Student experiences and perceptions of digital literacy skills development: engaging learners by design?

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Abstract: In the current digital environment, it is vital for learners to develop digital literacy skills. The UK's Quality Assurance Agency for Higher Education (HE) requires graduates to demonstrate digital literacy. Employers consider these skills essential. With the high cost of HE in the UK, learners themselves also expect university courses to demonstrate relevance to the workplace. Nevertheless, some learners may not fully engage in digital literacy skills development, instead concentrating on the subject-specific content of their modules. The Faculty of Health & Social Care (FH&SC) at the UK's Open University uses different approaches to digital literacy skills development, based on skills resources that are either 'generic' (usable by any FH&SC module) or module-specific. By exploring student experiences of digital literacy skills development, we aim to understand what motivates learners to engage with the skills content of their module. We collected data from online questionnaires and interviews involving learners from three modules and present findings from an analysis of the quantitative questionnaire data, supported by qualitative interview data, where relevant. We look at learner perceptions and engagement in relation to the demographic factors gender, age, previous education, disability and financial status and whether these factors influence individual learner preferences for learning design, such as use of generic resources versus contextualisation of skills activities within the module. We aim to identify good practice in learning design and what demographic factors need to be considered to support individual learners appropriately, and so optimise engagement.

Keywords: digital literacy, skills, information literacy, ICT, learning design, demographic factors

1. Introduction

Digital literacy has been defined in various ways (Bawden, 2008) since the term was first introduced by Gilster (1997). A commonly used definition is the 'confident and critical use of ICT for work, leisure, learning and communication' (European Commission, quoted in JISC InfoNet, 2012). The ability to demonstrate digital literacy skills is a key requirement for graduates, demanded both by the UK Quality Assurance Agency for Higher Education (HE) and by employers. Recent changes to HE funding in the UK mean the personal cost to the learner has risen dramatically. As a result, learners increasingly expect UK university courses to demonstrate relevance to the workplace. But despite all this, some learners may not fully engage in digital literacy skills development, instead concentrating on the subject-specific content of their modules.

Digital literacy skills are particularly important in work-based learning programmes leading to professional qualifications. As learning designers we need to understand how to engage students in learning materials so that they will meet their qualification requirements. This is an important issue in the social work (SW) degree in the Faculty of Health & Social Care (FH&SC) at the UK's Open University (OU). Thorpe and Edmunds (2011) explored learner perceptions of the importance of fit between skills developed for study and for work practices and showed that learners' attitudes towards and take up of ICT may be positively or negatively influenced by the learners' work context and by how central it is perceived to be to their work identity.

However, digital literacy skills are also widely required in other degrees, not just for professional qualifications and 'graduateness' but also for more general use in study, at home and at work. But learners, especially those that are work based, may find it difficult to make connections between the different areas of their lives in relation to digital literacy (e.g. Beetham and Oliver, 2010; Benfield and Sharpe, 2011). Learners may prefer to keep digital skills and tools used at home separate from academic and work contexts (Margaryan, Littlejohn and Vojt, 2011; Gros, Garcia and Escofet, 2012).

Various effects on digital literacy skills of demographic factors such as gender, race, educational background, and socioeconomic status have been demonstrated (e.g. Hargittai, 2010; Gros, Garcia and Escofet, 2012). Since Prensky (2001) introduced the idea of 'digital natives', it has also been argued that age has a significant impact on digital literacy, though there is mounting evidence against a simple difference between 'net' and 'non-net' generations (e.g. Helsper and Eynon, 2010; Bullen, Morgan and Qayyum, 2011; Margaryan, Littlejohn and Vojt, 2011).

We are interested in the pedagogical and resourcing implications of using resources that are more generic, in particular how effective generic contexts may be in enabling wider use of shared activities, as opposed to subject- and context-specific activities, which may be more challenging to share and maintain. As part of the Evaluating Approaches to Developing Digital Literacy Skills (EADDLS) project, we are therefore looking at students' perceptions of digital skills development, what motivates them to engage, the relevance of digital literacy to themselves and their employers, and whether demographic factors influence learner views and motivations.

