CITRENZ
COMPUTING AND INFORMATION TECHNOLOGY RESEARCH AND EDUCATION NEW ZEALAND

Journal of Applied Computing and Information Technology

ISSN 2230-4398, Volume 19, Issue 1, 2015

Incorporating the NACCQ publications:
Bulletin of Applied Computing and Information Technology, ISSN 1176-4120
Journal of Applied Computing and Information Technology, ISSN 1174-0175

Refereed Poster A2:

The odd one out: Revisiting and investigating the gender imbalance in ICT study choices

Morton, S. & Redmond, P. (2015). The odd one out: Revisiting and investigating the gender imbalance in ICT study choices. *Journal of Applied Computing and Information Technology*, 19(1). Retrieved January 15, 2015 from http://www.citrenz.ac.nz/jacit/JACIT1901/2015Morton_Gender.html

Abstract

For the past two decades there has been an imbalance between male and female students entering the Bachelor of Information Technology degree from high schools. The literature suggests that only one in six students entering higher education to study computer related degrees are female. It also suggests that occupational stereotyping can be linked to the decline in the number of females entering computing degree courses. This research is proposing to revisit and investigate why this is still prevalent in today`s society that has been brought up on technology and can see the benefits of good careers and good jobs.

Keywords

K.3 [Computers & Education], Computer Uses in Education, collaborative learning

Poster

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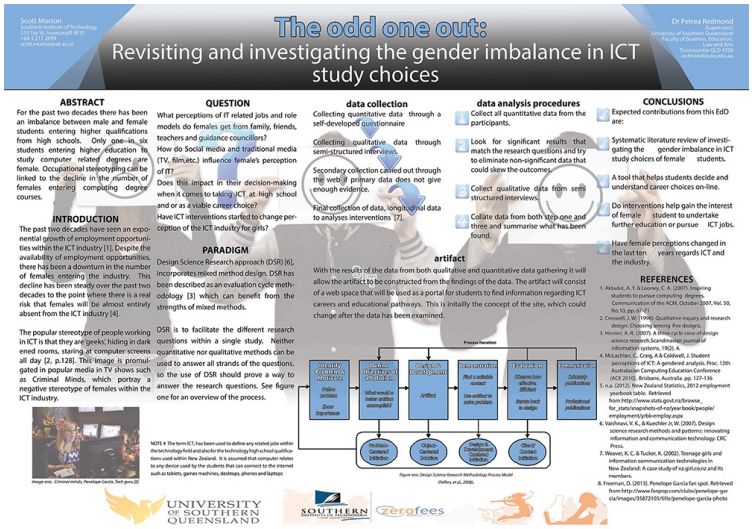

1. Introduction

Within this paper the term ICT, has been used to define any related jobs within the technology field and also for the technology high school qualifications used within New Zealand. It is assumed that computer relates to any device used by the students that can connect to the internet such as tablets, games machines, desktops, phones and laptops

First Symposium at the 5th annual conference of Computing and Information Technology Research and Education New Zealand (CITRENZ2014) incorporating the 27th Annual Conference of the National Advisory Committee on Computing Qualifications, Auckland, New Zealand, October 7-10, 2014.

The past two decades have seen an exponential growth of employment opportunities within the ICT industry. Many of these jobs internationally have been filled by graduates coming out of polytechnics and universities with degrees in computing or computer science (Akbulut, & Looney, 2007). Despite the availability of employment opportunities, there has been a downturn in the number of females entering the industry. This decline has been steady over the past two decades to the point where there is a real risk that females will be almost entirely absent from the ICT industry (McLachlan, Craig, & Coldwell, 2010).

The popular stereotype of people working in ICT is that they are 'geeks', hiding in darkened rooms, staring at computer screens all day (Creswell, 1998, p.128). This image is promulgated in popular media in TV shows such as *NCIS* and *Criminal minds*, which portray a negative stereotype of females within the ICT industry.

Although there are many avenues that females can take into the ICT industry, such as internal promotion, apprenticeships and on job training, New Zealand statistics show that only 1.8 per cent of women identify themselves as employed in ICT, media or telecommunications jobs (New Zealand Statistics, 2012).

2. Statement of the research question/s or hypothesis

The main research questions that will be addressed in the thesis:

- What perceptions of IT related jobs and role models do females get from family, friends, teachers and guidance councillors?
- How do Social media and traditional media (TV, film, etc.) influence female's perception of IT? Does this impact in their decision-making when it comes to taking ICT at high school and or as a viable career choice?
- Have ICT interventions started to change the perception of the ICT industry for girls?.

3. Research methodology

3.1 Research paradigm/s

This study will use Design science research approach (DSR) (Vaishnavi, & Kuechler Jr, 2007), which incorporates mixed method design. DSR has been described as an evaluation cycle methodology (Hevner, 2007) which can benefit from the strengths of mixed methods.

The purpose behind using DSR is due to the fact of different research questions needing to be addressed within a single study. Neither quantitative nor qualitative can be used to answer all strands of the questions, so the introduction of DSR should prove away to answer all research questions.

