an iterative way [1], perhaps collaborative research can then be a solution to what Passarelli et al. describes as different speed cycles [6] – one of the barriers for research[5] to

[3]This is not neccessarily a bad thing; more a statement of the nature of collaborative research.

[4]Perhaps, once collaborations are more common amongst industry-academia within the industry, we could look past this and work towards research that is not instantly "for profit"

[5]Worth pointing out here is that Passarelli et al. are talking about *social science*.

make impacts to the games inudstry. Should researchers work with stakeholders within the game companies through collaborative research, perhaps – over time – this barrier would be brought down as the speed cycles start to converge. In collaborative research the normal time frames within academia are not always possible to follow [9, 12] – and perhaps that is not always a bad thing? If support for research happening "together with development" inside a game development company were put in place, it would not only enable research on the game development process, but also for this to be directly applicable during later iterations of the development of the game. Should the company also be willing to slow down their internal processes to accomodate for this iterative symbiotic relationship, perhaps something beautiful would happen?

Another problem that collaborative research is facing, and that would risk this beautiful picture I am herein painting, is that of language and, through this, a common understanding of the problem to be researched [9, 10, 12]. It is not uncommon that academics use a language that, for those outside of academia, can be hard to comprehend [9, 10, 12, 13]. This is something that has also been identified within games research as problematic [6] – to the point of research becoming inaccessible to developers. As collaborative researchers have worked with this problem for decades [9, 10, 12], there exists multiple strategies to pick and choose from to handle it in the context of games research. Even if the reported problems within games research is more about the inaccessibility of published research, this problem will most likely creep up during the initial phases of any collaborative research endevour as well.

These two are not the only two overlaps where games research stands before a problem and collaborative research seemingly have the answer. A third problem identified by Passarelli et al. [6] is that of learning – or how developers engages with new knowledge. Learning from your peers are important – one developer says that "...learning from our peers is the most useful thing, in the same way we all learn from each other in the studio.", while another discuss GDC fondly by saying "...people are sharing their time and their talent together and that's very powerful." [6]. This ties back into what was previously discussed about the collaborative process and "learning by doing" [9, 12] – if the industry believe that this is the best way to learn, perhaps academia should take advantage of that through collaborative research? That is to say, perhaps we should share our time and talent, while learning from our new peers?

However, this problem exists in other contexts as well

2.3 The Flipside

As written, collaborative research almost sounds to good to be true. That's simply due to me ignoring the inherent challenges that are part of this way of conducting research – up until now. The question is then if collaborative research is the answer to every problem highlighted within this text. The answer is, of course, no: "There is no silver bullet"[6]. Let us rebuke some of the earlier discussions and highlights for a more well rounded discourse. There are always two sides to a coin, but interestingly enough we will notice that some of the inherent problems with collaborative research are already present – and a challenge – faced by games researchers.

Kieser and Leiner discuss the problem of communicating within collaborative research [10] [7]. In their discussions, they point out that researchers and practicioners are experts and laypersons to each other – researchers have the knowledge of methodologies and theory, while practitioners are experts when it coems to practices. They point out that the discussion can only come as far as to a common ground – the size and depth determined by the partners as they communicate. It is rarely bigger than it needs to become. Unfortunately, should an expert have complex knowledge in their area, the harder it is to create a common ground. The claim is then that laypersons cannot completently carry out the process of science – but they influence these processes [10]. Furhtermore, as the setting – or context – of the collaborative research is its own, neither pure academic nor pure industry, it will evolve its own logic for communication. Through this, all three contexts – academia, inudstry, and collaboration – will reflect upon and interpretate concepts discussed differently.

The communciation problem highlighted by Kieser and Leiner does not only affect the way communication within collaborative research is done. It also echoes on of the problems mentioned by Passarelli et al. [6]: the difficulty to understand research as a non-researcher [10]. As research is mainly written *by researchers for researchers*, it becomes inaccessible by practitioners that are not trained scholars. Unfortunately, different forms of collaborative research may be hard to successfully publish outside of specialized journals [10, 1], and those that gets published must still adhere to scientific standards and expectations – and thus becomes inaccessible per

[6] A reference to the paper *No Silver Bullet – Essence and Accidents in Software Engineering* written by Fred Brooks in 1986, a highly influential paper regarading the complexity of programming.