2. Background and methods

The OU is a distance-learning institution which uses a blended learning model, including technology-enhanced materials. A certain level of digital literacy is necessary simply to study with the OU.

In this study we divide digital literacy into:

- Information literacy (IL), defined as the ability to find and make use of information, including searching for, evaluating and referencing information.
- Information and communication technology (ICT) skills, defined as the skills needed to organise, present or share information using a computer, by means of e.g. word processing, spreadsheets, email and presentation software.

OU students taking its social work degree are mature, employed students, usually sponsored by their employer, though some are self-funded. During some SW modules, described as *practice-learning* modules, sponsored students undertake learning opportunities in the workplace, during which their studies are intended to relate directly to the work practices being developed. The regulatory body overseeing SW qualifications in the UK demands the inclusion of certain ICT skills.

OU students taking its health and social care (HSC) degree are generally mature students, usually employed, though mostly self-funded. Modules in this degree are practice-*related* rather than practice-*learning*: they are theory-based modules with no formal work-based learning, but the relationship between theory and practice is emphasised. ICT skills are a specific requirement for the HSC degree.

Data were collected from students taking three FH&SC modules:

- SW1 – a Level 1 (equivalent to first year undergraduate) social work module
- SW2 – a Level 2 (equivalent to second year undergraduate) social work module
- HSC2 – a Level 2 health and social care module.

SW1 and SW2 are both practice-learning modules. HSC2 is a module in the HSC degree, but is also an optional module in a number of different OU degrees. ICT skills are not necessarily a requirement for these other degrees.

In each module, students are introduced to a task requiring digital literacy skills in the main module learning guide. They are then directed to skills guidance, provided in one of three ways:

- Generic – a skills activity, provided via the HSC Resource Bank (HSCRB), a web-based, faculty repository of resources that can be used by any FH&SC module.

- Contextualised – module- and context-specific skills guidance provided as a PDF document on the module website.

- Hybrid – contextualised skills guidance that also links at certain points to a generic skills activity.

Guidance in SW1 and SW2 is contextualised within social work. In HSC2 students are provided with a direct link to the relevant HSCRB generic skills activity. For further details see Nix, Hall and Baker (2012).

A mixed methods approach was used for data collection. All students on the three modules were given the opportunity to complete a questionnaire, in the form of a reflective quiz towards the end of each module. This allowed students to reflect on their skills development and evaluate particular skills activities. Some questions required fixed-choice responses and provided quantitative data while others allowed free-text entry and provided qualitative data. Separate questions were asked about ICT and IL skills.

Respondents were invited in the quiz to participate in a follow-up interview, and 123 (41%) volunteered. We selected 18 interviewees, choosing six randomly from each module, apart from ensuring both sexes were represented where both volunteered. The semi-structured interviews built on the quiz questions, considering perceptions and experiences of activity designs related to ICT and IL skills development. For further details of interview methods and analysis see Nix, Hall and Baker (2012).

This paper considers student perceptions of their learning experience, concerning their preferences in relation to:

- the *nature* of skills guidance – generic or contextualised.
- the *location* of skills guidance – provided within the module or separately from it.
- the *timing* of skills guidance – provided at point of need or at a time when the learner decides.

It also considers their perception of the value of skills:

- to themselves
- to their employer.

We present an analysis of our quantitative data in relation to these themes. Where relevant, supporting evidence from interviews is included. Fuller analysis of our qualitative data is provided by Nix, Hall and Baker (2012).

For the quantitative data, comparisons are made in relation to five demographic factors: gender, age, level of previous educational qualifications (PEQs) obtained before joining the OU, disability, and financial status. Lower PEQs are those with qualifications up to and including UK A-Levels (or equivalent) while higher PEQs are those with qualifications from Further education (FE) or HE. Students categorised as having a disability are those who have declared any kind of disability to the University; students categorised as having no disability may have an undeclared disability. In terms of financial status, students are divided into those that receive support from the OU Financial Assistance Fund (FAF) and those that do not.

