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Student attitudes towards and use of ICT in course study, work and social activity: a Technology Acceptance model approach.

Rob Edmunds, Mary Thorpe and Grainne Conole

Abstract
The increasing use of information and communication technology (ICT) in higher education has been explored largely in relation to student experience of coursework and university life. Students' lives and experience beyond the university have been largely unexplored. Research into student experience of ICT used a validated model - The Technology Acceptance Model (TAM) - to explore the influence of work and social/leisure contexts as well as course study, on attitudes towards and take up of technology. The results suggest that usefulness and ease of use are key dimensions of students' attitudes towards technology in all three contexts but that ICT is perceived most positively in the context of work and technology use at work is an important driver for technology use in other areas.

Introduction

Educational leaders and governments have for more than a decade promoted the desirability of increased use of ICT in students' experience of study at university. This was one of the emphases in the 1997 Dearing Report in the UK, which recommended that 'all higher education institutions in the UK should have in place overarching communications and information strategies by 1999/2000' (Dearing, 1997, p23).With the growth of the Web since then, and particularly the development of highly efficient search engines and social networking tools, entrants to university have increased their personal use of ICT, year on year (Caruso & Kvavik, 2005, Kennedy, Judd, Churchward, Gray and Krause, 2009). The impact of ICT on study and learning practices has generated research seeking to identify both the extent of ICT usage and the effects this is having on student experience at university more broadly (Conole, De Laat, Dillon and Darby, 2006).

The Joint Information Systems Committee (JISC, UK Higher Education Funding Council) has funded two phases of enquiry into a holistic view of learners' experience of ICT, focusing on the social as well as study aspects of this experience. One of the studies funded by the JISC phase 2 Learner Experience Programme (2006 to 2009), broadened this approach and focused on the work as well as study and leisure contexts of students. The project studied students on six work-related Open University courses where the practices learned are relevant to specific employment contexts. Almost all students were in employment as well as studying part-time. While all the courses require students to use technology, a key aim of the research was to explore the possible effects of a students' current work context on their attitudes towards and take up of ICT. A survey developed to explore this as part of the research, provides the focus for this paper.

A review of the literature identified a body of work on the Technology Acceptance Model, which has identified ease of use and perceived usefulness as key factors in take-up of technologies within the work place. The present survey adapted the TAM questionnaire in order to explore technology acceptance through a comparison of work, study and leisure contexts.

The Technology Acceptance Model

One of the most well known models investigating resistance to new technologies in the workplace was developed by Davis (1989) in the Technology Acceptance Model (TAM). In its simplest 1989 form, Davis devised a scale that produced measures on two factors, ease of use and perceived usefulness. Scores on these two sub-scales have been shown to correlate with the use/acceptance of technology, particularly in information systems (Davis, 1989).

The TAM takes forward the idea that an individual's actions can be predicted from a number of known variables, which constitute two factors: perceived ease of use and perceived usefulness. Perceived ease of use is defined by Davis (1989) to be the degree to which an individual believes that a particular system would be free of effort, while perceived usefulness is the degree to which an individual believes that a particular system will enhance job performance. Both these two constructs achieved a reliability measure of Cronbach's Alpha (Cronbach, 1951) greater than 0.90 in two successive studies (Davis, 1989), suggesting high internal reliability within each scale. Correlations between the subscales and actual system use in figure 1, suggest a

causal pattern where perceived ease of use predicts perceived usefulness, which in turn predicts use. Additionally, usefulness is more strongly linked to Usage than Ease of Use is linked to Usage. This suggests users will put up with some difficulty in use, if the system provides some critical function.

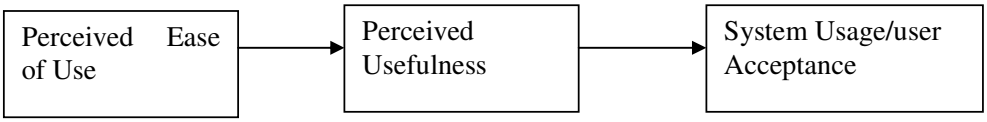

Figure 1. Model suggesting causal direction of influence on technology acceptance (Davis, 1989)

Both subscales also correlated significantly with reported indicators of technology use for those systems under investigation. This specification of the link between self-report and usage is encouraging and the TAM is a good instrument to understand how people come to accept technology and continue in its use. The widespread use of the TAM also suggests it is applicable to many areas of use, such as education and social applications of technology. However, the interaction between technology and its acceptance for use is multi-faceted and so the TAM with just its two constructs of ease of use and usefulness may not capture all the components necessary to predict user acceptance.

