EDPRAC 751 – Assignment 1

Critical Evaluation of a Practitioner Research Report

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# Introduction

The article “Differentiating Instruction to Increase Conceptual Understanding and Engagement in Mathematics” by Mainini and Banes (2017) investigates the impact of two interventions in an attempt to address an underlying issue of teaching students mathematical concepts with disperse learning needs. Mainini, a beginning teacher at Edwin Markham Elementary (2016), implements (1) flexible small groups and (2) Low Floor High Ceiling [LFHC] problems in her sixth-grade maths class and, after data analysis, contests to their effectiveness. This paper will critique the (1) positionality, (2) research questions, (3) methods, (4) analysis and (5) ethics from Mainini and Banes’ practitioner research. Additionally, the strengths, drawbacks, and issues her research will also be explored.

# Practitioner Research

A benefit of practitioner research is that it provides unique insight into the teaching profession and pushes the boundaries of what qualifies as research (Anderson, 1994). The classroom is a personal, contextual, subjective and relational domain (Herr & Anderson, 2005). Only practitioner research is able to capture an otherwise unavailable knowledge base by identifying (1) the beliefs of teachers and (2) how they have adapted traditional methods to their own context (Herr & Anderson, 2005).

The greatest strength of Mainini and Banes’ (2017) practitioner research is that they were able to resolve a real-world issue. Through systematic and intentional interventions, they have resolved the inquiry issue of meeting the diverse needs of students for success (Mainini & Banes, 2017). The study is persistently focused on the interventions, sometimes at the cost of self-reflection, an alleged hallmark of good practitioner research (Herr & Anderson, 2005) and indicator of positionality.

# Positionality

Positionality influences how one determines the criteria for research (Herr & Anderson, 2005) and is a point of contention for this study. Rather than provide introspection into their experiences, both authors attempt to objectify their involvement. As this obscures their positionality, so too is the inquiry which they present.

Banes is a post-doctoral scholar and course instructor to which the study was procured for. Former research focused on (1) equity in mathematics education, (2) relationships between mathematics and language, and (3) teaching and learning mathematics in two languages (Athanases, Banes, & Wong, 2015).

Mainini’s positionality is the primary author of the study and has been defined as “the classroom teacher… in [her] first year of teaching” (Mainini & Banes, 2017, p. 83). Herr and Anderson (2005) may view such a positionality as an ‘outsider-within’ as she is researching her own practice, but also new to the profession. This status may skew the research process as her perception is susceptible to change throughout the study, influencing her actions (Herr & Anderson, 2005). An oversight not addressed in the study and could have been omitted had Mainini shared her own assumptions and practice beliefs (Cochran-Smith & Lytle, 2009). Denial of such knowledge indicates the researchers’ involvement is not seen as a contamination to the setting (Herr & Anderson, 2005), making it difficult to enter into the reality which they attempt to procure (Herr & Anderson, 2005). Furthermore, it suggests they have inadvertently favoured the norms of outsider research, rather than those suitable to insider research.

Mainini and Bane (2017) have traditional beliefs about the role of a researcher. Inquiring into one’s own assumptions and practice is a major component of insider research (Cochran-Smith & Lytle, 2009); However, there is no record of this taking place. Tracking thoughts and feelings throughout the study can provide unique insights (Asselin, 2003) and such an exclusion, discounts the teachers influence on results, as well as their potential “systematic and positive impact on pupils’ learning” (Cochran-Smith, 2004, p. 112).

It is worth noting Manini may be of Italian descent (Ancestry, 2018) as research suggests students assigned to a teacher of a different race may not increase their math achievement as much as assignment to an own-race teacher (Dee, 2004). Additionally, dimensions, such as race, matter more for student of a low socio economic status (Nye, Konstantopoulos, & Hedges, 2004). Perhaps such knowledge could affect the student-teacher relationship, however, this was not within the scope of the study.

# Literature Review

Mainini and Banes’ (2017) literature review may present the fallacy of incomplete evidence. Whilst some scholars argue that the purpose of a literature review is to provide insights into previous work (Blaxter, Hughes, & Tight, 2010; Creswell, 2003), Mainini and Banes’ (2017) acts merely as a rational for their preselected interventions, omitting evidence contrary to their own. For example, 40 percent of students in Hallam, Ireson, Mortimore, and Davies (2000) study had experienced or witnessed teasing related to grouping practices or academic ability. Even though Mainini and Banes (2017) were aware of the risks in implementing ability groups, by referencing the aforementioned study in their own, the risks are neither mentioned nor contested; Casting doubt on their moral integrity.

Rather than identifying the phenomenon (Health & Cowly, 2004), Mainini and Banes (2017) simply attempt to measure the impact, of their interventions, on it. The narrow scope of Mainini and Banes research questions, to two specific interventions, has nullified any opportunity for discovering or testing competing practices. To the benefit of their study, this approach has provided consistency and focus throughout the study.