For this demographic analysis, data from all modules are combined and students are divided into the following groups for comparison (not all items of demographic information are available for every student and N values reflect this):

- Gender – men (N=44) and women (N=249)
- Age – 35 or under (N=91), 36 to 45 (N=106), and 46 or over (N=96)
- PEQs – lower PEQs (N=105) and higher PEQs (N=109)
- Disability – disability (N=38) and no disability (N=255)
- Financial status – FAF support (N=44) and no FAF support (N=249)

All differences between modules, between demographic groups, and between IL and ICT skills, are tested for significance using χ^2 tests.

3. Results

3.1 Interviewees

The qualitative data we present are based on an analysis of 11 of the 18 interviews, six fully-coded (two from each module) and five partly-coded. These data are illustrative only, since they represent just a sample of interviews. The interviewees are listed in Table 1.

Table 1: Interviewees (anonymised) and their demographic characteristics

Interviewee	Module	Previous educational qualifications (PEQs)		Age group (age range of all interviewees 31-55)	Receiving FAF support	Declared disability
		Lower (up to/ including UK 'A' levels or equivalent)	Higher (FE or HE)			
Vicky	SW1	✓		36-45	No	No
Diane	SW1	✓		46 or over	No	No
Deidre (partly coded)	SW1		✓	36-45	Yes	Yes
Caroline	SW2		✓	36-45	No	No
Suzie	SW2	✓		46 or over	No	No
Don (partly coded)	SW2	✓		35 or under	No	No
Jane (partly coded)	SW2		✓	36-45	No	No
Tracey	HSC2	✓		46 or over	No	No
Jackie (partly coded)	HSC2	✓		46 or over	Yes	No
Fanny (partly coded)	HSC2		✓	46 or over	No	Yes
Colin	HSC2		✓	35 or under	No	No

3.2 Questionnaire submission rates

A total of 298 students submitted the questionnaire (23.0% of all students invited to complete it).

Of these respondents, 87.2% are in paid employment and 6.4% are not (employment status unknown for 8.4%).

3.3 Generic versus contextualised skills activities

Student responses to four statements about the nature of skills activities are shown in Figure 1 (in this and other figures, statements have been abbreviated) and Table 2.

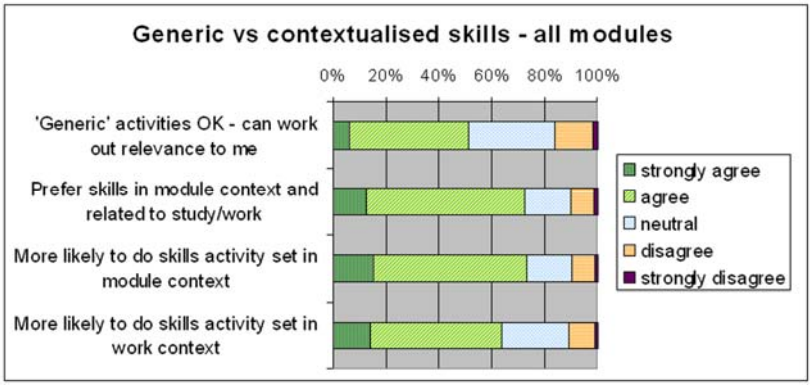

Figure 1: Student views on generic and contextualised skills activities: responses to statements 1-4 (listed in Table 2)

Only 16% of students are unhappy about doing generic skills activities. However responses to statements 2-4 show they much prefer skills set in a module context and related to study or to work and they are more likely to complete a skills activity if it is contextualised, especially if set in a module context.

There are no significant differences between modules, between age groups, between students with higher and lower PEQs, between students with a disability or with no disability, or between students with or without FAF support. Men are more likely than women to be happy about completing a generic skills activity (Figure 2).