Investigating learning with the TAM

Roca and Gagne (2008) investigated the use of e-learning using an integration of TAM and self-determination theory (SDT). SDT focuses on the three motivational needs of autonomy, competence and relatedness. Autonomy concerns the individual feeling in control of their own actions, competence is effectiveness of the individual in the environment and relatedness is the need to feel connected to others, such as teammates or teachers (Deci & Ryan, 1985). SDT therefore reflects perceptions that arise from the individual's interactions with the environment in which technology is used. To the combination of TAM and SDT was also added the construct of playfulness, which is about enjoyment in using the system.

Their combined TAM/SDT model suggests that perceived autonomy, perceived competence and perceived relatedness exert a direct effect on perceived usefulness and perceived playfulness, which jointly with perceived ease of use are the most important influences upon e-learning regarding continuance of intention and use. While this theory uses yet another motivational model it highlights the utility of the TAM when applied to a learning situation along with other relevant mediating variables. While the complexity of the SDT approach meant that it was impractical to use in the context of this study, questions were added to the TAM in order to incorporate a measure of student motivation and sense of competence in relation to the context of ICT use.

There have been a number of revisions to the TAM (see Venkatesh & Davis, 2000; Venkatesh, Davis & Morris, 2007) and also a number of alternative models of user acceptance of technology such as the motivational model (Vallerand, 1997) the theory of planned behaviour (Ajzen, 1991) and innovation diffusion theory (Rogers, 1995) to

name three. There have also been attempts to combine a number of theories into a single useful model (see Venkatesh, Morris, Davis and Davis, 2003). However, the simplicity of the original TAM (Davis, 1969) is still appealing. This is supported by its use as part of wider scales in a number of domains (see Bruner, 2005 (consumer research), Lee, 2008 (on-line learning), Padilla-Mele´ndez et al., 2008, (e-collaboration), Yi, Jackson, Park and Probst, 2006, (PDAs)). The TAM is well validated and can form the basis of a short questionnaire with face validity for the person asked to fill it out. Importantly it has been subjected to factor analysis techniques and results in two understandable subscales that can be used to measure acceptance without trying to determine the meaning of responses to a large number of separate questions. As can be seen from the literature reviewed, the core concepts of ease of use and functionality prove to be a successful basis for a number of revised models. This suggests these two factors are particularly valid in an understanding of technology use. It should be noted however, that the TAM has not been widely used to investigate the use of technology for social and leisure use (though use of the internet has been studied, for example Fenech, 1998), and the research reported here will investigate the model's applicability to this domain.

Encouraged by this research, we incorporated questions from the TAM into the survey of a sample of students studying six work-related courses, and in addition, added questions to investigate motivational reasons for use. Motivational factors seem to be valid additions to the TAM in the research outlined. The importance of motivational factors has also been highlighted by Jones and Issroff (2007), who suggest motivational factors such as Control (over goals), Ownership, Fun, Continuity between contexts and Communication are worth investigating in the use of mobile devices. We have adapted items from these factors and tailored them to be relevant for the three areas of course study, work and leisure.

The focus of this survey strand of the research was to investigate students' perceptions of ICT and how this impacts within and across the domains of study, work and leisure

Method

Students and courses

The survey was administered to 73% of students studying the six courses listed below (no student can be asked to take part in more than two research projects in a given year,and hence are excluded if they have already been sampled in other surveys). These were all Open University courses and the students were all resident in the UK. 421 students responded out of the 1209 surveyed, giving a response rate of 34.8%. Of those that answered the question, 239 indicated female, 181 indicated male, age ranged between 19 and 59 with a mean of 37.62 and a standard deviation of 8.97. Online surveys have widely varying response rates, but of 161 surveys at the OU in 2009, 17% had a response rate of 50% or higher, while the majority were well below this and some below 20%.

Technology (Tech) *Cisco Networking*

Provides knowledge and skills needed to configure a LAN/WAN using Cisco equipment. Students can go on to gain the industry-recognised certification through the CCNA examination. Students study the CCNA program using an online curriculum provided by Cisco, and most study is online.

There are 4 compulsory day schools focusing on skills development and team working, with preparation using simulation tools, 4 formative online assessments, 3 tutor-marked assignments and an examination.
(CISCO on-line Academy, providing interactive course materials, labs and quizzes and summative online assessment, offline simulation also provided in the 'packet tracer' tool)

Computing (Comp) *Software Requirements for Business Systems*
Masters level course focusing on requirements engineering. Students use a computer for a major proportion of the study time, downloading articles, software and assignments from the course website. There are three assignments and an examination. Students are also provided with a software requirements tool for use in recording requirements. Students are also invited to use the Moodle Personal Journal tool
(Moodle wiki, requirements recording tool, on-line resources, online tutor-group forums)

Engineering (MEng) *Team Engineering*
Requires students to work in small teams on addressing an engineering problem in depth. There is a compulsory residential weekend at the beginning and end of the course and students work collaboratively with their team and their tutor, using FlashMeeting, conferencing and individual and team blogs. Students identify the resources they require using the Internet and eLibrary, and course materials focus on group working, project management and the project brief.
(FlashMeeting video conferencing, Moodle wiki, online tutor-group forums)

