Don't dilly dally on the way: Driving towards digital information literacy capability

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Digital information literacy (DIL) is a vital capability in the changing spaces of tertiary education. In this paper the approach taken in a collaborative research initiative investigating how teaching staff and students acquire digital information literacy skills through action learning and the development of personal learning environments is described. The methodology is outlined, and as this is still a work in progress, some preliminary results are shared, which demonstrate that participants made important shifts in their capability as a result of the project.

Keywords: digital information literacy, action research, case study, multi-strategy research

Introduction

Researchers from four tertiary institutions in New Zealand combined efforts to investigate how staff and students acquire digital information literacy (DIL) skills. Making use of online communication technologies themselves, they set up and conducted the project working with groups of staff and student volunteers at their own institutions who were interested in advancing their digital information literacy. DIL capability is a must as staff and students navigate the same places but different spaces.

Research objectives

Four research objectives were to be investigated:

1. Investigate how staff and students access, and interpret digital information creating their own understandings using purpose built modules which are customisable and Web 2.0 strategies.
2. Ascertain how personal online learning environments and membership in a social networked community can influence digital information literacy (DIL).
3. Indicate how important digital information literacy is for lifelong learning of staff and students (including Maori and Pasifika), productivity and innovation.
4. Determine the standard of digital information literacy in the New Zealand working-age population compared with other OECD countries.

The research design

The research design was action research with groups at each of the four participating institutions taking part in face to face workshops over a period of ten weeks. Participants were introduced to the concepts of digital information literacy in the workshop environment and encouraged to find solutions to digital information issues which they encountered in their work and/or study. An action research spiral approach taken from _Middlewood, Coleman and Lumby (1999) was shown to participants as a way of monitoring and reflecting on their progress, and this was utilized by the majority to record their learning journey. They were also asked to make use of use of a journal, weblog (blog) or other digital means as a way of helping them to develop digital information literacy skills during the project. Participants were asked to fill in pre and post surveys as well as attend focus groups held at the end of the project.

The project researchers decided to use an action – oriented approach (Coglan & Brannick, 2002) with a mix of qualitative and quantitative methods so that meaningful data could be collected to measure the complexity of immersion in the digital environment. This was also to ensure participants could develop their digital information literacy skills while working within a supported and active learning environment. In addition, during the analysis and interpretation phase of the project, and given the diversity of the participants, it was decided that a case study approach was an appropriate way of handling the data. A multi-strategy approach (Bryman, 2000) was deemed to be the most complete method to allow fuller analysis of the empirical data and bring together the qualitative and quantitative aspects of the investigation, while supporting separate quantitative data analysis from pre and post surveys.

Case study as an analytical technique was used very effectively to collate the material collected during the project and this was done using more than one type of *unit of analysis* (Yin, 2009). According to Yin (ibid), case study research as an all-encompassing method can relate to not only research design and data collection but also to the approaches used to analyse data. In this study, individuals (participants) and groups (the four institutions) comprised two types of units of analysis and the data from these were examined for the presence of consistent patterns (pattern matching) and explanations (explanation building) in relation to digital information literacy. The patterns and explanations so revealed, led to the construction of a unit of analysis which established the parameters for a single overarching case, (see Fig 1). Thus a combination of action research and case study methods were used in the research design. This approach has previously been used with some success by Halonen (2008) during the investigation of information systems.

Process: Data collection

Pre and post surveys

The four institutional case studies included the use of pre and post survey questionnaires which were completed online. The surveys were informed by the work of Bundy (2004), Doyle (1992), Phelps (2002) and the ANZIL standards and originally devised for projects by Hegarty, Penman, Brown, Coburn, Gower, Kelly, Sherson, Suddaby & Moore (2005), Keen, Ritson-Jones, Coburn, Hegarty & McDonald (2006) and Penman (2007). The surveys consisted of questions about general demographic information and used Likert-type scales to measure perceived digital information literacy i.e. skill level and tool use, reported confidence with digital information literacy, self-efficacy in using a range of digital and electronic items. The final section asked about personal characteristics and attitudes, and overall confidence. Data from these questionnaires were analysed separately (quantitative) but also contributed to the building of institutional case studies, the overall case study and the thematic and interpretive analysis (qualitative).

Workshops

The participants were encouraged to attend workshops at their institutions over a period of 10 weeks, some compulsory, some optional. In the first workshop, participants were introduced to the project and given an overview of digital information literacy and social networking (web 2.0) tools, such as the project wiki on WikiEducator, blogging, social bookmarking, and the like. They were encouraged to share the digital information issue which they wished to work on in the research project and completed the online pre-survey.

The subsequent workshops followed the same pattern at each institution. Each workshop began with a round where participants reviewed and shared what they had been doing over the past week or fortnight, followed by group or individual exploration of topics of interest. The facilitators encouraged collaboration in the face to face workshops and hoped that participants would communicate and interact outside the workshops. A range of tools and strategies were introduced to participants, such as RSS feeds, Online Information Literacy (OIL) modules, (http://oil.otago.ac.nz) wikis, digital resources, many of which were requested by the participants themselves. The project facilitators concentrated on responding to the developing aspects of digital information literacy which affected the personal learning environments of the project participants.