The overall basic design of the DSR approach will use

- Awareness of problem
- Suggestion
- Development
- Evaluation
- Conclusion

3.2 Research method/s

The DSR research method uses phases which can be followed through as a singularity or through iteration using circumspection (Vaishnavi, & Kuechler Jr, 2007). The phases start with the awareness of problem which tries to find an interesting problem which could include new developments within the field or industry.

Phase two looks at the suggestion, this information is drawn from existing knowledge base for a problem, however the suggestion may be inadequate for the problem or suffer from knowledge gaps, which then can make it a research problem. This should be able to produce a solution which tentatively can be used to implement an artifact in the next phase.

Phase three is the development of the artifact, this is then carried out in partial or in full, if successful then they are evaluated according to the functional specifications created.

Phase four evaluates the results from the development phase and further suggestions could be made through circumspection or iteration. The basis of iteration is the flow from partial completion of the cycle back to any phase, this is shown in figure one.

Phase five is the conclusion, this can indicate the end of the research cycle and completion of the DSR project.

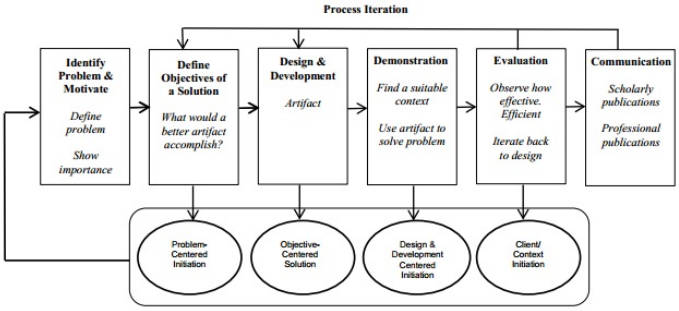

Figure 5. Design Science Research Methodology Process Model (Peffers, et al., 2008)

Figure 1: Design Science Research Methodology Process Model (Peffers, et al., 2008)

3.3 Data collection techniques

The awareness of problem phase of the study will be to identify many of the high schools within Southland, Central, Otago and Canterbury regions that are willing to participate within the study. Ideally, the number of students that are willing to participate in this study would be around 1000 students. For the teacher and councillors the number needs to be around 25. The primary technique for collecting the quantitative data will be through a self-developed questionnaire containing questions of different types such as multiple choice, Yes/No questions, open ended and self-assessment items which will be measured using the Likert Scale.

The questionnaire will be pilot tested with one of the schools close by. The goal of the pilot will be to validate the questionnaire and to test the reliability and accuracy of the questions asked. The results of the pilot survey will help establish a constant and reliable questionnaire, if not then phase iteration can happen.

The primary technique used will be in-depth semi-structured interviews with four or five of the teachers and councillors, this maybe via the telephone, face-to-face or by the web, dependent on technology. Depending on the outcome of the interviews and results gathered will depend on iterations.

The final collection of data for the study will look at one of the interventions that has been going in New Zealand for a period of time. Gathering longitudinal data to analyse to give an understanding of how these interventions are helping (Weaver, & Tucker, 2002). This will be carried out with school data of students opting to take ICT courses over a period of time to see if there is any increase that coincides with the interventions.

3.4 Data analysis procedures

Step One - Collect all quantitative data from the participants, these will be students, staff and career councillors. This should allow the researcher to find patterns that will be used to facilitate the selection of participants for the second phase of data gathering.

Step Two - The researcher will look for significant results that match the research questions and try to eliminate non-significant data that could skew the outcomes. Groups of participants will be contacted and given instructions for interview process.

Step Three - From the interviews, data will be recorded and transcribed into tangible outputs that will pick up on the research questions. This will allow the researcher to look for emerging themes across the different groups of participants.

Step Four - This will bring all data together from both step one and three and summarise what has been found. From these findings the researcher will then be able to explain how the qualitative results helps explain the quantitative results and to come to a reasonable proposition from the data gathered.

Step Five - This will use the data gathered to create the artifact of a web presence to imitate the career advisor in a web portal for students to find information about ICT education and careers. There will be iterations associated with this phase.

4. Conclusions

Expected contributions from this EdD are:

- Systematic literature review of investigating the gender imbalance in ICT study choices of female students
- A tool that helps students look at career choices on-line
- Do interventions help gain the interest of female student to undertake further education or pursue ICT jobs
- Have female perceptions changed in the last ten years regards ICT and the industry.

Acknowledgements

The first version of the poster was displayed and discussed at the First Doctoral Symposium at the 5th annual conference of Computing and Information Technology Research and Education New Zealand (CITRENZ2014) incorporating the *27th Annual Conference of the National Advisory Committee on Computing Qualifications*, Auckland, New Zealand, October 7-10, 2014.

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Journal of Applied Computing and Information Technology (JACIT): ISSN 2230-4398
(Incorporating the Bulletin of Applied Computing and Information Technology, NACCQ: ISSN 1176-4120 and
Journal of Applied Computing and Information Technology, NACCQ: ISSN 1174-0175)

An Open Access Journal, DOAJ #22304398, (✓zotero)