Social Work (SocW 1) *Foundations for Social Work Practice*
Compulsory level 1 component of the Degree in Social Work. Students must be sponsored by their employing agency. Assessment is via 5 tutor-marked, 3 computer-marked and an end of course assessment. There are 8 tutor-led compulsory workshops and practice is verified. ICT skills delivered online, based on the European Computer Driving Licence (ECDL).
(On-line resources, Online ICT activities, CD-ROMS, online tutor-group forums,)

Social Work (SocW 2) *Applied Social Work Practice*
Students must be sponsored by their employing agency and working in a practice context, and have passed all level 1 courses. Students undertake a practice learning opportunity of 100 days as part of the course, supervised by a practice assessor. Required to build ICT skills using ECDL requirements. Tutors run a series of 8 tutorials that are obligatory. Students also complete interactive computer marked assignments, which use audio and animation.
(On-line resources, online ICT activities, CD-ROMS, online tutor-group forums,)

Business Studies (Biz) *Business organisations and their environments*
The course is designed to develop personal and professional practice in business. It's practically based and grounded in the student's own experience of business organisations, whether as an employee, customer or stakeholder. Students learn by sharing experience, analysing it in new ways, and widening the experience they already have. Assessment is through six eTMA's and a final examination, there are no compulsory day/residential schools.
(Moodle ePortfolio, Moodle wiki, on-line resources, online tutor-group forums,)

Questionnaire design and method of data analysis
The questionnaire asks students the same set of questions with sections covering usefulness, ease of use and motivation in using ICT, first in relation to course study (Part A), then to work (Part B) and then in relation to social/leisure activities (Part C). This resulted in 19 questions for part A, and 20 for each of part B and part C, where an additional question was added to ask if ICT was a useful 'tool'. The wording of questions was identical except where adjustments were required to suit the context. This enables us to compare the impact of each of these contexts on perceptions and use of technology and to reflect on the relationships between them. Finally, we have not targeted one technology, rather we have asked about ICT overall. ICT was used as the generic term to cover all types of information and communication technologies. The term ICT is regularly used by the Open University in its communication with students, but it was also defined within the questionnaire. For each question students responded on a scale of 1-5, ranging from agree strongly to disagree strongly (this follows the format used by Davis, 1989). Items from the questionnaire are shown in tables 1 and 2

The responses to the survey were subjected to Factor analysis to identify the constructs underlying each scale for course, work and social use of ICT. The number

of factors to extract was determined by parallel analysis of 1,000 random correlation matrices using the program written by O'Connor (2000). Principle axis analysis was used to extract the relevant number of factors, and these were submitted to oblique rotation using a quartimin procedure to achieve simple structure. Loadings greater than 0.30 in size were regarded as important for interpreting the factors. The items yielding salient loadings of this magnitude on each factor were taken to define a subscale, and each student was assigned scores on each subscale by calculating the mean of their responses to its constituent items. The reliability of each subscale was estimated using Cronbach's (1951) coefficient alpha.

In addition to the TAM, students were also asked questions about their use of on-line learning and communication tools, software and hardware, each scored on a three-point scale for 'don't use', 'use occasionally' and 'use frequently'. This was intended to give us some idea of overall ICT use in each domain of interest and also allow some validation of the TAM score by allowing a comparison between perceived usefulness and actual technology use.

Data analysis and results

ICT and Study

The first scale analysed investigates the students' use of ICT in relation to course study activities. Following parallel analysis it was determined that two factors should be extracted. Table 1 shows the factor loadings on each of these. Loadings greater than 0.30 are shown in bold. A cut-off of 0.30 was chosen as a salient factor loading instead of 0.4 or 0.5 in order to fully explore the items that had an association with the factors, even at a relatively weak level. To develop the scales further for the purposes covered here, a 0.5 cut-off would be advisable. Overall, though, the factor analysis indicates good construct reliability.

(place table 1 about here)

As can be seen from the table, the questions load onto two factors in a way that still suggests usefulness and ease of use. The motivational items we added load onto the usefulness factor. It seems then that the students interpreted the motivation items as the usefulness of ICT. Motivation to use ICT in this domain may reflect the technology's inherent usefulness. The mean scores for each of these two subscales, usefulness and ease of use, were calculated; each sub-scale was found to yield values of coefficient alpha of 0.934.and 0.920 respectively, both of which would be regarded as satisfactory accepting conventional criteria and suggests good internal reliability for the scales.