Table 2: Differences in responses to statements about generic and contextualised skills activities

Statement		Differences between modules			Differences between demographic groups				
No.	Text	SW1 vs SW2	SW1 vs HSC2	SW2 vs HSC2	Gender	Age	PEQs	Disability	FAF
1	I am happy to complete a 'generic' skills activity (one not specifically related to the module or to my work) because I can work out what its relevance is to me.	NS	NS	NS	χ^2=11.07 df=4, p<0.05	NS	NS	NS	NS
2	I prefer skills activities set in the context of study or work, and built into the content of the module, rather than presented as something separate.	NS	NS	NS	NS	NS	NS	NS	NS
3	I am more likely to do a skills activity if it is set in a context that is relevant to the module.	NS	NS	NS	NS	NS	NS	NS	NS
4	I am more likely to do a skills activity if it is set in a context that is relevant at work.	NS	NS	NS	NS	NS	NS	NS	NS

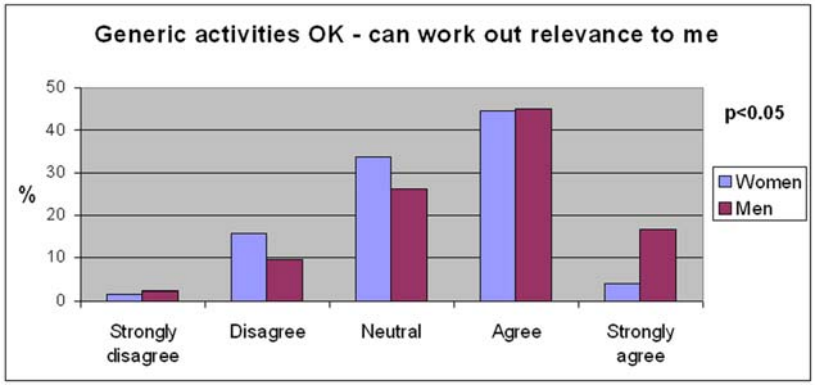

Figure 2: Responses of men and women to statement 1 (listed in Table 2)

Our qualitative analysis reflects the quantitative data and identifies some possible reasons for these preferences. Seven of the 11 interviewees are happy to accept generic contexts. Two (both women) are neutral. But the majority (nine) prefer skills activities set in a relevant context, especially that of their current module.

Various reasons are given for being willing to accept generic contexts. One of the two male interviewees says that, as a business analyst, he feels confident he can extrapolate from a generic context. One of the neutral women will engage as long as a clear rationale is given and the other likes the fact that generic activities provide variety within her learning experience. Of the other women, one thinks generic contexts can work if they focus only on the relevant skill and are at a basic level, while three find generic contexts acceptable for HSCRB activities.

Interviewees who prefer contextualised activities identify a number of disadvantages to a generic context:

1. It suggests the activity is optional.

2. The activity is experienced as disconnected from the module learning and disorienting on return to the main teaching.

3. Subsequent time and effort is needed to replace the context or data in the generic activity with the relevant context or data for the module, and then work out if the result is correct. Diane notes that, if a relevant context has been provided within the skills guidance, she does not have to identify connections or work out how to transfer the generic context to her module context, even though she acknowledges she ought to be able to do this.

Activities set in a module context, however, seem intended for the module, meaningful and relevant. If they fit within the main topic, they also create a smooth experience, maintaining the learner's train of thought. Jane comments 'I wouldn't enjoy it as much if it wasn't [linked to the module]. I would hate it more!' Interviewees do not identify any disadvantages to contextualised skills activities.

Thinking of fellow students and work colleagues, Colin comments that health and social care students and staff need considerably more support than those in other sectors where they may be more ICT confident. In his experience, real world scenarios directly related to their own work-based needs aid learners to engage and see the value of the skill. Diane, who also supports colleagues with ICT, has a similar view.

3.4 Location and timing of skills activities

Student responses to three statements about the location and timing of skills activities are shown in Figure 3 and Table 3.

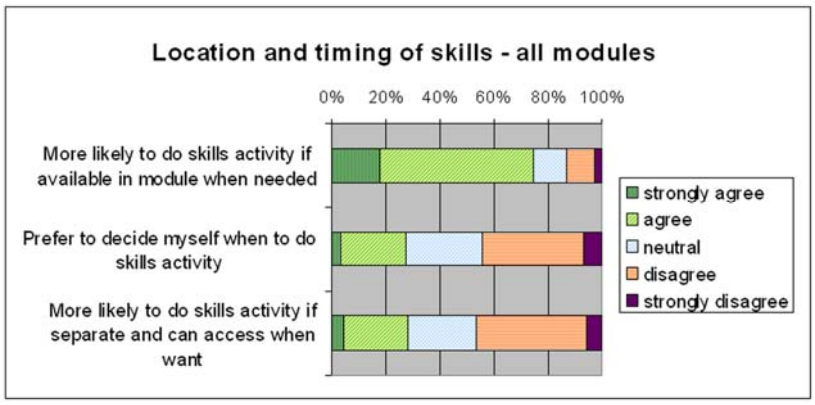

Figure 3: Student views on skills activities integrated into or separate from the module: responses to statements 5-7 (listed in Table 3)

