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STEM: What should be taught in school?



Dawne Bell (BellD@edgehill.ac.uk),
David Wooff (WooffD@edgehill.ac.uk)
Michela Insenga (Insengam@edgehill.ac.uk)
The Faculty of Education, Edge Hill University, St. Helens Road, Ormskirk, Lancashire L39 4QP United Kingdom



Keywords

STEM, education, career choice, narrative inquiry, constructivist grounded theory.

Research context

Situated within the wider social and economic context, where globally STEM disciplines are considered fundamental to countries' competitiveness, this study seeks to understand how to best deliver STEM in school, in order to motivate and attract students to choose and persist in STEM careers.

A great deal of what should be taught in school in relation to STEM has been the focus of much debate (Nathan 2010) but overall, little research has been done in this regard.

As female participation in Higher Education exceeds that of men in several parts of the world, women remain an untapped resource for science and innovation (OECD, 2006:18). This longer term aim of this study is to investigate the role of education in engaging students, with a comparison between male and female students in STEM related subjects. Further, it seeks to examine the role of education, specifically with regard to investigation relating to the increased motivation of students to embark upon, and remain in, a STEM career field.



Introduction

This work considers preliminary findings from the early stages of a larger research project, the aims of which are;

- to provide a basis for educators to gain a deeper understanding into how best to deliver STEM subjects in school.
- to explore perceptions around the engagement and motivation around social justice, inclusion and gender with specific relation to STEM education and career choice.

It is the intention of this larger research study to explore the field of 'unconscious bias' (Guba, 1978). In particular it seeks to explore factors that influence STEM participation, with a specific focus on gender and social inclusion as a starting point.



Method and Methodology



The adopted research method for this study is constructivist grounded theory (Charmaz, 2006). Utilising narrative inquiry (Clandinin, 2006) during this initial phase elicited empirically grounded data demonstrating different stakeholder viewpoints. Discourse sought to explore participant's perceptions in relation to the current school curriculum, and the impact STEM education in school had on their own choices and subsequent career trajectories. Emergent findings were discussed in relation to establishing the potential education holds to help ensure the emergence of a STEM-literate society (Bybee 2013). In this initial phase, data was drawn from eleven participants, five female and six male, each pursuing an industrial STEM based career.

First phase findings

This work presents preliminary findings from the early stages of the larger research project previously referred to.

Early findings suggest that all participants (100%) believe that access to a stimulating, high quality STEM education experience is essential in order to foster active engagement with STEM based subjects in future career choices. Of particular note was the participants' continual reference for the need to provide opportunities for experimental and inquiry based forms of learning across the STEM disciplines. The majority of participants (n=9) also believed that specific, targeted, intervention would be a way positively encourage more girls to study STEM disciplines.

"... extra curricular activity and STEM based competitions only target and gain the engagement of a few ... we have to make fundamental, structural changes across the system in order to enable full access and participation by everyone ..."

Research Participant 4



Conclusions and next steps

In conclusion, emergent findings from this initial research phase indicate that in order to support the development of a STEM-literate society, from which an increased number of STEM graduates may emerge, participants perceive that improved STEM education is essential. Utilising documentary analysis, the next phase in this research project aims to compare participant perceptions of 'What should be taught in School?' against the United Kingdom's (UK) national curriculum for schools (DfE 2014), to determine if the current curriculum correlates with the perceptions of those engaged in this study.



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