(place Figure 1 about here)

The students' perceived Usefulness and Ease of Use for ICT are illustrated in Figure 1 for each course surveyed. The two sub-scales were subjected to ANOVA with course as the between subjects independent variable. For this analysis 377 participants responded to all the items in both scales. This revealed a significant effect of Course

for Usefulness $F(5,371) = 3.89$, $p < 0.01$ and Ease of Use $F(5,371) = 13.72$, $p < 0.01$. Post hoc tests (Tukey HSD) found that for Usefulness the Tech Course scored significantly higher than SocW 2 ($p<0.01$). For Ease of Use Tech students responded significantly higher than both SocW 1 and SocW 2 students ($p<0.01$ in both cases). Also responses for the Biz Course were significantly different to both SocW 1 and SocW 2 ($p< 0.01$ in both cases). This suggests that students on SocW 2 generally find ICT less useful in their studies than those on the Tech course. Additionally, students on both SocW 1 and SocW 2 find ICT less easy to use for their studies than students on either Tech or Biz. Course related differences such as these are a valuable feature of the survey results in that they signal areas where more support for students is likely to be required. The significant difference among students taking different courses is evidence of discriminative validity for the scales.
It is encouraging that the Technology Acceptance Model as adapted to a study setting still captures factors for usefulness and ease of use. The motivational items added did not form a third factor but helped to define the Usefulness dimension of the original scale, and reliability (see the alpha coefficient values listed above) is also comparable to the original use by Davis (1989).

ICT and Work

A similar analysis was carried out for part B of the questionnaire. Parallel analysis to determine the number of factors to extract this time suggests three factors are important within the data. Table 2 displays the factor loadings for each of the extracted factors.
(Table 2 to go about here)

While some of the motivational items still load on the Usefulness factor, five of these motivational questions now load on the third extracted factor. These five items concern control, personalisation, choosing location and enjoyment in the use of ICT and so seem to reflect both motivation and perceptions of the ICT environment or context rather than strictly usefulness or ease of use in the workplace. The mean scores for each of these three subscales, Usefulness, Ease of Use and Motivation, were calculated; each sub-scale was found to yield values of coefficient alpha of 0.909, 0.905 and 0.845 respectively, which would be regarded as satisfactory accepting conventional criteria.

(Place Figure 2 about here)

The students' perceived Usefulness, Ease of Use and Motivation for ICT are illustrated in Figure 2 for each course sample surveyed. The three sub-scales were subjected to ANOVA with Course as the between subjects independent variable. For this analysis 331 participants responded to all the items in the three scales This revealed a significant effect of Course for Usefulness $F(5,325) = 5.88$, $p <0.01$ and Ease of Use $F(5,325) = 7.14$, $p < 0.01$, but no significant effect for Motivation. Post hoc tests (Tukey HSD) found that for Usefulness of ICT in a work setting, Tech students scored significantly higher ($p = 0.034$) than SocW 2. Comp students were significantly higher ($p<0.01$ in both cases) than both SocW 1 and SocW 2, and Biz students also scored significantly higher ($p<0.01$) than SocW 2.

For Ease of Use of ICT at work, Tech students responded significantly higher ($p = 0.01$) than SocW 1, Comp students responded significantly higher than both SocW 1 and SocW 2 students ($p = 0.01$ & 0.034 respectively) and Biz students were also significantly higher in their scoring than both 'SocW' courses ($p<0.01$ in both cases). The level of motivation did not differ significantly across courses.

Overall, students perceive technology in their work context very positively in relation to both usefulness and ease of use. The third factor identifies other positive features of ICT experience in a work context, in relation to increased sense of control of work activities, increased personalisation and enjoyment.

ICT and Leisure and Social Activities

A similar analysis was carried out for part C of the questionnaire, which asked students to consider their use of ICT for leisure and social activities. The two factors of Usefulness and Ease of use again emerged (Coefficient alpha of 0.948 and 0.933 respectively). However, further analysis of these two factors across courses found no significant difference in average scores. Overall, this suggests that students on the different courses surveyed, perceived ICT during leisure or social activities as both useful and easy to use at similar levels.

Comparison across the three areas of use; Course, Work and Social

As can be seen from the previous analyses, the level of reported Usefulness and Ease of Use for ICT differs in the different domains of Course, Work and Social settings. This is illustrated in Figures 3 and 4 below. Repeated measures ANOVA found Usefulness to differ significantly across areas of ICT use (Course, Work and Social settings); 270 participants responded to all the questions across these three areas. $F(2,538) = 116.74$, $p < 0.01$. Pairwise comparisons (Bonferroni test) revealed that the students surveyed scored Usefulness at Work as significantly higher than either during their studies or leisure activities ($p<0.01$ for both cases). Perceived Usefulness during course activities was also higher than for social activities ($p<0.01$).