A large majority of students (over 70%) are more likely to do a skills activity if it is provided in the module at the point of need. Only a minority of students (less than 30%) prefer to decide for themselves when to do a skills activity or are more likely to do a skills activity if it is provided separately from the module.

Table 3: Differences in responses to statements about skills activities that are integrated into or separate from the module

Statement		Differences between modules	Differences between demographic groups						
No.	Text	SW1 vs SW2	SW1 vs HSC2	SW2 vs HSC2	Gender	Age	PEQs	Disability	FAF
5	I am more likely to do a skills activity if it is made available at the exact point in the module that I need the relevant skill.	NS	NS	NS	NS	NS	NS	NS	NS
6	I prefer to decide for myself at which point to do skills activities.	NS	NS	NS	χ^2=10.97 df=4, p<0.05	NS	NS	NS	NS
7	I am more likely to do skills activities if they are made available as part of a separate set of resources that I can access when I want to.	NS	NS	NS	χ^2=13.69 df=4, p<0.01	NS	NS	NS	χ^2=12.84 df=4 p<0.05

There are no significant differences between modules, between age groups, between students with higher and lower PEQs, or between students with a disability or no disability. Men are significantly more likely than women to prefer to decide for themselves when to do a skills activity, though overall men are about equally split between preferring to decide for themselves and preferring not to. Men are also more likely than women to do a skills activity if it is provided separately from the module and they can complete it when they like (Figures 4 and 5). Students receiving FAF support are also more

likely than those not receiving FAF support to do a skills activity if it is separate from the module (Figure 6).

Figure 4: Responses of men and women to statement 6 (listed in Table 3)

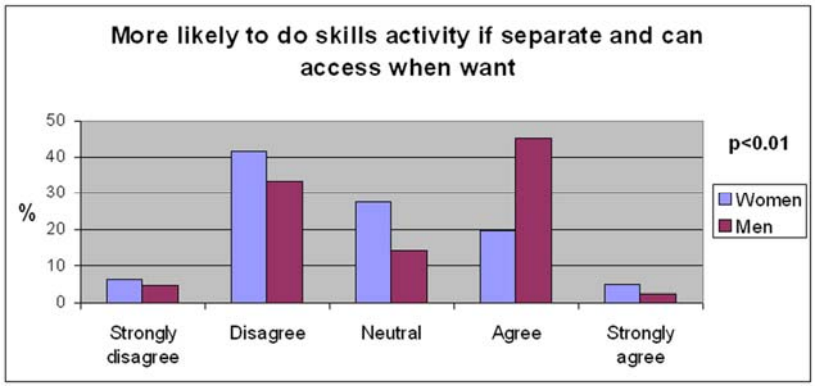

Figure 5: Responses of men and women to statement 7 (listed in Table 3)

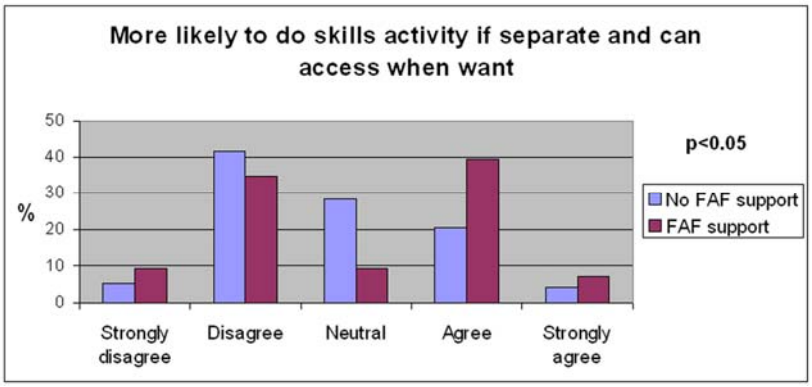

Figure 6: Responses of students with FAF support compared with those with no FAF support to statement 8 (listed in Table 4)