As part of the action research cycle approach to the research, participants brought ill-structured problems into the workshops, and worked within a scaffolded and structured environment. In all cases they were guided to view their participation in the project from an action research perspective. Participants were encouraged to use the Three Step Reflective Framework (Hegarty, 2005) and an action learning spiral
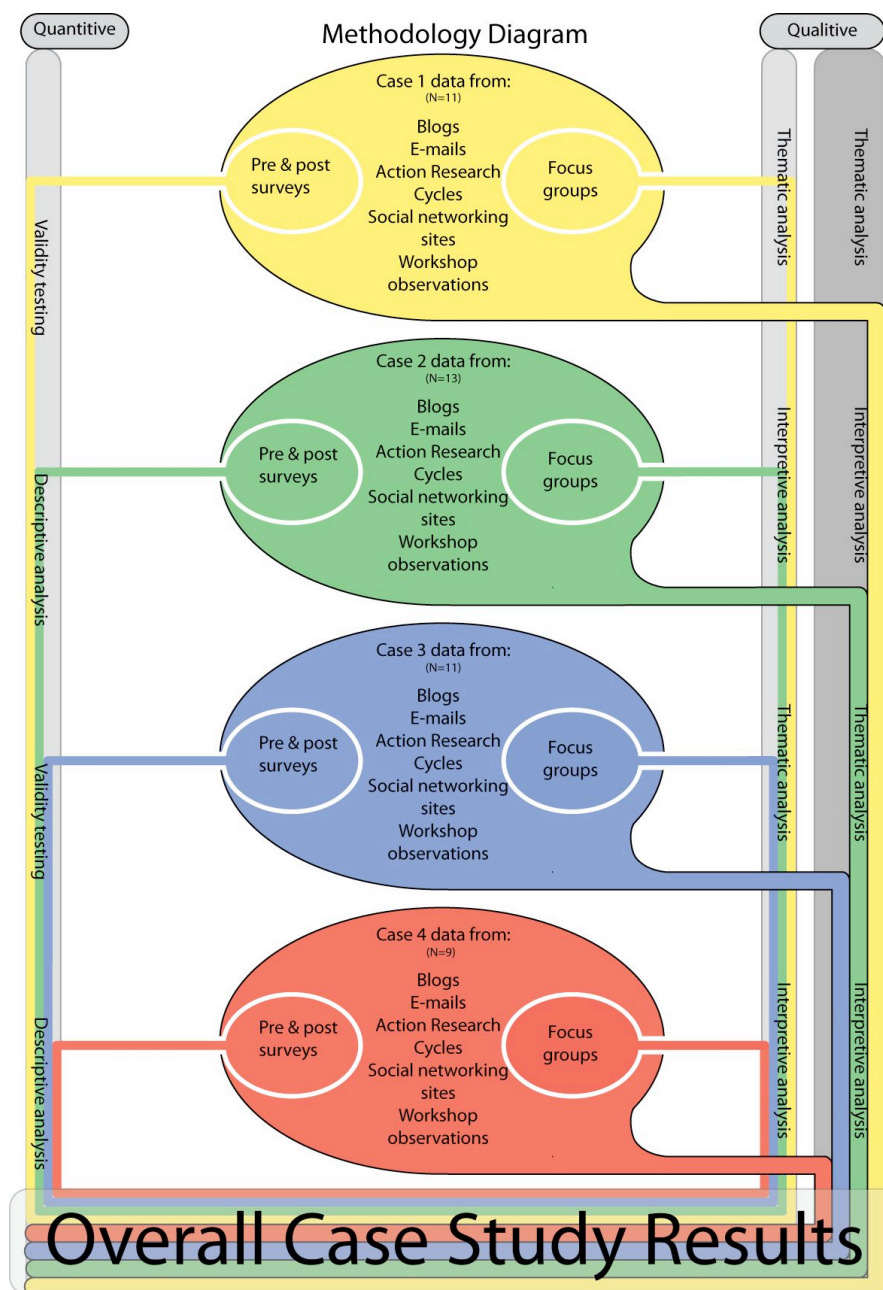
Figure 1: Methodology diagram

devised for the project to capture their action research cycles. Individual goals were set, plans were made, then action was taken within the workshops or between them, and progress evaluated. Subsequent steps were then planned and the cycle began again.

At the end of each workshop session, participants were encouraged to update and continue their reflective journals, their action research spirals and maintain their interaction with other participants via group email their blogs and other social networking sites. The facilitators recorded their observations of the interactions and progress of the participants which contributed to the qualitative data collected for thematic analysis. Participants were asked to fill in a post-survey at the final workshop session.