Ease of Use was also found to differ significantly across Course, Work and Social areas of ICT use; 319 participants responded to all the questions across the three areas. $F(2,636) = 17.20$, $p < 0.01$. Pairwise comparisons (Bonferroni test) found that the students surveyed scored Ease of Use at Work as significantly higher than either during their studies or social/leisure activities ($p<0.01$ & $p = 0.012$ respectively). Perceived Ease of Use during social activities was also higher than for Course activities ($p = 0.013$).

Overall, the students surveyed here perceive ICT as both more useful and easier to use during work related activities, compared to study and social use. Elements of enhanced control and a sense of personal ownership are also identified in the work setting. It is possible that this reflects a higher degree of consistent functionality in the programs used at work, such as Microsoft Word and Excel. There may also be more peer support at work thus increasing the sense of ease of use.

Influence of perceived Usefulness on actual technology use.

In the original model (Davis, 1989), while ease of use is correlated with usefulness, it is usefulness that seems to most strongly predict actual use of a technology. It was also relevant to our study to see whether the levels of usefulness indicated by the students surveyed, do predict their overall use of ICT across the three areas of course study, work and leisure activities. We asked students how often they use a long list of contemporary technologies. The sum of the number of technologies they use that captures the frequency of use may provide a reasonable index of their ICT use in general. This can then be compared with their score on ICT usefulness to determine if this dimension does predict overall ICT use.

Students were asked questions concerning on-line learning and communication tools, software and hardware, each scored on a three-point scale for 'don't use', 'use occasionally' and 'use frequently'. However exploratory factor analysis found that all the questions load onto a single factor of 'ICT use'. This one factor explains over 75% of the variance in the data, suggesting this one factor captures students' use of ICT to a very high level. Subsequently, one measure of ICT use was computed from these questions providing a mean score of ICT use for each student. Linear Regression was then used to determine if perceived usefulness of ICT at course, work or social activities predicts the level of ICT use.

In a separate regression analysis for both 'Usefulness for Course' and 'Usefulness for Social/Leisure' activities, both these variables significantly predict ICT use as measured here. However as can be seen from the pattern of correlations in tables 3a and 3b this is because they are confounded with Usefulness at work. Multiple regression with all three areas of Usefulness (Course, Work & Social) in the model finds that the only significant predictor of ICT use is Usefulness at Work (Beta = 0.315, $t = 4.17$, $p<0.01$), suggesting that neither measured usefulness for their course or their leisure activities add anything to the model, beyond what is already explained by the level of perceived usefulness at work.
(Place table 3a and table 3b about here)

Discussion

It should be noted that there are well known limitations to the factor analysis approach, both concerning the type of analysis used and the way the results are interpreted (for example see Ford, MacCallum & Tait, 1986). However, many of these issues are less problematical since the well validated TAM has been employed. The application of the TAM factors of 'ease of use' and 'usefulness' have proved useful measures for the study of students' attitudes towards and take up of ICT. The factor structure replicated for student responses about ICT in the context of course study, work and leisure use of ICT. However, students perceive ICT as both more useful and easier to use in the work context, by comparison with course study and leisure activity. This study points towards the relevance of the work context in particular as influencing both attitudes towards and take up of ICT more generally.

We also investigated whether the level of perceived usefulness (scored from the TAM items) could predict students' use of technology overall. In other words, if students scored ICT as useful in the three areas (Course, Work & Social) would this mean they used more technologies more frequently? The results suggest that the higher students

scored ICT at work the higher the index of actual technology usage. The strongest driver of technology use is perceived usefulness at work.

When collapsed across courses the responses suggest that Usefulness and Ease of Use is highest in a work setting. It is possible that the perceived usefulness of ICT formed at work impacts strongly on how useful they find it for other activities. This may go some way to explaining how usefulness at work reflects the level of use engaged in across all areas.

The relevance of this finding beyond the circumstances of the students sampled in this study can be explored in relation to two areas; the orientation to work of all students, and the factors that play into decision making about effective use of ICT on higher education course work. First, in relation to work orientation, students studying part-time constituted 43% of the sector in 2004/05, with 56% of these classified as mature students (Jamieson, Sabates, Woodley and Feinstein, 2009). Research has also demonstrated that at least half of all undergraduates undertake income-generating activities. A study by the Centre for Higher Education Research and Information of seven universities differing in type, subject spread, vocational/non-vocational and location, showed that just over half of all students undertook paid work during term time, on average of around 12 to 14 hours a week (CHERI, 2005). Many full time students therefore have a current link to a workplace as well as intentions relating to their future employment when they graduate. The survey results demonstrated that ICT in the workplace is experienced as both useful and easy to use and these dimensions were also evident in attitudes towards ICT for course study. The elements incorporated into these dimensions flesh out what it is that students value about ICT. Tables 1 and 2 demonstrate features that are highly rated for both study and work contexts, for example:

- ICT generally increases my performance (at work or for learning)
- ICT allows me to produce more in the time I have (at work or for study)
- Work/learning is made easier by using ICT
- ICT makes me more effective at work/a more effective learner
- I can learn and cover material more quickly through the use of ICT /cover material more quickly through the use of ICT at work)

Students' orientation towards ICT therefore is best viewed in relation not only to their needs for social connection and leisure use of technologies, but in relation to the way in which ICT is used in relevant areas of employment. Students may already have some exposure to these employment areas, but can also be expected to be motivated positively towards technologies that are relevant to their future employment intentions. Furthermore, the survey results reveal the importance of performance and efficiency as perceived benefits of ICT usage and motivators for their use in general.