Responses from interviewees support our quantitative data. Two interviewees, one who receives FAF support (Jackie) and one of the men (Don), say they would like skills activities provided in a separate block they could work through. Jackie believes it would allow her to complete the skills activities before (or at the start of) the course and get them out of the way so she can concentrate on the main module learning. Don thinks it would enable him to work at his own pace. However, he also has concerns about separate activities, worrying that if he assesses his own abilities incorrectly, he may skip something important. In addition, he notes that assessed activities within the module may aid learning and be more satisfying.

Four interviewees explain the benefits of activities located within the module. They believe the 'visibility' of the activities within the module, and the prompts they provide, are necessary. If the activities were separate and not visible, they are too easy to skip, either accidentally or deliberately. Caroline, for example, does not enjoy ICT, so she does not trust herself to seek out separate activities, preferring to avoid them instead. Diane does enjoy ICT yet would be tempted to skip activities because of time pressures. She also values being prompted to explore topics she might not have done otherwise (such as blogs and Twitter). Left to her own devices, she thinks these might be too 'overwhelming' to attempt.

Diane, who believes locating skills activities within the module may help to shape expectations, improve attitudes and prepare students for employment, says: 'it might help people to feel less resentful about the amount of ICT skills when they actually get into the workplace.'

Colin presents an employer's perspective. He believes that including skills guidance within the module maximises the likelihood that the activities are completed and so reassures employers that graduates have a guaranteed grounding in skills. He says:

> '…what I've learnt within the course on the ICT side is regarded…as very, very useful grounding to staff because we're still getting…staff through from some universities where they have managed to avoid a lot of IT [in] the course [so] their literacy skills are poor when they come to actually use the systems at hand.'

3.5 Importance of skills to the student

Student responses to six statements about the importance to students of IL and ICT skills are shown in Figure 7 and Table 4.

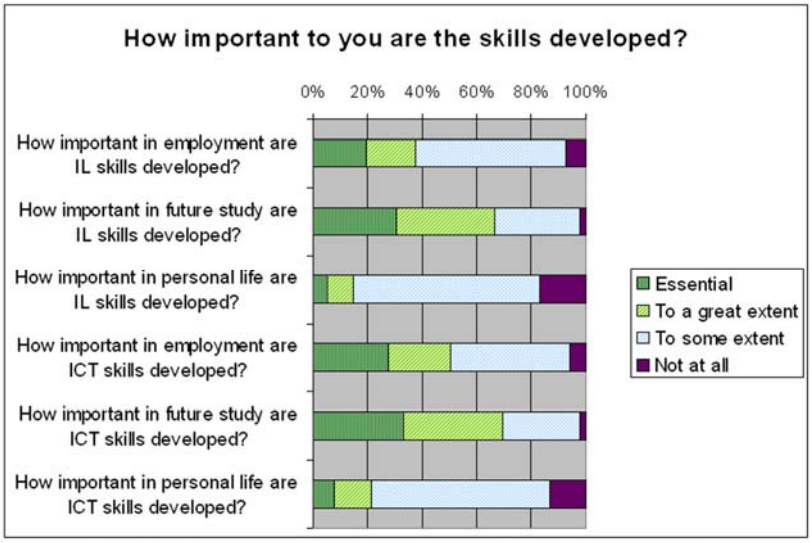

Figure 7: Student perceptions of the importance of the skills they have developed: responses to statements 8-13 (listed in Table 4)

Most students think skills are important, especially for future study (over 97%) and in employment (over 92%), but also in personal life (over 82%).

For example, one interviewee (Vicky) comments 'I can do without my TV, I couldn't do without my computer...we pretty much run our entire life on our computer.'

There are significant differences between at least one pair of modules for all statements except statement 9. In terms of employment, a greater proportion of SW1 students believe IL skills are important than either SW2 or HSC2 students. A greater proportion of SW1 students also believe ICT skills are important than HSC2 students. In terms of future study, a greater proportion of SW1 students believe ICT skills are important than SW2 students. In terms of their personal life, a greater proportion of SW1 students believe both IL and ICT skills are important than SW2 students. A greater proportion of HSC2 students believe IL skills are important than SW2 students.

