

Research into girls' Lived Experiences of STEM Education as they Transition from Primary to Secondary School

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INTRODUCTION

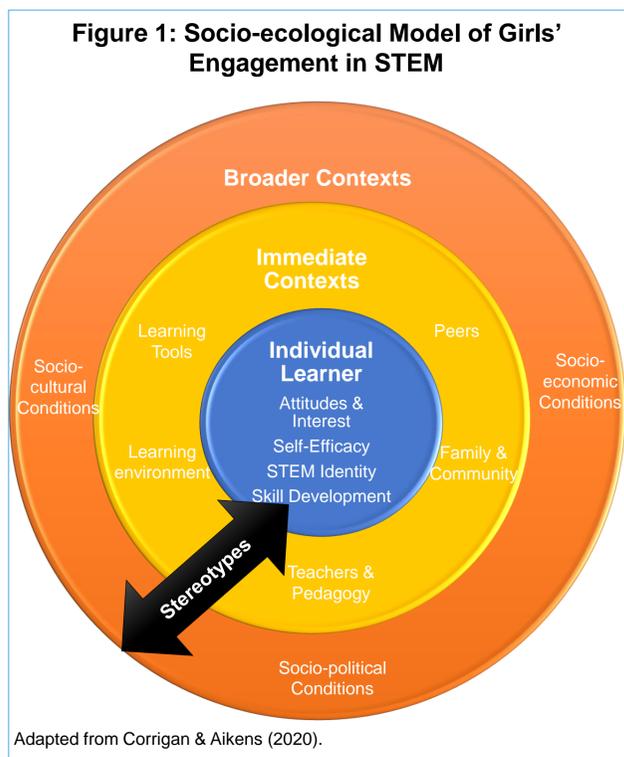
STEM interest for girls has been found to solidify or decline across the ages of 10-14, depending on what they experience in their home, school and out-of-school environments (Corrigan & Aikens, 2020; Kang et al., 2019; Maltese & Tai, 2010). Based on varying influences within these environments (Figure 1), girls decide whether or not STEM subjects and fields are a viable option for them (Moote et al., 2020). Current Victorian enrolment figures indicate that STEM subjects such as Computing, Specialist Maths and Physics are not being seen as an option for many girls (Figure 2). Capitalising on girls' initial STEM interest during the influential age of 10-14 is thus recommended in order to encourage greater participation across STEM subjects and fields in upper secondary school and beyond (Kang et al., 2019; Maltese & Tai, 2010). In Australia, this age range coincides with the transition of students from primary (year 6, age 11-12) to secondary (year 7, age 12-13) school. Girls' experiences during this critical juncture are likely to influence their STEM interest and aspirations (Moote et al., 2020). Consequently, developing a deeper understanding of these experiences on the girls' terms would provide the means for parents, educators and policy makers to become better "informed, shaped or enriched" (van Manen, 1997, p. 62), and thus, likely to develop and implement more targeted STEM interventions and experiences.

RESEARCH QUESTIONS

The aim of this study is to explore the "lived experiences" (van Manen, 1997, p.9) of girls in STEM Education as they transition from primary to secondary school, and to determine how these experiences influence their STEM attitudes and aspirations.

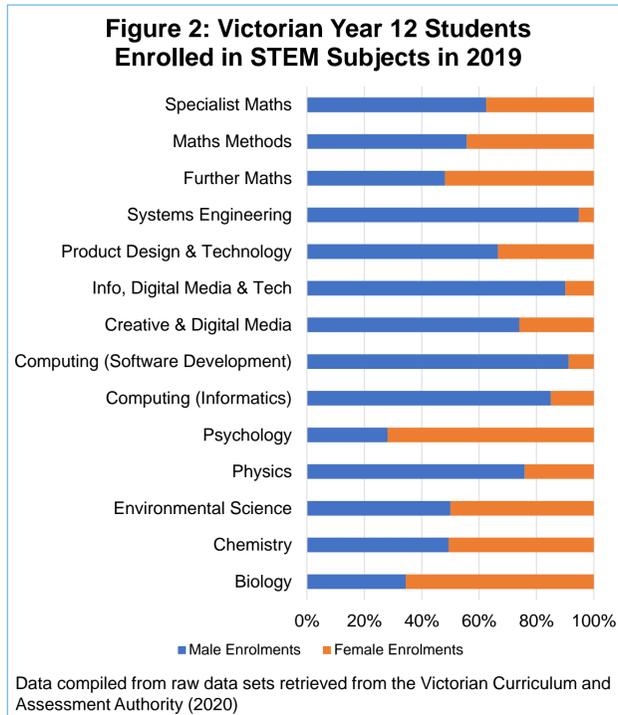
The research questions for this study are as follows:

- How do girls describe their experiences of Science, Technology, Engineering and Mathematics Education as they transition from primary to secondary school?
- How are girls' STEM attitudes and aspirations influenced by the themes uncovered within their lived experiences?



