CHARACTERIZING VICTORIAN UNIVERSITIES' INFORMAL STEM EDUCATION PROGRAMS

Efrat Eilam[a], Kirsten Sadler[a], Fiachra Barry[a], Stephen W. Bigger[b]

Presenting Author: Efrat Eilam (Efrat.eilam@vu.edu.au)
[a]College of Education, Victoria University, Melbourne Victoria 8001, Australia
[b]College of Engineering and Science, Victoria University, Melbourne Victoria 8001, Australia

KEYWORDS: informal education, STEM education, universities' outreach programs

BACKGROUND AND CONTEXT

In recent years there has been a growing concern that the goal of "science education for all" is not being met. Increasingly, education systems are failing to attract students to science, to the extent that schools are often blamed for deterring students from pursuing secondary and tertiary science education (EU, 2004, 2007; OECD, 2006; Osborne & Dillon, 2008; Royal Society, 2010; DEST, 2003; Tytler, 2007).

While students seem disinterested in school science education, a developing avenue of research directs attention to the role of informal science education in particular to the untapped potential of university outreach programs in filling the gap (Eastwell & Renie, 2002; EU, 2005a, b; 2010). To date, most research regarding university outreach programs has been limited to investigating specific programs.

There is a critical lack of data regarding the scope, goals, forms of management, modes of administering and, impacts of university Science, Technology, Engineering and Mathematics (STEM) outreach programs. The present research aims to develop a data-base of university STEM outreach programs, which can then be used to characterize the programs, evaluate impacts and establish best practices.

RESEARCH QUESTIONS

This study addresses the following two issues, namely, determining the characteristics of STEM outreach programs administered by the nine universities in the state of Victoria, Australia, and how the outreach programs are positioned within the universities' businesses in regard to policies and management practices.

METHODS

Data were collected from scientists and program coordinators in the nine universities in the State of Victoria. A total of 3688 online questionnaires were distributed. The data included 190 questionnaire respondents and 17 interviewees. The data were analysed qualitatively and quantitatively.

FINDINGS AND RECOMMENDATIONS

The nine Victorian universities apply predominantly an intra-curriculum model, designed to support the school curriculum. The majority of the programs are one-off exposures, developed for preparing students in years 11-12 for the Victorian Certificate of Education [VCE].

Most of the universities do not have a policy that specifically directs the implementation of science education outreach programs. The programs are conceptualized by university management as a marketing enterprise with an aim of increasing student recruitment. Typically, there is no central organization or coordination, resulting in sporadic programs, over reliant on 'soft' money, with frequent changes in the management schemes. The majority of the programs are initiated by motivated staff, based on their areas of interest, so the programs typically cease when the initiator leaves the university. The study's recommendations include moving beyond the existing model of intra-curricular support; integrating outreach STEM programs into the universities' core businesses; and, abandoning the marketing approach in favour of ethical and community service approaches aimed at enhancing citizens' scientific literacy.

REFERENCES

The Australian Government, Department of Education, Science and Training (DEST) Committee for the review of teaching and teacher education. (2003). *Australia's Teachers: Australia's Future. Advancing Innovation, Science, Technology and Mathematics*. Canberra: DEST, Commonwealth of Australia.

Eastwell, P. and Renie, L. (2002). Using enrichment and extracurricular activities to influence secondary students' interest and participation in science. *The Science Education Review*, 4, 1-19.

European Union (EU). (2004). Europe needs more scientists! *European Commission*, Brussels. Directorate-General for Research High Level Group (HLG) on Human Resources for Science and Technology in Europe. Retrieved February 12, 2013 from http://europa.eu.int/comm/research/conferences/2004/sciprof/pdf/final_en.pdf.

European Union (EU). (2007). Science Education Now: A renewed pedagogy for the future of Europe (The Rocard Report). *European Commission*, Brussels.

European Union (EU). (2005a). Europeans, science and technology. Special Eurobarometer 224. *European Commission*, Brussels. Retrieved February 12, 2013 from http://europa.eu.int/comm/public_opinion/index_en.htm.

European Union (EU). (2005b). Social values, science and technology. Special Eurobarometer 225. *European Commission*, Brussels. Retrieved February 12, 2013 from http://europa.eu.int/comm/public_opinion/index_en.htm.

European Union (EU). (2010). Science and Technology Special Eurobarometer 340. *European Commission, Brussels*. Retrieved February 12, 2013 from http://ec.europa.eu/public_opinion/archives/ebs/ebs_340_en.pdf.

Organisation for Economic Co-operation and Development (OECD). (2006). Evolution of Student Interest in Science and Technology Studies Policy Report. *Global Science Forum*. May 2006. OECD, Paris.

Osborne, J.F., and Dillon, J. (2008). *Science Education in Europe: Critical Reflections*. Nuffield Foundation, London.

Royal Society (2010). *Science and Mathematics Education, 5 – 14.* A State of the Nation Report. *The Royal Society*, London.

Tytler, R. (2007). Re-Imagining Science Education: Engaging Students in Science for Australia's Future. *Australian Council for Educational Research*. ACER Press. Victoria, Australia.