# Research Questions

The two research questions are aligned to the interventions and the studies methods. Both ask “how [each intervention] impacts the conceptual understanding and behavioural engagement of students with differing needs?” One concern is that by examining only the relationship of (1) flexible, small groups and (2) LFHC problems on students in a multivariate study may lead to bias interpretation, as authors attribute results to their preselected interventions, rather than those unmentioned (i.e. teacher competence, observer effect, or students improving their English). The premise is not false, but rather incomplete.

The questions are not without validity or application. Redirecting resources to address accessory components of the study may detract from the aim. Thereby, the specific question can address the essential themes of the research and allow for various methods in answering it (Flick, 2015). Thereby, presenting an opportunity for unaddressed variables to be tested in future studies with alternate methods.

# Research Methods

The absence of random assignment and control places Mainini and Banes’ research as a quasi‐experimental design. Such a design is subject to concern as results from interventions may not be comparable to earlier phases or observation rounds, as treatment can vary between groups and time-periods (Cook, 2015). For example, the upward-trending quiz scores (Mainini & Banes, 2017, p. 93) may be the result of the teacher targeting focus students rather than the intervention. Without the disclosure of personal beliefs, it is impossible to identify and discern their influence on the data (Asselin, 2003). As with other self-studies, validation is based on trustworthiness (Vanassche & Kelchtermans, 2015).

A strength of practitioner inquiry is the multitude of data sources (Cochran-Smith & Lytle, 2009), capable of confirming and disconfirming one another. Mainini and Banes (2016) have successfully collated interview, quiz, observational, and historical data in this study. Pluralistic methods aid in improving practice (Borko, Liston, & Whitcomb, 2007) and the researchers have been able to view the phenomenon from multiple angles**.**

The authenticity of behavioural indicators is subject to Mainini’s selection process. Any assessment has to be reliable (Alkema, 2011) and given the potential for confirmation bias, it should be noted how many interactions were involuntary (i.e. initiated by the teacher). Acheson’s (1987) verbal flow chart is an observation tool that may provide insight into the true nature of Mainini’s involvement and the students behaviour. Whilst Mainini was providing classroom instruction and assisting small groups, an observer could record the flow of conversation, such as (1) who initiated the conversation? (2) how many questions did Mainini ask? (3) how often? and (4) to whom? In combination with the existing data, the verbal flow chart can offer additional insight.

A drawback of Mainini and Banes’ (2017) study is that very few measures have been taken to ensure the validity of Mainini’s observations. Burton and Bartlett (2004) attest to the value of observations, however, they warn that “it is not always possible to understand actions by observation alone” (p. 141). Mainini dismisses research that argues ability level grouping negatively impacts students socially because “many students in [her] class wanted to be in the small groups” (Mainini & Bane, 2017, p. 86). As the term “many” is not comprehensive, it is implied some students did not want to be in small groups. This was not investigated due to what appears to be confirmation bias, in that only evidence in support of the interventions is pursued. this concern could be alleviated had focal students been randomly selected and, thereby, more indicative of the classroom’s population. Or, alternatively, a post interview, performed by an outsider, could extract deeper meaning from such observations (Burton & Bartlett, 2004).

Whilst Mainini has moderated her involvement to that of providing “hints” (Mainini & Bane, 2017, p.89) during sessions, her impact on results may be much greater. All data generated from participatory observations is the combination of both the researched and researcher (Cohen, Manion, & Morrison, 2007; Peshkin, 1982). Rather than attempt to disassociate herself, it may have been beneficial for Mainini to write field notes on thoughts and feelings during these sessions, in order to preserve them for later reflection, probe deeper meaning, and provide a means for measuring their influence.

The extent of collaboration in the studies research methods is unclear. Mainini and Banes (2017) mentions “sharing… with other educators” (p.83), however, . “Collaborative teacher inquiry systematically investigating shared problems to discover cause effect connections between instructional plans and student outcomes-can lead to detectable changes in teachers’ practice” (Ermeling, 2010). Whilst there is mention of a mentor, is recommended thoughts be discussed (Asselin, 2003).

# Analysis Approaches (critiqued + resolved)

A drawback of Maini’s analysis approach is the absence of a shared conceptual framework. For example, fluidly grouping students based on “questions on white boards […], participat[ion] in pair-shares and class discussions” (Mainini & Banes, 2017, p. 86) neither provides true insight into the grouping criteria nor a means of tracing the process (Asselin, 2003). without explicit qualitative systematic methods, it makes data interpretation vulnerable to ontological and epistemological assumptions (Jabareen, 2009) and undermines the studies rigour. Additionally, it is nearly impossible to draw comparisons across similar studies (Borko, Liston, & Whitcomb, 2007) … Therefore, the claim that findings can be “generalised to similar populations” (), is speculative. Linking one’s experiences with agentive decision-making tools can foster needed knowledge in novice teachers (Wong, Athanases, & Banes, 2017).

