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Project 44: Schools Supporting Girls' Menstrual Health

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Project description

Primary dysmenorrhea, or 'period pain' affects up to 75% of all women during their reproductive life. Menstrual disorders are very prevalent amongst young women in their teens and 20s with over 90% of Australian adolescents experiencing regular menstrual pain[1]. Menstrual pain may disrupt young women's education because it can result in school absenteeism in around a quarter of adolescent girls, missed lectures in university students, and reductions in test taking abilities, often in Grades 11-12, a crucial time for future academic prospects[2].

Despite disruptions to academic, social and sporting activities and learning about reproductive health, puberty, and how to access medical care to manage symptoms as part of the Personal Development, Health and Physical Education curriculum, most young women frame period pain as a "normal" experience [3]. Consequently, women may not seek formal medical advice, but rather tend to use a variety of self-care approaches, often resulting in the use of sub-optimal doses of analgesic medication, or unproven forms of self-care[2]. Another significant risk of the normalisation of menstrual pain is that at least one in ten women will actually have secondary dysmenorrhea, which is often caused by endometriosis. By normalising pain, many women will not seek treatment for their symptoms, which may hide a significant underlying pathology until later in life.

Understanding how young girls respond to current approaches to menstrual health education in schools is of vital important if schools and teachers are to better serve their educational needs. This project will analyse 5000 young women's responses to a survey focussed on menstrual health. Specifically, the summer scholarship project will analyse young women's responses to open ended survey questions designed to elicit information about the effectiveness of their health education classes and how schools could better support girls' experiences with menstruation.

Project Aims

This research aims to respond to the following research questions:

1. How effective are secondary school Health and Physical Education classes in educating girls about menstrual health from the girls' perspective?
2. How can schools better support girls with their menstrual health?

The project will draw on data collected in the funded project 'Development and piloting of a menstrual health literacy program for women aged under 25'. As part of this project a comprehensive survey has been conducted with more than 5000 responses. This summer scholarship project will focus on analysis of open-ended responses to survey items focused on girls' experiences at school and in their Health and Physical Education classes.

Project Methods

The student will be expected to:

- Conduct a literature search on the topic “Girls’ Menstrual Health and Schooling’.
- Draft a literature review based on the literature suitable for a journal article
- Analyse open ended responses to questions from the survey to determine themes and recommendations for schools and teachers

Opportunity for Skill Development

The student will learn skills in literature searching and synthesis, journal article writing, qualitative data analysis

Students are required to have the following skills/meet the following pre-requisite(s) to apply

An interest in the research area.

Project 45: Shaping the STEM experience: curriculum tools to create, collaborate, connect and inspire!

Supervisor(s): Dr Maree SKILLEN (Principal Supervisor)
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Project description

The current state of, and future needs for Science, Technology, Engineering, Mathematics (STEM) education, is an area of interest and broad discussion at both a national and international level. School-based STEM education is seen as playing a crucial role in preparing children for the future, and the global needs of society. As an emerging field of research, STEM education is identified as being an area where opinions vary on what it should look like and what approaches should be taken in its delivery at the school-level. For some STEM merely represents individual discipline areas, and for others it is a way of teaching that integrates each of the four areas identified by removing subject boundaries and making links to real-world learning experiences.

By taking an integrated approach to STEM education, at least two or more of the discipline areas of STEM can be linked and combined. For primary school teachers there is the opportunity to implement this type of approach to STEM because they can be more flexible in their delivery of subject matter, and are not like secondary colleagues teaching in siloed discipline areas. If STEM education can begin from the earliest years and fundamental skills established, then primary students can develop self-belief in their ability as a STEM learner. These students can be engaged actively in forming an understanding of connections with STEM and other curriculum areas, whilst fostering their interest and curiosity.

Gaps in STEM knowledge and understandings can be addressed in the primary school, given it is seen as being an optimum time to develop and nurture interest as well as providing opportunities for establishing a sense of competence in the foundations of mathematics and science. To support early STEM experiences exploratory learning should be encouraged. This type of learning enables children to learn content through the process and to take control of their own learning whilst providing opportunities to develop knowledge which can be rich and multidimensional.

Through the employment and use of a variety of resources, teachers can provide experiences which support STEM subjects in terms of offering an exploratory and integrated learning experience for students, whilst also encouraging computational thinking and literacy in meaningful ways. STEM should be seen as being part of the rich fabric of curriculum, teaching, and everyday life. In order for students to see the links, teachers should be forming connections between STEM, English, social sciences, languages, visual and the performing arts. This can be encouraged by identifying and using resources including but not being limited to children's literature, consumables and manipulatives, web-based resources, and Apps.