[7] Although this paper is connected to the field of management research, there are – as we will see – some points that should be applicable to other areas as well

default.

Game development have their own challenges with communication [1] adhering to the fact that it, more or less, forces people together. Perhaps this can be a strength, and not a weakness? If we subscribe to the discussion presented above by Kieser and Leiner, and just twist it in the slightest, should it not in theory hold for other kind of differently trained professionals – for instance a game designer and a game writer? If the game industry have ways to work it out – in collaboration – as discussed by Engström [1], then what we as researchers must do is simply[8] to learn and adhere to their rules. In essence, we become just another discipline.

Another problem with collaborative research is a lack of problem awareness [9]. That is to say, it can be hard to start from a joint problem if there is a lack of problem awareness from one of the collaborative partners. This is, in essence, the problem with games research as pointed out in this essay – and as such, the solution for this particular area is straightforward; allow the industry to highlight the problem until understanding and trust has been built.

This can however make another problem come to life; unbalanced ownership of the problem [9, 12]. If the so called *joint* problem is dominantly defined by only one participant, this can lead to a multitude of difficulties down the line. Add to this that the game industry are fond of Non-Disclosure Agreements (NDAs) [1] which makes it hard to disseminate findings, and suddenly the researcher can become the one in an unfavoured position – a position often "reserved" to the stakeholder [12]. Regardless, the same strategies to balance ownership should be usable, see [9, 12] for more on this.

I will herein highlight a problem that is very real for both games research and different forms of collaborative research; building trust and foster long-term collaborations [9, 12]. As there today exists a mistrust towards academia within the game industry [6] it is of utermost importance that this is handled and mutual trust between researcher and stakeholder is built. That is to say, a relationship between those involved in the collaboration must be done – preferably long before the research is conducted, or even started [12]. Unfortunately, getting access to companies, and therefore collaborative partners, is in itself a problem for games research [1, 4]. Unlike many other industry-academic areas, there are no grants to find in Europe regarding the development of the game industry and their collaboration with

[8]Note: This is not simple. Quite a few problems would arrise from this that needs handling, but this text is not the place to discuss these.

academia [4]. Other problems to even start the discourse and rebuild trust with the game industry are the afformentioned NDAs – which risks limit the research potentials – and the fact that the working condition in many game companies are not the best; any additional task may be the straw that breaks the camels back [1].

2.4 The Ethics of Collaboration

As in all research, the ethical considerations are of great importance. When it comes to games research, the ethical aspects can take a multitude of different faces, affecting not only the researcher-stakeholder relationship, but also the field itself.

Unlike what the literature regarding collaborative research highlights, for games research the researcher is in risk to become the "marginalised" part. Relational ethics, as discussed by Cornish et al. [12], "encourages an emphasis on inclusive practices, dialogue, mutual respect and care, collective decision-making and collaborative action.". As the researcher in this context is an "outsider" that, at worst, is seen as a liability that only causes extra work, it is easy to see how they can be excluded in a multitude of ways – especially if they have not signed any NDA [9]. The literature presents communication and early trus-building as solution for these problems but as mentioned earlier there are no silver bullets; how this would work in practice is still up for discussion.

On the flipside, if a community have been treated as the subject or passive object of research they may be suspicious of further research or researchers at large [12]. While this statement is in relation to marginalised communities being used to further produce knowledge for "a distant elite", I would argue that this suspicion on both research and researchers also exists within the game development sphere – although not to the same degree. This may, of course, be a localised problem of the game development sphere wherein I have had discourse with developers, but there seem to be few voices regarding the positives of research and more on the negatives. There exists a scepticism and mistrust towards academia within the industry [6], which have to be overcomed before collaborative research can be conducted.

Another discussion that must be had is the question of objectivity. By agreeing to an NDA, can a researcher truely be objective, neutral, or even a voice of reason through their research? As these are used for secrecy [1], they

[9] An NDA will often include a fineprint that everything that is about the game/project/or other thing under research must be approved by the company before being shared – be it a research report or a presentation in a course.

can also be used to silence any reporting of problematic findings emerging from the collaboration.

