

GUIDING ATTITUDES IN CAREER CHOICE: A GIRLS' SUMMER SCHOOL

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Abstract

January 1996 saw the running of the University of Southern Queensland Girls in Maths & Science Summer School for the seventh year. This Summer School brings 96 fourteen year old girls from all over Queensland for a six day residential school covering engineering, science and mathematics activities. As sponsorship is received from the Queensland Department of Education and the University of Southern Queensland the Summer School is completely free to all participants. All travel, meals and accommodation are covered.

The aim of the school is to encourage these girls from diverse backgrounds to develop and maintain their interest in mathematics and science for their remaining years at school, and then to pursue careers in engineering, science and technology.

Queensland, geographically, is the second largest state of Australia covering in excess of 1.7 million square kilometres (667 thousand square miles) and a population of just over 3 million. Thus the school gives girls from isolated and rural communities, as well as the larger cities, the chance to interact and participate in activities which they may not have had the opportunity to do before.

Approximately 350 girls apply each year and rigid selection criteria are applied. Girls are selected on the basis of their academic history, career aspirations and family background, with the aim being to select those girls who, because of environmental and social circumstances, may not have the opportunity or get the encouragement to consider non-traditional careers. Girls are chosen from both state and private schools with only one girl from each school being selected per year. Thus it is hoped that these girls will return home producing a 'ripple effect' generating interest and enthusiasm amongst their peers.

The range of activities offered includes hands on engineering and science, excursions, careers workshops and group cohesion workshops to name just a few.

This paper gives an outline of the school discussing detailed aims, selection criteria and activities undertaken as well as some quantitative and qualitative analysis of statistics pertaining to the students' participation.

INTRODUCTION ¹

Since 1989 the University of Southern Queensland has been running an annual Girls in Maths and Science Summer School. To date almost 700 girls representing some 400 schools from around Queensland have participated in and benefited from the activities and philosophy of the Summer School.

During the 6 day school, the girls who are about to enter year ten are accommodated on campus and participate in a wide range of science or mathematics based activities such as electronics, Computer Aided Manufacture and firing rockets as well as excursions and workshops. These activities are run not only by University of Southern Queensland staff but also a diverse group of outside experts ranging from consulting engineers, CSIRO research officers (Commonwealth Scientific and Industrial Research Organisation) and The National Centre for Science and Technology to a professional acting group.

The girls, in groups of eight, are supervised by a facilitator who is an undergraduate student of USQ, usually from the Science, Education or Engineering and Surveying Faculties. The facilitators begin the Summer School the day before the girls arrive so as to familiarise themselves with the surroundings, timetable and committee members before the girls begin to arrive. Workshops are also run for the facilitators on such areas as supervision and group dynamics.

On the last day of the Summer School, parents are invited to join the girls on campus. A number of workshops and seminars are run for the parents including "Helping at Home - You, Your Daughter & Mathematics" and " 'Suitable' Careers - Where's She Heading?". This is to give some advice and information to parents who may be a little uncertain on the suitability of some non traditional careers that their daughters may be interested in pursuing.

SELECTION PROCESS

Although the Faculty of Engineering and Surveying at the University of Southern Queensland traditionally has one of the lowest female participation rates in Australia ², the Summer School is not primarily used to recruit potential students. The selection process is undertaken by the Summer School committee and "aims to identify those girls who, for a number of reasons, would obtain the most benefit from the activities, stimulation and encouragement provided by the Summer School. "¹ As the Summer School can accept only 96 participants from nearly 400 applications the logistics themselves are daunting and present somewhat of a challenge.

Information is requested from both the girls and the principals of schools they attend on areas such as academic achievement, proposed career paths and extra curricular activities in the maths and science areas. However, such information is considered in the light of opportunities that girls already have and care is taken to focus on those girls whose current situation suggests limited opportunities and support. The committee tries to select girls who have sound academic skills in the maths and science area, but who might be lacking either the motivation, or role models to maintain and foster this ability.

These could be girls who have no close relative who has attended university and hence it might not be seen as an achievable goal, or a girl who is in the top ten to fifteen percent in maths and science but is not receiving the encouragement from either the school or the family to maintain these subjects. Many also come from rural areas or from "financially disadvantaged" situations.

LONGITUDINAL STUDY

Over that last seven years there has been a huge amount of data collected on individual activities, pre and post attitudinal surveys, proposed career paths and actual courses undertaken at a tertiary level. The data on individual activities has always been collated yearly, to help plan the activities for the following year, however analysis of other information has never been undertaken fully. In fact, part of the project remains the collection of data to ascertain the long-term effects of the Summer School.

As data was collected over a long period of time and its analysis presented such a huge task an initial investigation was undertaken in 1995. This was to identify available data and determine the research questions to be answered given the resources.

This report recommended that the research concentrate on identification and description of patterns of behaviour/intended behaviour, associated with choices of school subjects, post-compulsory study, and/or employment of the groups rather than on attempts to find cause/effect relationships between Summer School participation and subsequent behaviour/attitudinal changes.