The limiting qualifiers indicate inconclusive findings from the study; However, the data has been interpreted as supportive of the interventions, with statements such as “this suggests that both instructional strategies were an effective way to behaviourally engage higher performance students” (Mainini & Bane, 2007, p.94). Mainini’s duel role may prevent the necessary detachment for analyzing data objectively (Asselin, 2003) and it is preferable observe interactions to ensure findings correlate.

Regardless, such experiments are not without merit, as they can significantly increase student achievement (Gallimore, Ermeling, Saunders, & Goldenberg 2009) and, as with this case-study, can resolve practical issues.

# Ethical Considerations

Pseudonyms have been used in substitute of the children’s real names, however, this ethical act is notional rather than actual. It is public knowledge that, during the year of data collection for this study, Mainini was teaching at Edwin Markham Elementary School in Room 32 (Edwin Markham Elementary, 2016). The anonymity of the children is further compromised by the publicly-assessable archive of blog posts and newsletters (Edwin Markham Elementary, 2016). In knowing that these participants are vulnerable subjects (i.e. children) and given the discussion of sensitive information (i.e. none of them classified as “Standard Met” for the previous years standardised math test; Mainini & Banes, 2017), it is a huge ethical concern for their identities to be so easily deduced. Until schools remove the names of teachers participating in practitioner research from their websites, the identities of children can, at the very least, be narrowed down to that of the school’s cohort.

There is no mention of consent or assent, however, Mainini and Banes’ (2017) research is an extension to a University of California program and, therefore, beholden to their regulations. The University of California’s (2018) website states that - all research involving human subjects require prior approval from the Institutional Review Board-Human Subjects. Additionally, researchers must have (1) the minors assent and (2) permission from one legal guardian or parent for compliance with federal regulation and state statute (University of California, 2018). Mainini has been contacted to confirm this inference, however, there has been no response at the time of publication.

One minor consideration of pseudonyms is that it obfuscates the student’s gender (which has not been specified). Gender has an influence on teacher perception (Auwarter, & Aruguete, 2008) and, therefore, diminishes the description of subjects in an actual setting (Goubil-Gambrell, 1992).

Another ethical concern is that dual roles encompassed in practitioner research may detract from the teacher’s responsibilities and, by extension, student learning. A practitioner cannot work and record data at the same time (Anderson, Herr, & Nihlen, 1994; as cited in ). Whilst Asselin (2003) claims that practitioners must answer questions as a researcher, presumably for objectivity, it would seem negligent to do so with student participants. Students benefit from interpersonal relationships with their teacher (Wasserman, 2016; Van Uden, Ritzen & Pieters 2014). To help overcome the blurred boundaries between inquiry and practice (Cochran-Smith & Lytle, 2009), Alderson and Morrow (2011) recommend that insiders make it obvious when their primary focus is research. For example, by wearing a ‘researcher’ badge during intense periods of data collection it can be made clear to students that their teacher currently has a research focus, factoring in the ‘observer effect’. Additionally, openness and honest throughout all stages of the research process can assist with easing student dissonance (Burton & Bartlett, 2004).

There are issues of trust (Asselin, 2003). The primary goal of teaching is student learning. Does research detract from this? Do students get special treatment?

Researcher and participant relationships can shift throughout - and perhaps as a result of - a study (Herr & Anderson, 2005). Students may feel anxious about the additional analysis (Asselin, 2003). It is recommended that in order to curtail negative effects, the researcher communicate their research role and participant confidentiality. There is no indication this took place or even that students knew of the study.

A benefit of quantitative research should be the However, throughout the article, anactodatal evidence is provided

Practitioner research has empowered Mainini and Banes (2017) to become change agents in their domain. A phenomenon when undertaking practitioner research is the shift in attribution of improved student performance to one’s own teaching rather than external causes (Gallimore, Ermeling, Saunders, & Goldenberg, 2009). Furthermore, Ermeling’s (2010) research suggests the nature of inquiry research can positively change teacher practice, regardless of the phenomenon under study. Such is the case with Mainini and Banes’ research.

# Conclusion

Bias places the trustworthiness and validity of the study at risk (Field, 1991; Tilley & Chambers, 1996; Thomas, Blacksmith, & Reno, 2000; as cited in Asselin, 2003).

There is a positive relationship between M’s research and the students learning.

The broader application of Mainini and Banes’ (2017) work is subject to the Schrödinger effect; in that it may or may not have any generalizable results and, yet, in its transitive state, the inquiry process has empowered this one practitioner to meet the needs of her diverse students’ needs, a testament to intramural applicability of practitioner research.

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