



## Teaching IT professional practice with virtual teams

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The ability to communicate effectively as part of a virtual team working in the online environment is a valuable skill to have in the modern e-workplace. Such skills can be difficult to develop in undergraduate students. This paper reports on a professional practice unit situated in a web 2.0 environment that aims to develop students' teamwork skills. The paper also reports on research that sought to gain understanding of the student experience of interacting online in virtual teams. The results showed that students value the virtual teamwork experience, finding it useful and relevant for their future careers. The student perceptions of various aspects of virtual teamwork have improved with each subsequent offering of the unit.

Keywords: Virtual teams, problem-based learning, authentic learning environment.

### Introduction

Virtual teams are comprised of people who have a common purpose that requires them to collaborate, share information, communicate and work in an online environment. Virtual team members are generally not co-located and they may be separated by large distances and live in different countries around the world (Edwards & Wilson, 2004; Goold, Augar & Farmer, 2006). Increasingly employers use virtual teams to leverage business knowledge that can solve day-to-day business problems and create new business opportunities (Bongio, van Bruggen, Ceri, Cristea, Dolog, Hoffmann, Matera, Mura, Taddeo, Zhou & Zoni, 2006; Borowicz, 2006; Goold et al., 2006; Massey, Hung, Montoya-Weiss & Ramesh, 2001; Powell, Piccoli & Ives, 2004). Consequently, graduates, and particularly those entering the IT sector, are required to have virtual teamwork skills such as communication, negotiation and collaboration skills (Brodie & Gibbins, 2007; Lynch, 2004). These types of skills are best taught by immersing students in a learning environment where these skills can be practised. Ideal settings for developing professional skills may be an online environment using asynchronous communication tools (McLoughlin & Luca, 2002).

This paper reports on the experiences of students working in virtual teams in a final year, wholly online IT professional practice unit. This paper provides background about the unit and describes the authentic learning environment and activities and presents some of the results of student surveys undertaken in 2006 and 2007.

### Background

Deakin University has mandated that every undergraduate student experience at least one wholly online unit as part of their studies. This is part of the University's commitment to preparing students for lifelong learning where students develop their skills in communicating and collaborating while studying the curriculum. Students generally access online units through the University's learning management system (LMS), *Blackboard*. The nominated wholly online unit for the Bachelor of Information Technology is a professional practice unit, IT Practice. This unit is undertaken by all students in their third year and attempts to prepare them for the workplace. The learning objectives of the unit are that students will have knowledge of technical practices within the IT industry and an understanding of the ethical behaviors and social responsibilities required of IT professionals. They will have practiced skills acquired over their previous studies and will have extended their critical thinking, time management and communication skills.

The unit was introduced in 2006. The unit has a problem-based learning approach where students work in groups and have large open-ended problems to solve. In any professional practice unit it is important to create a realistic learning environment and immerse students into an actual case (Jewels & Bruce, 2003) with “authentic practices relevant to the students’ future pragmatic goals” (Hung, 2002, p. 411). The IT professional practice unit has a realistic learning environment and learning is driven by the authentic tasks and activities. These activities are in line with the 10 key characteristics described by Herrington, Oliver and Reeves (2003).

All teaching and learning activities for IT Practice take place in the online learning environment which consists of two parts: the University LMS, known as Deakin Studies Online (DSO), and a website. The unit presence in the LMS is typical of most unit sites. It has learning resources such as readings, links to websites and activities. In this learning environment students are *learners* and they acquire knowledge and complete group activities in discussion forums, supported by a tutor acting as a group mentor.

The website, on the other hand, is hosted outside of the LMS and has been created as a separate entity to provide students with a realistic organisational context in which to solve tasks. It is made available to students through URL links in various areas in the LMS. The website has information about a fictitious telecommunications organisation, United Enterprises (UE), including a public area and an intranet. In UE students work as *employees* of UE in an IT team, completing an IT or business related task. The UE team forums are discussion spaces where employees work in teams of about eight and negotiate and collaborate about the tasks that they are required to do. The team forums also provide points of contact for senior UE staff (role played by teaching staff) who provide help on project tasks.

The unit has five modules and each module is completely self contained and independent of other modules and is worth 20% of the unit assessment. There is an underlying scenario throughout the semester that links the five modules. In the second module of IT Practice, IT Teams, students were asked to select suitable UE staff members from a number of staff with profiles listed in the UE intranet. The team report consisted of staff selection and suitability, and also recommendations about how to work with virtual team members with culturally diverse backgrounds. The aim of the module was for students to gain an understanding of the customary mode of work within the IT sector; to gain an understanding of the issues related to virtual teams; and to work within a team to gain experiences of team dynamics.

## **Student evaluation of teamwork**

In both 2006 and 2007 students completing IT Practice were asked to complete a voluntary, anonymous online survey questionnaire. The overall aim of the survey was to ascertain student levels of satisfaction with the unit relating to content, resources, teaching and delivery. It aimed to investigate whether the pedagogical approach was achieving its aims and whether students thought the new environment was representative of the workplace. The questionnaire was posted in the LMS towards the end of semester. The questionnaire sought responses to questions about the unit itself, the group (team) work aspects and the learning environment. Most questions required the respondent to select from a five-point *Likert* scale indicating the level of agreement with the statement. Feedback was also sought through several short-answer questions. There were six questions that specifically related to the teamwork aspects of the unit and are reported here. Questions relating to other aspects of the unit, including the other modules are not reported here.