As the established aims of the Summer School state that it will endeavour to:

- encourage more girls to enrol in engineering, science and technology courses at the tertiary level³
- influence the subject selection of girls in Years 11 and 12³

it is desirable that the longitudinal study investigate whether the school was in fact, meeting these aims. Thus, considering available resources it was decided to study the following set of research questions as priority number 1:

1. What are the career and course paths of the participants?
2. What are the career and course paths of non-participants?
3. Do career and course paths differ between participants and non-participants?

A detailed analysis of the data has revealed a number of deficiencies which has limited the extent to which definitive statements can be made. For example, the collection of data over seven years had been unsystematic due to staff changes over that time. Difficulties in interrogation include:

- problems in identifying clear criteria for differentiating participant/non-participant groups⁴
- problems in identifying complete cohorts⁴
- problems in “following” student cohorts through high school systematically⁴

The available conclusions from the longitudinal study report were, understandably disappointing. Because of the limitations with the available data, there were no clear conclusions about the effects of participation in the summer on career or course paths. Given the duration of the Summer School, this may be a perfectly plausible and logical conclusion to reach. Nevertheless there is a strong case for a qualitative study to be designed in order to understand what influences student decisions concerning career and subject selection, and what effect the Summer School, if any, plays in this selection process.

On the surface it is unreasonable to think that a one week experience in a fourteen year old girls life is going to have a profound effect on her career choice. The girls are selected because it is felt that they need an extra incentive to maintain an interest in ‘non-traditional’ areas. These girls are not ‘top’ academically, they have not indicated a great desire to pursue a technical career, nor do they have a family role model on which to base an aspiration for a university education, let alone a non-traditional career. They are girls to have the ability but through circumstance may be ‘lost to the system’ and not utilise those abilities. Whilst parents are mostly very supportive of their daughters and recognise the potential that they have, some of the literature suggests that they basically return to the same environment which may or may not nurture the goals of the Summer School. This begs the question - would a support system or network amongst the girls to help maintain the enthusiasm generated at the school? Would it help maintain the attitude that engineering, science and technology were realistic and worthwhile career goals?

Another inconclusive point of the longitudinal study was the actual and intended year 11 subject choice. Whilst data showed no difference between participants and non-participants in terms of numbers of mathematics and science subject undertaken at this level, no information was available for subjects actually available at the schools. Many rural and remote schools in Queensland do not have the variety of subjects due to small numbers of students attending the school. This is one point to be addressed in future studies.

Although there is limited quantitative data, feedback from the girls involved indicates that the Summer School does have an impact. This was captured by a quote written by a 1996 participant in “The Daily Buzz”, a newsletter produced daily by the girls. “This

week has given us an inside look at the versatilities (sic) of science and maths in everyday life. It has shown us the many ways that we can use it to help... We have been taught the World is changing and that females are being accepted for the work that we can do and that we are just as good as males, (if not better!!!!)."

Obviously changes in attitude even if they don't lead to a technical career are worthwhile, and in future must be monitored much more closely. Attitudinal surveys are conducted in the areas of science and mathematics however there was no information was available on the validity of the measures of the constructs used. Perhaps the route to take in future is to follow the paths of the girls much more closely, with personal interviews and a rigorously designed and implemented study.

CONCLUSIONS

The Summer School has, for the past seven years tried to open the eyes of girls attending, showing them the diversity and depth of careers in engineering and science. The organising committee has tried to overcome the stereotypes of engineers in hard hats, scientist in white coats and that these careers are far removed from the reach of 'ladies'. But the attitudes and community knowledge of these careers makes this an immense task. Can the Summer School, in one short week, inspire the attending girls to reach for goals not thought of before? Maybe it can - "It was great to listen to (her) talk about real life experiences as a civil engineer and really inspired me to pursue a career which requires a university degree. Actually I never even knew what any type of engineer was until I came to this summer camp. I always thought that engineers were people who had their head jammed in a car motor, day in, day out. It's great to know that engineering involves many fun, interesting and dramatic experiences." ⁵ The Summer School opens doors to career prospects that will remain open even if the student never chooses to walk through that door.

Obviously there is much to do in terms of quantifying our success, but (still based on the qualitative) evidence the committee and people involved in the Summer School, both past and present, are succeeding in changing the attitudes of the attending girls. "The participants left with an experience of diversity, challenge and enjoyment in relation to the topics of maths and science and their related careers." ⁶ In the long term this can do nothing but benefit the community which has so generously supported the Summer School.

REFERENCES

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² Cobbin D., (1995) *Women's Participation in Nontraditional Fields of Study at the Undergraduate Level of Higher Education 1989-1993*, Department of Employment, Education and Training Evaluations and Investigations Program, Australian Government Publishing Service, Canberra, pp 274-278

³ Girls in Maths & Science Summer School Brochure and Application Form

⁴ Bedford, T., *Draft Report - Girls in Mathematics and Science Summer School Longitudinal Study*, unpublished report

⁵ participant (1996), "*The Daily Buzz*", daily newspaper produced by participants at the Summer School

⁶ Swarbrick G., (1996) *Independent Evaluator's Report on the 1996 University of Southern Queensland Girls in Maths and Science Summer School*, unpublished report