Focus groups

After the conclusion of the workshop phase, focus groups were held in each of the institutions. Attendees were asked through the use of a semi-structured interview process to contribute to five areas: to jointly construct a definition of digital information literacy, and then to describe how participating in the project had helped them to make connections, to create a personal learning environment, if it had assisted with

their original need or problem and whether the skills they had acquired would assist them in life long learning. The sessions were transcribed verbatim for analysis.

Data analysis: Case study construction

Initially each participant's digital information literacy and self-efficacy was scored from responses obtained from the pre and post-surveys using a process based on work by Hegarty et al (2005). As the surveys had used a Likert-like scale, it was possible to obtain percentages of the total possible score for each individual as an indication of their digital information literacy level. Pre and post data could then be compared to reveal any shift that had occurred. Next, qualitative data was collected from participant action research cycles, reflective blogs, emails, workshop observations and contributions to the focus group. This combined qualitative and quantitative material was then annotated using categories developed for digital information literacy: recognition, access, evaluation, management, application and ethical considerations (these were based on the ANZIIL standards), and capability in computer use, confidence, problem solving, motivation, interaction, reflection, technical aptitude, beliefs (Phelps, 2002). Individual participant case summaries were then compiled, and these underwent a content analysis process which examined them for consistent patterns and themes. This enabled institutional case studies to be constructed. These included trends for each group taken from the survey results, and the separately analysed focus group material, and permitted further thematic and interpretive analysis. These last, combined data sets are currently being used to construct an overarching case for describing the findings for the project.

Preliminary findings

Analysis of the data is still proceeding, however some initial findings can be shared which emerged from the analysis of the individual and institutional case studies themselves. The following summary of a case illustrates some of these key findings, while the graph illustrates numerical shifts in digital literacy scores in the four institutions.

Overall, "Bernice" demonstrated an incredible shift in her digital information skills and capability by the end of the project. She entered the project as a cautious information user with a low digital information literacy score, and by the end her pre-survey/post-survey score had increased significantly by 65%. "Bernice" used the project to explore a wide range of Web 2.0 tools and approaches and other technologies with the intention of using them in her workplace. "Bernice" was a reflective and inquiring learner who liked to share her experiences with others in the group. She had gained confidence in using technologies new to her, and left the project with a changed attitude with regard to digital information and confidence in her own ability. "Bernice" demonstrated several dispositions by the end of the project which can be attributed to someone who demonstrates digital information literacy.
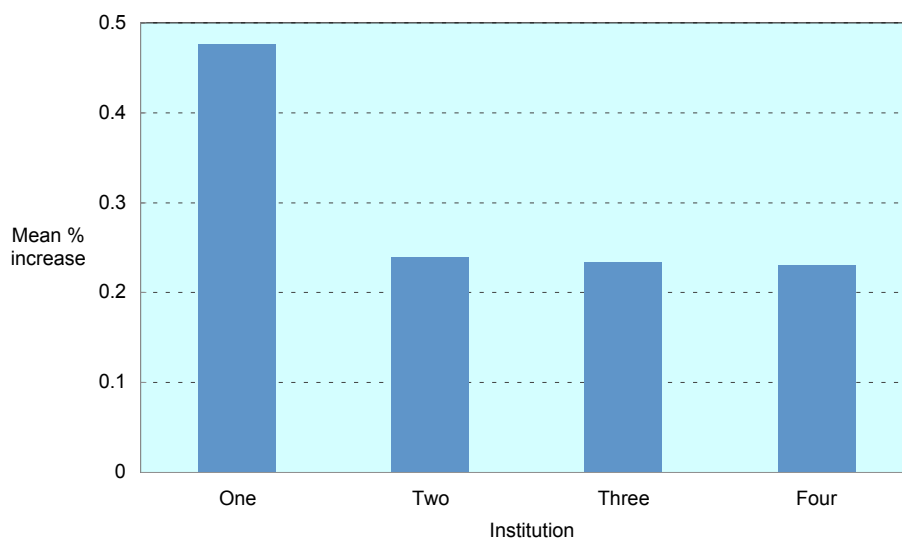

Figure 2: Overall digital information literacy scores: Mean % increase per institution

As well as examining qualitative data for the construction of cases, descriptive data were compared to investigate changes in overall confidence and digital information literacy scores. Across the four institutions (groups), a comparison of the responses to the pre-surveys and post-surveys demonstrated

there were significant changes reported by participants in their personal overall confidence using computer-based and Internet-based communication and information tools. The increases ranged from 20%, 57%, 70% and 78% across the four groups. Figure 2 illustrates increases in DIL scores across the four institutions.

Markedly, when increases in mean digital information literacy (DIL) scores were compared, one institution in particular had a 50% mean increase in DIL scores for that group. The reasons for this are still being examined. Additionally, the majority of individual participants had an increased total DIL score at the end of the project, that is, 95% gained a higher level of digital information literacy by participating in the project. This finding is significant.

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