The question of objectivity is not only relevant for NDAs, but also the data received. Besides the usual problems that comes with data sharing (for example GDPR compliancy), they can also be subject for conflict of interests. Data sharing arrangements can be expensive for the company [14] – money they most likely expects to get back in form of scientific findings they can use to boost revenue. This begs the question if academia – when pursuing these arrangements – put up research questions that aligns with the goals of the industry and thus creating an "evidence base" built on what the industry wants to hear, and not what "free" research would create [14]. This is not even taking into account that the industry may simply only allow the data that is shared be curated in such a way that the research becomes scewed towards the industries needs [14, 15]. There are simply areas wherein the industry do not want research to be conducted with raw data – for instance monetary spendings [15] – presumebly because they do not want to know the answers. In fact, revenue may actually guide the game design and, as such, having it researched may actively harm the business.

3 A Final Note on Collaboration

Collaboration has already happened for one of the many subfields making up games research – Games User Experience [10]. Researchers from this field are actively integrated in different parts of game development – although they are rarely from an academic institute and the "inner workings" of the companies they work at are thus shrouded in mystery. They do, however, bridge an academic-industry gap through collaboration, and may be one of the few games research areas from which insights from the industry is actively published in journals [1].

As briefly mentioned in Section 1, Games Research, research within "utilitarian" uses of games are an active area of research. It is also an area of collaboration between different academic disciplines and industries – for instance games and medicine developing excercise games. However, findings from these research projects are rarely, if ever, useful to understand the constraints that a game developed "in the wild" must adhere to. Furhtermore, these games rarely survives after the projects end, and most of the time they are built around a different purpose than to entertain – using game elements

[10] Which I will not discuss in detail, the interested is recommended to read Engstörms book for an overview

to further another goal [1].

This is seemingly one of the biggest barriers to games research, and one I have not given room in this essay. The development behind games for entertainment are severely under-researched, and not only due to the structures of academia and industry. My personal reflections after many discussions with colleagues is that "games for games sake" are rarely given any room. When the discussion is had at different levels within the institutes, what you get is often "have you looked at games for other areas" or "company X wants to introduce gamification for task y", with the undertone that "perhaps you should start with this kind of research first". The problem is that "this kind of research" has been done for decades, without any closer collaboration with the industry.

Research needs to be conducted regarding and together with the game industry. I believe that collaborative research and games research shares many difficulties and, perhaps, the former can inform the later for a more healthy research field with collaborations not only within academia as Warpefelt champions (see [5]), but also between industry and academia. Something I hope that I, through this text, have managed to convince you, dear reader, is needed.

4 Declaration of AI Usage

Throughout the writing of this text, different large language models (LLMs) has been used to brainstorm, evaluate, analyse, and meta-analyse the text. This has been done for, mainly, three reasons: a) as a way of reflection regarding the written text; b) as a way of proof-reading the text for language errors; and c) making sure that I do not get to comfortable with my own text too see errors. This practice has, undoubetly, resulted in a subconscious shift in how I see my own text, for good or bad. However, I hereby declare that: a) All text, thoughts, and connections are written by myself without the assistant of any AI tool; b) All references have been found by me through ordinary database searches; and c) The idea and reasoning around adding the vertex of *Practice* in Warpefelt's framework is my own.

All answers genereated by the AI tools has been critically analysed and examined, and suggestions given have generally been discarded unless glaring errors were pointed out. However, small changes to the text and extra clarifications has been added due to suggestions from the tool – mainly around topics were my background in the field makes me blind for concepts not generally known.

Prompts that has been used are akin to the following:

- `Kindly evaluate, analyse, and meta-analyse the attached text`,
- `Kindly meta-analyse the author of the attached text and describe his stance to the field`,
- `Kindly summarize the five take-aways of the attached text`
- `Kindly point out all grammatic errors of the attached text`

Kindly note that no ethical stance on the usage of AI tools will be discussed here; this is simply a declaration *of* usage.

5 Special thanks

A special thanks go out to my fellow PhD students and the teachers in the course *MAU0004 – Research in Collaboration: theories, methods, practices and ethics* for many great discussions and feedback. A special thank you goes out to Jess Haynie-Lavelle for her detailed feedback during the seminar where the draft to this essay was discussed.

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