To support the integration of STEM with other curriculum areas, *this research project will investigate* the types of resources available for primary teachers to incorporate and form integrated student learning experiences. Resources will be compiled and a document made available that has the purpose of providing teachers with some support in relation to using the resources, with suggested lesson ideas and strategies, to enhance the teaching and learning of STEM in the primary classroom. An annotated bibliography of literature will provide a theoretical and contextual basis for the resources selected, and the impact that they may have on student learning in STEM and other integrated curriculum areas.

Project Aims

The aims of the research study will involve the student by:

1. locating different types of curriculum tools and resources to be used in shaping the STEM learning experience for Primary students;
2. compiling and categorising the selected curriculum tools and resources to support the effective implementation and integration by Primary teachers into lessons and activities for students; and,
3. conducting a review of the literature for STEM-based learning tools and resources; providing a theoretical and contextual basis for the curriculum tools and resources selected to shape the Primary students' STEM experience.

Project Methods

Methods Used to Conduct the Research

A mixed methodology approach will be utilised to gather data for this research study. The combination of both quantitative and qualitative measures is important in supporting the research process and data analysis. Johnson and Onwuegbuzie (2004, p.14) support this stating that "the goal of mixed methods research is not to replace either of these approaches but to draw from the strengths and minimize the weaknesses of both in single research studies and across studies".

Instrumentation: The instrumentation for this study will consist of curriculum tools and resources with a particular focus on the selection being appropriate for use by teachers with students in the Primary classroom.

Qualitative techniques will include the use of document analysis. This is a systematic procedure for reviewing and/or evaluating documents and resources which may include both printed and electronic (computer-based and Internet-transmitted) materials. This method can be used in combination with other qualitative research methods as a means of triangulation.

Quantitative measures may be used to extend this project and to gather information through the use of structured research instruments (including polls, questionnaires and surveys) about the appropriateness and uses of the compiled STEM-based curriculum tools and resources within the Primary classroom.

Student Engagement in the Process

The student will undertake a comprehensive search and analysis of STEM-based curriculum tools and resources using both online and manual methods. They will be involved and engaged in the research and compilation of relevant sources to be used in the writing of a comprehensive literature review and annotated bibliography. The student will work under guidance on the development of a tool to use when compiling and categorising the selected curriculum resources for integration into Primary classroom learning experiences by teachers.

Opportunity for Skill Development

By participating in this research project, it is anticipated that the student will:

- Develop skills in project management to support the setting and meeting of priorities and timelines.
- Develop research skills and methods required to support them in further study including:
    - written communication skills with the ability to write reports;
    - verbal communication skills to confidently and effectively present clearly and persuasively; and,
    - ICT skills including the ability to complete online searches and use online library and database facilities.
- Develop and refine their research skills to support the selection of different STEM-based resources for use in the Primary classroom.
- Compile and develop an annotated listing of STEM-resources which will also incorporate sample ideas for lessons and strategies to use in the Primary classroom and across key curriculum areas.
- Develop skills to contribute to the writing of an annotated bibliography, literature review, reports and/or articles for publication.
- Be involved with the proof reading and preparation of journal articles for publication.

In summary, the student will have the opportunity to develop their awareness of the types of resources available for teachers to incorporate and form integrated student learning experiences to link STEM, and other areas of the Primary curriculum.

Students are required to have the following skills/meet the following pre-requisite(s) to apply

To be a successful member of this project team, the student will need to have the following skills to support them:

- Commitment to high ethical, personal and professional standards in all aspects of work
- Ability to be highly organised, set and meet priorities and timelines in relation to the project
- Liaison and interpersonal skills with the ability to foster sound working relationships
- Highly motivated, enthusiastic and able to work within a group
- Strong written communication skills including the ability to write reports
- Strong verbal communication skills including the ability to present clearly and persuasively
- Strong ICT skills including the ability to complete online searches and use online library and database facilities

A third year student, or a competent 2nd or 1st year student, who has highly developed ICT and research skills is encouraged to apply. The successful applicant will be supported by experienced researchers to assist them in their skill development and application for a postgraduate research degree, or to complete a research unit at undergraduate level in readiness for possible Honours or HDR study.

Students applying for this project should have an interest in science and mathematics education, with an emphasis on pedagogical strategies and resources to support engaging teaching and learning practices.

Project 46: How children draw inferences from gestures

Supervisor(s): Lyn Tieu (Principal Supervisor)
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Project description

Language users can communicate information explicitly or implicitly through a variety of means. For instance, when we hear the sentence "The tea is *warm*", we tend to infer that the tea is *not hot*, for otherwise the speaker would have said "The tea is hot." This implicit and optional inference arises due to the competition between *alternatives* – namely between the utterances that are pronounced and those that are not. Another type of well-studied linguistic inference is a *presupposition*: saying "Bill knows that Jane won the prize" or its contrary "Bill doesn't know that Jane won the prize" both imply that *Jane won the prize*; in fact, these utterances are most natural in contexts where the information that Jane won the prize is already known.