The second area to which these findings relate is the strategic use of ICT by universities for support of learning. Universities may be increasing ICT for curriculum delivery for a variety of reasons (Selwyn, 2007) but issues of pedagogy are central to the concerns of teaching staff. These findings suggest that at minimum, staff should make explicit links between the ICT they use on course work, and that in use in the workplace. More importantly, the dominant role played by issues of efficiency and effective performance in relation to positive attitudes towards ICT,

should play a strong role in the choice of technology used for study, and in the way in which it is designed into study activities. While incoming generations of students may take technology for granted, the evidence here suggests that attitudes towards usefulness and ease of use will nevertheless play a strong role in willingness to develop new skills and technology usage.

Conclusion

Overall use of the TAM in this context has been successful, indicating the robustness of the model and its value for understanding students' attitudes towards and use of technology across contexts of course study, work and leisure, and the ways in which the work context in particular influences perceptions and usage of technology more generally. Usefulness and Ease of Use are key aspects of students' attitudes towards technology in all areas of their lives, but ICT is perceived most positively in the work context. The work context also appears as an important driver for technology use in the other two areas of use. There are implications for higher education practitioners in terms of decision making about whether and how to require students to use particular technologies for course study. The evidence suggests that of the various factors that influence use of and perceptions about ICT, its perceived functionality plays a dominant role. Practitioners should not assume that students share their view of what is functional or that a technology does deliver its promised functionality in a particular study context. Students also have clear requirements in terms of technology enabling them to produce more in the time that they have, and enabling them to be more effective. Technologies which do not meet these requirements may prove counter productive or simply be ignored.

The importance of the work context as a driver for ICT usage suggests that practitioners should also emphasise the ways in which particular technologies can increase effectiveness in work contexts as well as course study. While the social connectedness of students has been highlighted in the use of Web 2.0 technologies, the research reported here suggests that students' experience of work and their intentions towards particular careers after study, could be used more directly to influence their use of particular technologies and heighten their awareness of the benefits of developing skills that enhance their effectiveness in work contexts. There is certainly scope for further research to investigate how ICT connects across different domains and how its use is influenced by cross-context application. These technologies become ever more integrated in daily lives during work, study and leisure, so understanding user perceptions of ICT should provide improved performance and acceptance of currently developing technologies.

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Table 1 Factor loadings for study use of ICT

Questionnaire Item	Factor	
	1 Useful-ness	2 Ease of use
Learning is made easier by using ICT	**.821**	-.017
I use ICT because it allows me to learn wherever I need to	**.821**	.172
ICT makes me a more effective learner	**.798**	-.035
I can learn and cover material more quickly through the use of ICT	**.796**	-.017
I use ICT because it allows me to have all the information I need for my studies in different locations	**.741**	.094
I use ICT because it makes study activities more personal and my own	**.737**	-.052
ICT generally increases my learning performance	**.724**	-.076
I use ICT because it gives me control over things I want to do in my studies	**.702**	-.137
ICT allows me to produce more in the time I have	**.672**	-.126
I use ICT because it is enjoyable to use while studying	**.640**	-.178
ICT is useful as a learning tool	**.637**	-.129
I use ICT because it allows me to communicate and work with others during the course	**.463**	.043
I use ICT because it is relevant to my studies	**.330**	-.276
I use ICT because it is a requirement of the award	-.112	.045
I find ICT easy to learn to use on my course	-.026	-**.917**
ICT is generally easy to use on my course	.005	-**.865**
I find it easy to become skillful in using ICT on my course	.009	-**.857**
I can control ICT and make it do what I want on my course	.086	-**.718**
I find ICT flexible to interact with on my course	.283	-**.567**

