Response profiles in the ROSE survey

Diego Petrucci
Universidad Nacional de Hurlingham. Instituto de Educación.
Av. Vergara 2222, B1688GEZ Villa Tesei, Buenos Aires, Argentina.
Departamento de Ciencias Básicas, Facultad de Ingeniería,
Universidad Nacional de La Plata, 1 y 47, CP 1900, La Plata, Buenos
Aires, Argentina.
diego.petrucci@unahur.edu.ar, diegope@gmail.com

Monica Giuliano
Universidad Nacional de Hurlingham. Instituto de Tecnología e Ingeniería.
Av. Vergara 2222, (B1688GEZ), Villa Tesei, Buenos Aires, Argentina.
Departamento de Ingeniería e Investigaciones Tecnológicas,
Universidad Nacional de La Matanza, Buenos Aires, Argentina.
monica.giuliano@unahur.edu.ar, mgiuliano@unlam.edu.ar

Juan Pedrosa
Universidad Nacional de Hurlingham. Instituto de Tecnología e Ingeniería.
Av. Vergara 2222, (B1688GEZ), Villa Tesei, Buenos Aires, Argentina.
juan.pedrosa@unahur.edu.ar

Abstract

Science, Technology, Engineering and Mathematics (STEM) are not particularly popular disciplines among University applicants. In addition, there is high rate of dropouts in the first years of these programs. Since motivation is a very important factor in the selection of a University program as well as in students´ success or failure, we have included the National University of Hurlingham to the *Relevance of Science Education* (ROSE) project. In order to know more about students´ attitudes, a survey was carried out among 359 high school students in Argentina. A four-point Likert scale was used to analyze answers on the basis of the Principal Component Analysis (PCM). Four profile related components were obtained:

- C1. Topics in the sections: *"what I would like to learn"*. 109 context-related topics in Natural Sciences (environmental protection, common affairs, natural phenomena, health, mysteries, CTS, NOS, etc.). Of these, this profile includes aspects related to health and reproduction, in particular sexual health, sex, growth and maturation and diseases.
- C2. Aspects the sections: *"What I would like to learn"* related with technology (functions of technological objects, substances such as petroleum, explosives). Items from the section *"My future work"* appear less often (such as work with machines, tools or technology, creation or repair of technological objects).
- C3. Topics related with *"What I would like to learn"* mostly appear in two subject groups: mysteries, outer space objects and extraterrestrial life on the one hand; and on the other recent inventions and discoveries. Protection of endangered species is also mentioned.
- C4. In the section *"My experiences outside school"*, the following are mentioned: use of levers, wheelbarrows and binoculars, garbage separation and tire repair.

- After analyzing components according to gender, significant differences were observed in the medias. Females show a bigger interest in sexuality and safety issues (C1), as well as activities outside the school (C4). Males are more interested in technology, their future job (C2) and outer space and inventions (C3). Major differences are observed in C1 and C2.

Keywords
STEM, PCA, Gender, ROSE, Science Education.

Acknowledgements

Biographies

Diego Petrucci is Profesor en Físico-Matemática at the Universidad Nacional de La Plata and PhD in Didáctica de las Ciencias Experimentales, Universidad de Granada, Spain. Professor at the Instituto de Ingeniería y Tecnología, Universidad Nacional de Hurlingham and Professor at the Facultad de Ingeniería, Universidad Nacional de La Plata. He has been Director of research projects in Didactics of Natural Sciences accredited by UNLP, UNAHUR and UNGS. He teaches Mathematics, Physics, Didactics of Physics and Psychology of Learning at the universities of General Sarmiento, Buenos Aires and La Plata. He has developed multiple tasks of teacher training. He has taught a postgraduate course on History, Philosophy and Didactics of Natural Sciences for the Doctorate of the Faculty of Exact Sciences. He has carried out several extension activities. He has published articles in journals, conference proceedings, books and book chapters. He has directed master's theses and specialized works; he has been a jury member for doctoral and master's theses. He has given lectures and participated in panels of several congresses. He is an evaluator of several magazines and congresses.

Giuliano, Monica is a Professor en Físico-Matemática at the Universidad Nacional de La Plata and has a Master's degree in Psicoinformatics Education and is specialized in Applied Statistics. She is a research professor in the Engineering of National University of Hurlingham and National University of La Matanza. She is a Professor in Probability Course of Engineering. Also, Prof. Giuliano has category II in the Incentive Program belonging to the Ministry of Science and Technology of Argentina and she is Director of research projects related to Statistics and Education, with multiple publications in the field of education and statistics. She has participated in research projects collaboratives involving various universities.

Juan Pedrosa is secretary of research and development at the National University of Hurlingham. He is Ph.D in physics from the National Atomic Energy Commission and the National University of San Martin. He has a degree in physics from the National University of Mar del Plata.