There are thus **a variety of sophisticated ways to convey information with language**. The past two decades of research have revealed that young children may not draw linguistic inferences to the same degree that adults do because they lack a seemingly 'lingustic' kind of knowledge -- the competition between the words "hot" and "warm" in the first example, and properties of the verb "know" in the second example (see Barner et al. 2011, Tieu et al. 2016).

Strikingly, recent work has argued that these phenomena are **not specific to language proper**; that is, gestures are capable of making meaning contributions that are just as sophisticated (Ebert & Ebert 2014, Schlenker 2016, 2017, 2018). Experimental work with adults has indeed shown that gestural sentences can spontaneously give rise to the same kinds of inferences that we observe in spoken language (Tieu, Schlenker & Chemla 2018, in progress).

The current project combines these two strands of research to investigate **children's understanding of gestural sentences**. Pre-linguistic children younger than 1 year have been observed to produce a predominance of gesture over speech (typically pointing gestures) (Bates 1976, Cartmill, Demir & Goldin-Meadow 2012). If gestures emerge in development prior to spoken language, we may expect to observe inferences in the gestural domain prior to observing the equivalent inferences in the verbal domain. This project will investigate children's understanding of sentences containing gestures, asking whether their ability to draw inferences in everyday conversation may in fact emerge earlier than previously shown in experiments that studied only spoken language. Because of the predominance of gestures in the early stages of language acquisition, the study of gestures may offer a more profound window into how language acquisition occurs.

Project Aims

The present research is designed to investigate children's understanding of sentences containing manual hand gestures, and in particular to understand whether they are able to draw inferences from such sentences. While previous work has examined whether children draw inferences from strictly verbal (gesture-less sentences) and whether adults draw

inferences from sentences containing gestures, no previous work has examined whether children draw inferences from gestures. As such, the aims of the research are the following:

- To assess children's understanding of manual hand gestures that are produced in the context of spoken utterances;
- To determine whether children are capable of drawing inferences from sentences containing manual hand gestures;
- To test predictions of recent theoretical and developmental work according to which some inferences may be acquired earlier than others.

Project Methods

The project will draw on three methods that are standardly used in investigations of children's grammatical knowledge and language comprehension. In the Truth Value Judgment Task (Crain & Thornton 1998), children are presented with short stories told through pictures or acted out with toys. A puppet watches or listens to the stories unfold alongside the child (or is presented in pre-recorded videoclips as though participating live through webcam). At the end of each story, the puppet utters a description of what happened, e.g., "I know what happened! Some of the cats walked to school." Children are then asked to judge whether the puppet's statement is right or wrong, and their response indicates how they have understood the puppet's sentence in the context of the story. In the Covered Picture Task (Huang et al. 2013, Bill et al. 2015), children are presented with a scenario and a sentence, accompanied by two images. One of the images is visible while the other is obscured, e.g., by a black square. Children are instructed to select the picture that best matches the sentence they have heard; if the visible picture matches the sentence, then they should choose that picture, otherwise they should choose the covered picture. The child's choice indicates whether they find the test sentence to be an appropriate description of the depicted scenario. Finally, in the Picture Selection Task, the child is presented with a linguistic description and two pictures, and is asked to select the picture that best matches the sentence they have heard. The two pictures typically differ in some critical aspect, and the child's choice indicates their sensitivity to that difference.

The project will use the above methods to investigate children's understanding of sentences containing gestures. It is expected that their responses in each of the three tasks will provide information about their sensitivity to the meaning contribution of the gesture.

All three methods wil require two types of experimental materials: pre-recorded videos of the puppet's statements (these correspond to the test sentences) and clipart pictures depicting either the stories (in the Truth Value Judgment Task) or the picture choices (in the Covered Picture Task and the Picture Selection Task). The materials will then be integrated into a web-based experiment using the Qualtrics platform, which can then be presented to adult and child participants.

The student will be engaged in creating the visual and video stimuli, as well as helping with the web implementation of the experiment using Qualtrics, under the supervision of Dr Tieu and Dr Chemla.

Opportunity for Skill Development

Through selected readings, regular discussions with the supervisors, and hands-on role in the development of the experimental stimuli, the student will gain a basic understanding of the relevant aspects of linguistic theory, an understanding of experimental design as applied in

human subjects research, and a strong understanding of what is required in developing a child language research project. Dr Tieu will provide the student with training and guidance in preparing the experimental materials and stimuli, and will oversee the project to ensure that all work is completed within the anticipated timeframe.