## **Results and discussion**

In 2006 with an enrolment of 141, 46 completed the survey. In 2007 with an enrolment of 179, 40 completed the survey. The demographics of the respondents was generally representative of the of the unit cohort. The majority of respondents were male (80% for both 2006 and 2007); a sizable proportion were international students (37% in 2006 and 55% in 2007); the majority of students had not worked in an online group before (65% in 2006 and 70% in 2007) and even fewer students had studied a wholly online unit previously (17% in 2006 and 13% in 2007).

The questions about groups and group/teamwork are listed in Table 1, together with the mean values of the responses and the standard deviations. For all of the questions there was a consistency of responses and a general improvement from 2006 to 2007. For example, “I like working in an online group” improved from 2006 to 2007 while conversely responses to “I prefer working alone” decreased from 2006 to 2007.

**Table 1: Responses to questions about teams in 2006 and 2007**

Question	2006		2007	
	Mean	SD	Mean	SD
The usefulness of the IT Teams module	3.65	0.86	3.68	1.10
The relevance of the IT Teams module	3.72	0.81	3.83	0.96
Like working in online group	2.76	1.34	3.45	1.28
Prefer UE group to DSO	2.7	1.09	2.98	1.00
Online group help me to understand	3.13	1.19	3.4	1.17
I did more work than my other team members	3.5	0.94	3.43	0.78
Prefer to work alone	3.02	1.13	2.48	1.01

In 2006 the mean for “How useful was the IT Teams module for you?” was 3.65 and in 2007 this increased slightly to 3.68, indicating that both student cohorts thought the module was useful. In 2006 the mean for “How relevant do you think the IT Teams module was to what happens in the IT sector?” was 3.72 and in 2007 this increased slightly to 3.83, indicating that in both student cohorts thought that the module was relevant to what takes place in the IT workplace.

Students were asked whether they preferred working in their group in UE to working in their group in DSO. The mean of 2.7 in 2006 suggests that students actually preferred working in DSO, however this was not surprising as DSO, the University LMS, was much more familiar to them. The mean of 2.98 in 2007 suggests that in that year students did not really have a preference either way. An investigation into the spread of responses indicated a small increase in the acceptance of the UE forums over DSO.

To the question “How much did working in an online group help you to understand the unit material?” students responded slightly positively in 2006 (mean = 3.13) with an improvement in 2007 (mean = 3.4). Responses to the statement “I prefer working alone than in an online group” were effectively neutral in 2006 (mean = 3.02) but were negative in 2007 (mean = 2.48), indicating that students preferred to work together in groups.

Students were asked to respond to the statement “The amount of work I have done compared to others is ...”. Overall the responses were positive with means of 3.5 and 3.43 respectively for 2006 and 2007. An investigation into the spread of responses showed that most students gave a neutral response to this question with no students indicating they had done a lot less work and only a few indicating that they had done a little less. This finding is supported by a similar finding in an earlier prototype version of the unit where the average for the same question was 3.63 (Goold et al., 2006). It is expected that this downward trend may continue as the experience of group work for students is improved.

## Conclusions

While the results of this snapshot study of aspects of teamwork in the first two years of a new unit are not conclusive, they are nevertheless encouraging. On the whole IT students see the importance of team work skills and the importance of acquiring them. Responses by both the 2006 and 2007 cohorts about the IT Teams module indicated that this module was both relevant and useful. The increase in general satisfaction with online group work from 2006 to 2007 may be due to a number of factors including the introduction of more resources to support group work and emphasis by teaching staff on supporting students in understanding the new learning environment. This type of support “in the early weeks of immersion in a student-centred learning environment is crucial” (Herrington et al., 2003, p. 70). Another reason why satisfaction with online group work increased may be simply due to the fact that different types of web 2.0 software were used. In 2006, the website was created in Drupal while in 2007 the site was migrated across to Joomla! platform integrated with Simple Machines Forum (SMF) to support the team forums (Goold & Augar, 2008). The fact that different cohorts of students were involved may have contributed too.

Our efforts in improving this module are ongoing. In 2006 and 2007 the module used asynchronous web 2.0 discussion forums for team communication and collaboration. In 2008 however, a synchronous communication tool eLive (Elluminate Live!™) was introduced and students were asked to conduct an online meeting and make decisions about appropriate staff selection as before. Early feedback from the 2008 cohort suggests that this technology is a suitable addition to the suite of technologies used in the module and encourages group collaboration. It is expected that these changes will further improve the relevance and usefulness of the module.

Research focusing on student perceptions of the authentic learning environment, the problem-based learning approach and virtual teamwork process is continuing throughout 2008. The aim of the 2008 iteration of the study is to further improve the student experience in response to the feedback presented in this paper. This will be done through the adoption of strategies and technologies that suit the learning needs of the students whilst supporting and enhancing the underlying pedagogy of the unit.

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