Table 4: Differences in responses to statements on the importance of skills to the student

Statement		Differences between modules			Differences between demographic groups				
No.	Text	SW1 vs SW2	SW1 vs HSC2	SW2 vs HSC2	Gender	Age	PEQs	Disability	FAF
8	How important to you are the IL (finding and using information) skills that you've developed by studying this module in employment?	χ^2=16.44 df=3 p<0.001	χ^2=11.44 df=3 p<0.01	NS	NS	NS	NS	NS	NS
9	How important to you are the IL (finding and using information) skills that you've developed by studying this module in future study?	NS	NS	NS	NS	NS	NS	NS	NS
10	How important to you are the IL (finding and using information) skills that you've developed by studying this module in activities outside employment and study?	χ^2=21.45 df=3 p<0.001	NS	χ^2=15.98 df=3 p<0.001	NS	NS	NS	χ^2=10.60 df=3 p<0.05	χ^2=12.00 df=3 p<0.01
11	How important to you are the ICT (computing) skills that you've developed by studying this module in employment?	NS	χ^2=13.78 df=3 p<0.01	NS	NS	NS	NS	NS	NS
12	How important to you are the ICT (computing) skills that you've developed by studying this module in future study?	χ^2=10.07 df=3 p<0.05	NS	NS	NS	NS	NS	NS	χ^2=8.43 df=3 p<0.05
13	How important to you are the ICT (computing) skills that you've developed by studying this module in activities outside employment and study?	χ^2=10.68 df=3 p<0.05	NS	NS	NS	NS	NS	χ^2=11.62 df=3 p<0.01	χ^2=9.85 df=3 p<0.05

There are no differences between men and women, between age groups, or between students with lower PEQs and those with higher PEQs in the importance they attach to either IL or ICT skills, whether in employment, future study or their personal life.

Students with a disability are more likely to believe that both IL and ICT skills are important in their personal life than students with no disability (Figures 8 and 9).

Figure 8: Responses of students with a disability compared with those with no disability to statement 10 (listed in Table 4)

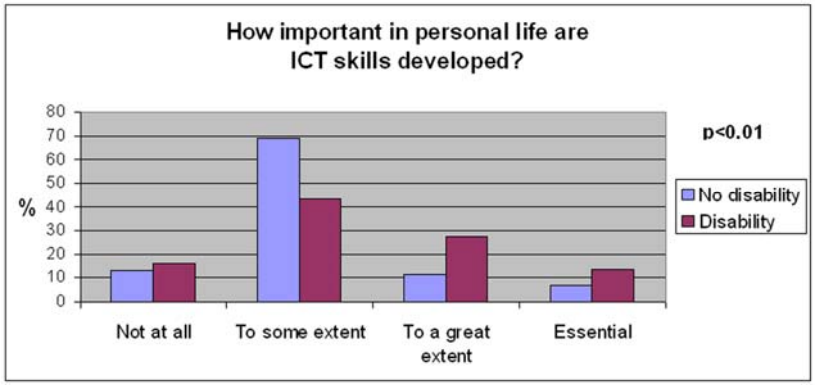

Figure 9: Responses of students with a disability compared with those with no disability to statement 13 (listed in Table 4)

Our qualitative data provide some support for this difference. Fanny, who is on long term sick leave, chose an OU course so that she could study from home and acquired a PC especially for this. She now regularly uses her skills in her personal life, for example to help her nephew. She feels it is 'important to be on the same wave length as him' and explains, 'I was pretty much a dinosaur as regards computers, and you can't keep like that when you're with children'. She also uses her skills for study, and expects them to be useful for any future job.

Students receiving FAF support are more likely than students not in receipt of FAF support to believe that both IL and ICT skills are important in their personal life (Figures 10 and 11) and that ICT skills are important in their future study (Figure 12).