Students are required to have the following skills/meet the following pre-requisite(s) to apply

We anticipate that the project will be of interest to students enrolled in Psychology, Linguistics, or a related discipline. Alternatively, students who have previous experience or an interest in computer programming or art and design would also be a good fit for the project, as it will involve implementing web-based linguistics experiments and creating child-friendly experimental stimuli. Past research experience is desirable. The supervisors will work closely with the student to develop and refine the student's research knowledge and skills.

Project 47: Investigating gendered language in primary and secondary teaching resources in New South Wales

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Project description

This project aims to generate new data about the teaching resources that are most commonly used by schoolteachers in NSW, and to generate a quantitative measure of the gendered language used in these resources. The first stage of the project will involve a web-based survey administered to primary and secondary schoolteachers about the teaching resources that they most commonly use in their classrooms (which may include both paper-based and web-based materials). Building on the results of the survey, the second stage of the project will involve a linguistic analysis of the most commonly used resources, to determine whether there exist gender asymmetries in these resources.

Previous studies have observed the presence of gender role stereotyping in Australian educational textbooks (Healy & Ryan 1974; Freebody & Baker 1987; Clarkson 1993; Ritchie 2005; Lee & Collins 2009, 2010; Ragusa 2013); for example, women are more often depicted as emotional beings, while men are presented as intellectual (Ritchie 2005), and women are more often depicted within a limited range of social roles, operating primarily within domestic domains (Lee & Collins 2010). Subtle linguistic cues can also engender implicit biases, e.g., whether males or females appear more often in subject position, appear as agents (or initiators) of actions, and whether they are referred to more often with proper names and pronouns (Macaulay & Brice 1997; Pabst et al. 2018). Lee & Collins (2009) observe that "gender portrayal in textbooks and educational materials affects social values, behaviour and recall of material", and potentially shapes students' attitudes towards the two sexes. Gender bias and its effect on students may be particularly important to study in STEM subject areas, where females continue to be disproportionately underrepresented (Blackburn 2017).

Much of the previous literature in this area has focused on printed textbooks. Beyond textbooks, however, teachers can now turn to various online and web-based teaching resources. In Australia, for example, the Australian Broadcasting Corporation (ABC) provides a large collection of videos, "digibooks", and games for all grades, covering various subject areas. Other freely accessible online resources include Youtube videos, Bozeman Science, Let's Learn Science, Crash Course, and the Fuse School series. As such resources become more frequently used, it becomes increasingly important to extend the study of gendered language beyond textbooks to these online resources. The present study therefore aims to establish which resources are most commonly being employed to teach STEM subjects in NSW classrooms, and to examine both the social and linguistic biases that may exist in these resources.

Project Aims

- To generate new data about the teaching resources that are most commonly used by schoolteachers in NSW, through a web-based survey administered to primary and secondary schoolteachers about the teaching resources that they most commonly use

in their classrooms;
- To generate a quantitative measure of the gendered language used in these resources through systematic linguistic analysis.

Project Methods

A survey containing questions about teaching resources (both print- and web-based) will be administered to teachers in NSW. Under the supervision of Tieu and Mackenzie, the student will implement the survey using the Qualtrics platform, and assist in advertising the survey to teachers through the Teachers' Guild of NSW and the Science Teachers' Association of NSW, as well as on social media (e.g., Twitter). The survey part of the project will provide much-needed data about the resources that are commonly employed in NSW classrooms, including novel data about the use of online resources.

The results of the teacher survey will provide a better understanding of which resources are most commonly being used in NSW STEM classrooms. Under the supervision of Tieu and Mackenzie, the student will then conduct a systematic linguistic analysis of (samples from) these resources, examining in particular sentences containing gendered nouns (proper names, pronouns, common nouns such as 'boy' and 'girl'). Properties to be coded for will include: the proportion of female vs. male characters, the social setting in which the female/male character appears, the grammatical role of the noun phrase (subject vs. direct object vs. indirect object), the thematic role (agent vs. patient) of the noun phrase, the noun phrase type (proper name vs. pronoun), and the verbal predicate that appears in the sentence. The linguistic analysis will allow us to investigate whether gender biases exist in the teaching materials used in STEM subjects, and whether such biases could be influencing the disproportionate participation rates among males and females.

Opportunity for Skill Development

Through selected readings, regular discussions with the supervisors, and hands-on role in the development of the survey as well as the linguistic analysis of teaching resources, the student will gain a basic understanding of the research process, from survey design to data collection and analysis. Tieu and Mackenzie will provide the student with training and guidance in preparing the survey and conducting the linguistic analysis, and will oversee the project to ensure that all work is completed within the anticipated timeframe.

Students are required to have the following skills/meet the following pre-requisite(s) to apply

We anticipate that the project is best suited to students enrolled in Education, Psychology, Linguistics, or a related discipline. Past research experience is desirable. The supervisors will work closely with the student to develop and refine the student's research knowledge and skills.