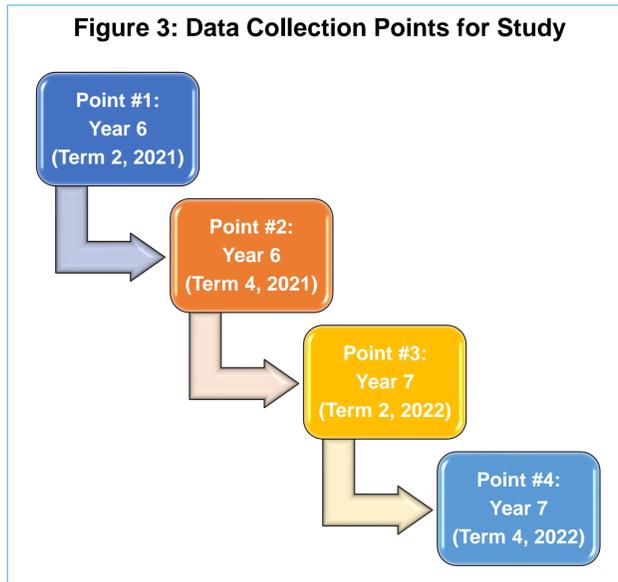
SIGNIFICANCE OF STUDY

Whilst factors that influence girls' STEM engagement (Figure 1) have been uncovered in previous research, these have not been extensively investigated through the lens of transition, and solely from the point of view of the girls' themselves. In addition, there is currently limited knowledge of the experiences of young girls and their development of STEM aspirations (Kang et al., 2019; Moote et al., 2020), with the majority of this research being conducted in the United States (Corrigan & Akins, 2020; Moote et al., 2020). Since this study will be conducted in an Australian context and will examine young girls' experiences of STEM education from their point of view (van Manen, 1997) during the time period that their STEM interest (Maltese & Tai, 2010) and aspirations (Moote et al., 2020) are being formed, it offers a unique insight that has not been widely explored in the current literature.



METHODOLOGY

Participants will be Victorian girls in years 6-7, aged 11-13 years from three P-12 schools with a dedicated primary STEM program. Girls' exposure to this STEM program would form the basis of their initial perceptions of what STEM education is. Two of the three schools will be coeducational and one school will be single sex (all girls). Data – young girls' descriptions of their lived experiences (van Manen, 1997) – will be collected from the same participants across three time points (Figure 3). Their lived experiences will be sought via drawings and focus group interviews using a hermeneutic phenomenological approach.

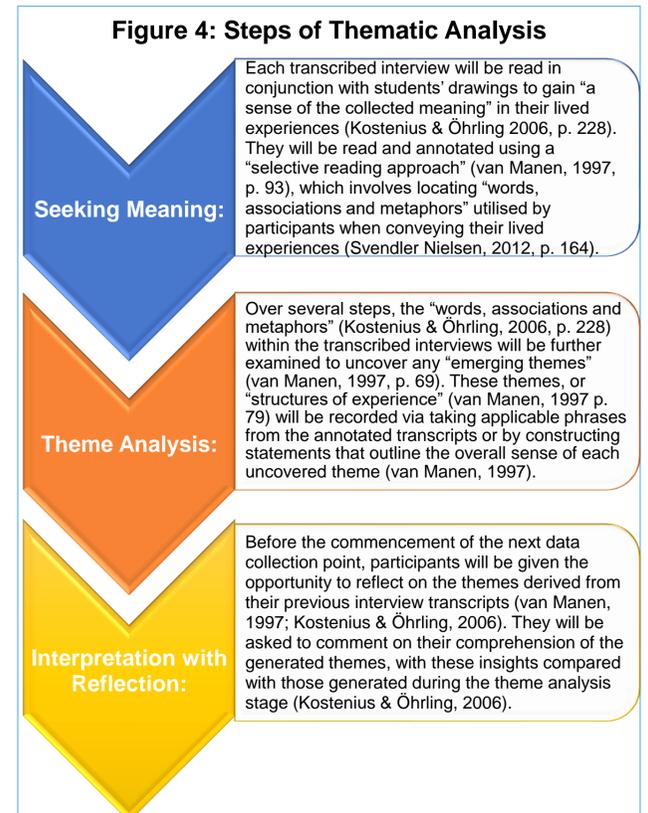


Participants will be first asked to draw a picture of a particularly salient or novel experience they have had (van Manen, 1997; Svendler Nielsen, 2012) in their STEM education. For example, participants would be asked to draw themselves in their Maths class with their teacher and classmates. In addition, they will be prompted to draw what they are doing in that classroom and provide some insight into what they are thinking and feeling via providing thought/speech bubbles and facial expressions to the characters in their drawing. The drawings created by each participant will then be used as artefacts when discussing their lived experiences of each of these phenomena in their interview. These will then be collected for further analysis after each data collection point.

Hermeneutic (conversational) focus group interviews will then be conducted (van Manen, 1997). During each interview, participants will be asked to describe the experience detailed in their drawing "as (they) live/d through it" (van Manen, 1997, p. 64). They will also be asked to describe what they were feeling (Svendler Nielsen, 2012), their mood at the time, and any emotions they were exhibiting during the experience (van Manen, 1997). In addition, they will be asked to talk about their sense of the experience (ie: the visual stimuli, smells, sounds, etc) (van Manen, 1997). Interviews will be audio recorded, transcribed and analysed after each data collection point.

ANALYSIS

In order to uncover the "lived meanings" of each participants' experiences, (Svendler Nielsen, 2012, p. 164), a thematic analysis will be conducted (Figure 4). Participants' interview statements, as well as the drawings of their experiences, will be converted into "narratives" (Svendler Nielsen, 2012, p. 169).



NEXT STEPS

A pilot study will be conducted in Term 4, 2020 in order to ensure young participants (age 11-13) are able to comprehend the prompts that will be given when producing their drawings, as well as the questions that will be directed to them during the subsequent interview (Kostenius & Öhring, 2006). The research proposal for this study is pending approval by Monash University's Faculty of Education. Once given, approval will then be sought from the Monash University Human Research Ethics Committee (MUHREC), the Department of Education and Training (DEET), and the principals of selected Victorian state schools. Informed consent will then be sought from the school principals of each participating P-12 school, parents of participating students, and the students themselves.

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