International Council of Associations for Science Education

Science Education International

The Online Journal of the International Council of Associations for Science Education

Volume 22 * Number 4 * December 2011

ISSN: 2077-2327

SCIENCE EDUCATION INTERNATIONAL

DECEMBER 2011

Volume 22 - Issue 4

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ISSN: 2077-2327

Science Education International (SEI) is published by International Council of Associations for Science Education (ICASE)

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http://www.icaseonline.net/seiweb
ISSN: 2077-2327

SCIENCE EDUCATION INTERNATIONAL

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International Council of Associations for Science Education

Supporting and promoting science education internationally

Editorial

Exploring the impact of social capital (social factors involving family, friends, other students, the community, society as a whole) on student career aspirations, with particular regard to science careers is a priority in many countries across the world. Descriptions of reasons for why students opt out of science, and the various initiatives to encourage science uptake have been researched and documented.

However, there is a limited body of research offering theoretically informed critical accounts of the influence of social capital factors on student aspiration and on student choice with regard to careers based on science education. This special edition of Science Education International reports on the problems/issues/factors that exist given the large number of initiatives, policy changes and activities that have been introduced over the last decade.

Leaks in the Science, Technology, Engineering and Maths (STEM) pipeline have for many decades been a cause for concern: Reports have documented a decline in students opting to pursue science post-secondary education; a decline in numbers of science graduates pursuing science careers and a drop off between undergraduate and postgraduate endeavour. Other inequities within the STEM pipeline have also caused concern, as policy makers have noted the absence or dwindling numbers of particular societal groups from within the STEM pipeline. To a certain extent, much of the focus in addressing these concerns has dwelt on making changes to formal education. Curriculum reviews, teacher professional development, policy change, have all been advocated in order to address the issue of a leaking STEM pipeline. However, the pipe continues to discharge, which would suggest that simply addressing formal education factors will not determine whether students opt in or out of STEM study and careers. In this special edition of SEI, we present articles documenting the influence of various social capital factors on student choice with regard to STEM careers. We start with articles on factors influencing student choice in secondary school and end with factors influencing choice at doctoral level. The articles consider a whole host of factors including gender issues, race issues, student perception of science ability and enjoyment of school science, career-related issues (remuneration and job security), and the influence of family, friends, neighbourhood, church, media, and other social factors.

What most of the articles in this special edition have in common is the place of values that interact with identity and career choices. It would appear that societal values, be they ascertained through the media, through family and friends, or through formal education determine the value of science related careers.

The first article is by Quinn and Lyons and explores gender differences in 3800, 15year-old Australian high school students' perceptions of school science and their intentions to study university science courses. Quinn and Lyons suggest that boys rated their ability in science, and their enjoyment of science more highly than did girls. The second article is by Haun-Frank who discusses the multiple socio-cultural factors that shaped the science career trajectories of 14 African-American high school students. In that study, students chose to pursue science for its altruistic potential because they wanted to make a difference, in and for their community and themselves. The third article is by Bevins, Byrne, Brodie and Price and reports on research, conducted in 2004 (surveying 542 students aged 13-14 years and focus groups with 150 students) and in 2010 (surveying 283 students aged 13-14 years and focus groups with 27 students) aimed at eliciting secondary school students' perceptions of classroom science and professional fields of science and engineering. Students in both studies reported similar views: a lack of practical/investigation sessions; some subjects and topics remain irrelevant, particularly physics; ineffective careers information, advice and guidance. Unfortunately the majority of the students were not considering STEM related careers, despite the range of policy changes and initiatives introduced in England to address the STEM pipeline. The fourth article is by Rodrigues, Jindal-Snape and Snape, and reports on the perceptions of 536 Scottish students aged 14-15years, regarding their intention to choose careers in science in terms of the influence of family, friends, gender and ethnicity. The students reported that science was important and scientific careers were good, but only just over one third of all respondents indicated that they were considering a career in science. The major factor influencing pupils' career choices in Scotland seemed to be their perception of whether their parents value science careers and therefore want their children to pursue a career in science.

The next batch of articles reports on data generated by post school samples. The article by Cavas, Cakiroglu, Cavas and Ertepinar reports on research conducted to explore gender differences and the factors affecting students' career choices in Turkey. They used data generated by 1635 (1043 male, 592 female) first year students from eight different departments- mechanical, civil, computer, electrical-electronics, industrial, chemical, environmental and food engineering at 21 universities in Turkey. Their findings suggest that students were making decisions at high school or after graduation from high school. However their research also showed that career choice was influenced by information garnered from the internet, popular scientific magazines, books and movies. The sixth article is by Zegwaard and Coll and discusses students commencing university studies. They suggest that students starting their university degrees opt for subjects of personal interest, but have vague notions of intended career paths. They describe the role of work placements in enhancing career clarification and describe the need for enculturation into a community of practice. The special issue concludes with an article in which Grunert and Bodner in the United States, discuss the STEM pipeline at doctoral level. For, despite the increasing number of women with chemistry undergraduate degrees in the United States, Grunert and Bodner suggest that women do not appear to go on to pursue doctoral work or academic careers in high research activity universities. Grunert and Bodner discuss the value women place of balancing career and family needs and wants, as they consider careers in chemistry.

The articles in this edition of Science Education International report on a variety of STEM related social, academic and vocational decision points that influence students' decisions as to whether to pursue STEM careers. There appear to be two key influencing aspects: The influence of societal values, and the obstacles within the system that encourage division between personal-social and academic needs. What the articles appear to signal is the role of societal values in determining whether STEM careers are pursued. If and when STEM careers are valued in and by society, and this value is recognized for example by family, friends, church, television, and the internet, and when obstacles that are perceived to situate personal social needs against academic needs are removed, then the STEM pipeline may stop leaking.

Susan Rodrigues
Guest Editor of Special Issue

All submissions should be made online at the Journal Website.
Bulent Cavas, Chair of Publications Committee

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