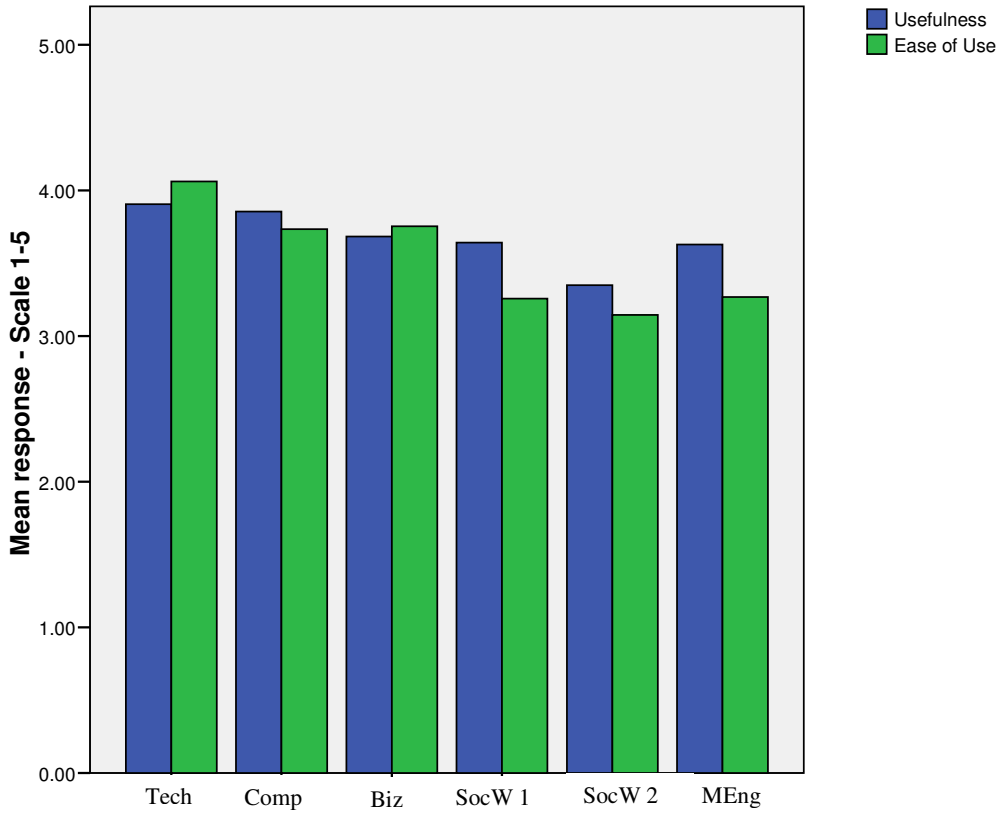

Figure 1 ICT in the course context: Mean response rate for each of the two sub-scales split by the course of study.

Table 2 Factor loadings for work use of ICT

Questionnaire Item	Factor		
	1 Usefulness	2 Ease of Use	3 Motivation
ICT generally increases my performance at work	**.769**	-.057	.106
ICT is useful for learning at work	**.672**	-.072	.200
ICT allows me to produce more in the time I have during work	**.817**	-.083	.065
Work is made easier by using ICT	**.778**	.064	.036
ICT makes me more effective at work	**.822**	.028	.048
I can cover material more quickly through the use of ICT at work	**.678**	.003	.113
ICT is useful as a tool at work	**.785**	.071	-.071
I find ICT easy to learn to use at work	.111	**.811**	-.129

I find it easy to become skilful in using ICT for my work	.147	**.761**	-.076
ICT is generally easy to use at work	.048	**.809**	.044
I can control ICT and make it do what I want at work	-.082	**.733**	**.301**
I find ICT flexible to interact with at work	-.064	**.755**	.181
I use ICT because it gives me control over things I want to do at work	**.301**	.286	**.425**
I use ICT because it makes work activities more personal and my own	.070	.162	**.685**
I use ICT because it allows me to communicate and work with others during work	**.524**	.054	.074
I use ICT because it is enjoyable to use at work	.150	.191	**.513**
I use ICT because it allows me to learn wherever I need to at work	.225	.053	**.618**
I use ICT because it allows me to have all the information I need for my work in different locations	.245	.130	**.385**
I use ICT because it is a requirement of my work	**.389**	.125	-.199
I use ICT because it is relevant to my work	**.474**	.281	-.115

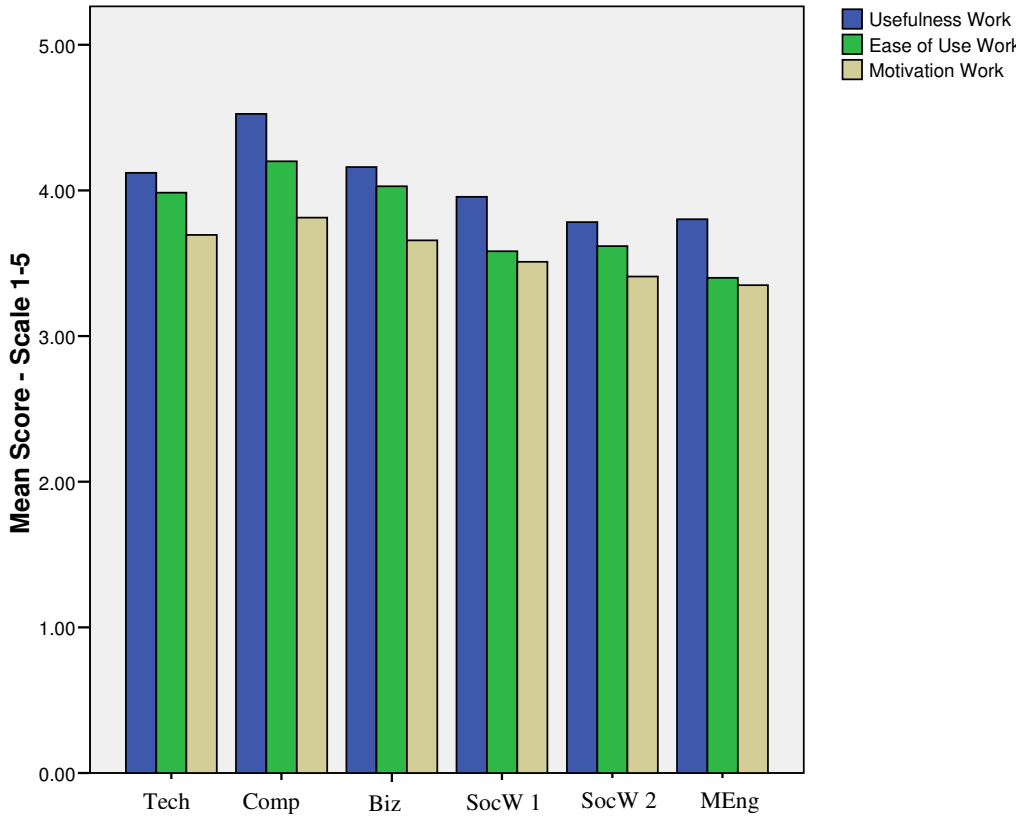

Figure 2 ICT in the work context: Mean response rate for each of the three sub-scales split by the course of study.

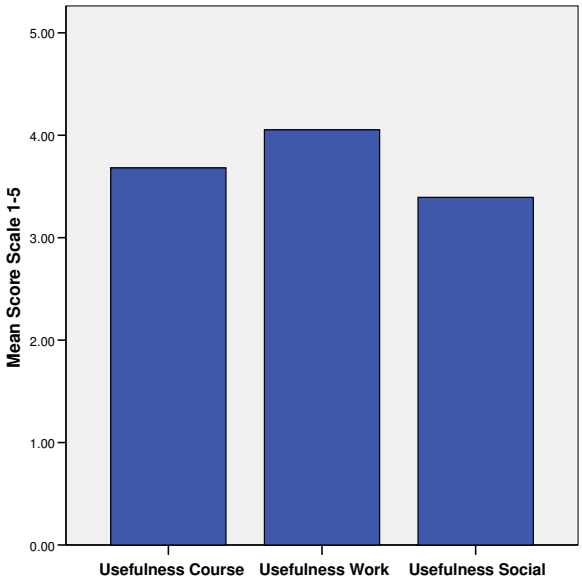

Figure 3 Usefulness by area of use

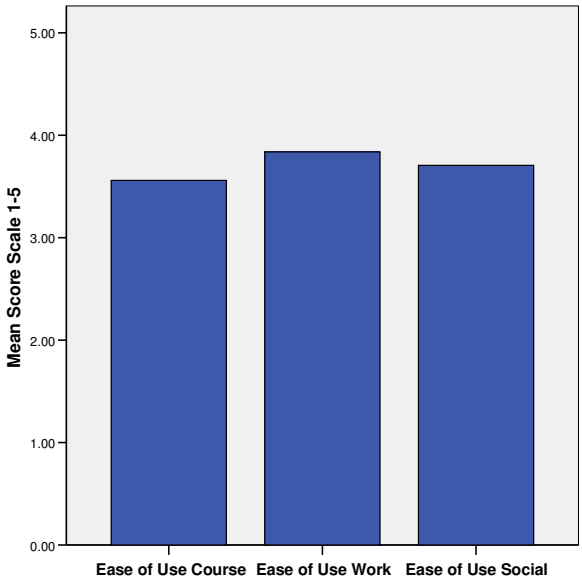

Figure 4 Ease of Use by area of use

Table3a.Correlations between types of technology use and Usefulness in the three areas of Course, Work & Social. Correlation is significant at the <0.01 level marked **, Correlation is significant at the <0.05 level marked *

	UseCourse	UseWork	UseSocial
Online	.239(**)	.403(**)	.267(**)
Learning	.158(**)	.288(**)	.214(**)
Software	.162(**)	.309(**)	.068
Hardware	.177(**)	.340(**)	.156(*)

Table 3bCorrelations between All Technology use and Usefulness in the three areas of Course, Work & Social

	UseCourse	UseWork	UseSocial
AllTech	.210(**)	.384(**)	.207(**)

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