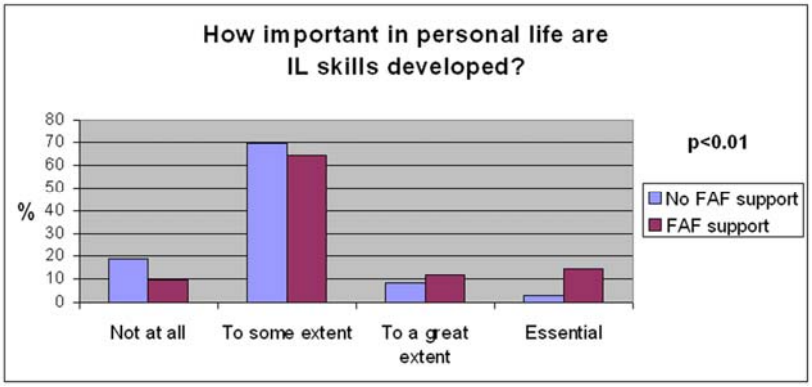

Figure 10: Responses of students with FAF support compared with those with no FAF support to statement 10 (listed in Table 4)

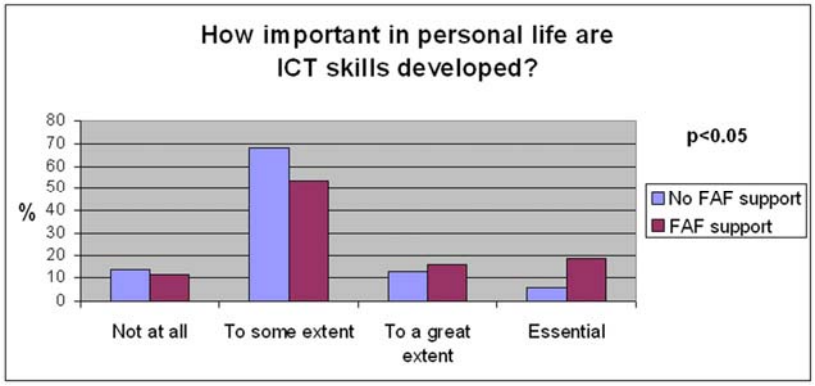

Figure 11: Responses of students with FAF support compared with those with no FAF support to statement 13 (listed in Table 4)

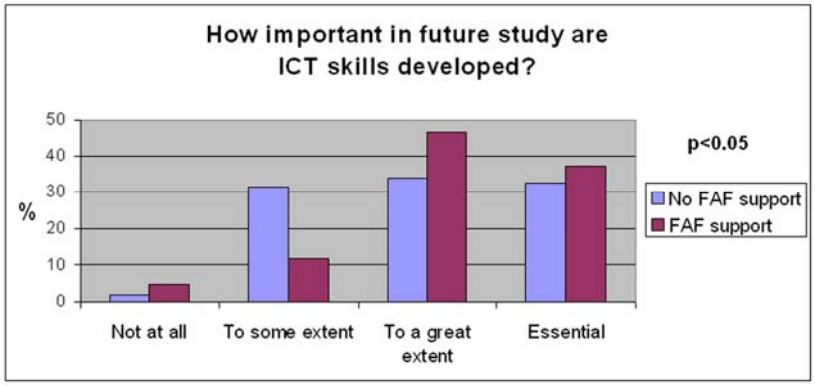

Figure 12: Responses of students with FAF support compared with those with no FAF support to statement 12 (listed in Table 4)

Students are significantly more likely to believe that ICT skills are important to them in their employment than they are IL skills (Table 5). There are no significant differences in their belief that ICT skills are important to them, compared with IL skills, in either their future study or their personal life.

Table 5: Differences in responses to statements (as listed in Table 4) on the importance to the student of IL skills compared with ICT skills, in employment, study and personal life

Area of life	Statements compared (importance of IL vs importance of ICT)	Result of comparison
Employment	Statement 8 versus statement 11	χ^2 =9.41, df=3, p<0.05
Future study	Statement 9 versus statement 12	NS
Personal life	Statement 10 versus statement 13	NS

3.6 Future use of skills by the student

Student responses to six statements about the extent to which they believe they will be able to use the IL and ICT skills they have developed in the future are shown in Figure 13 and Table 6.

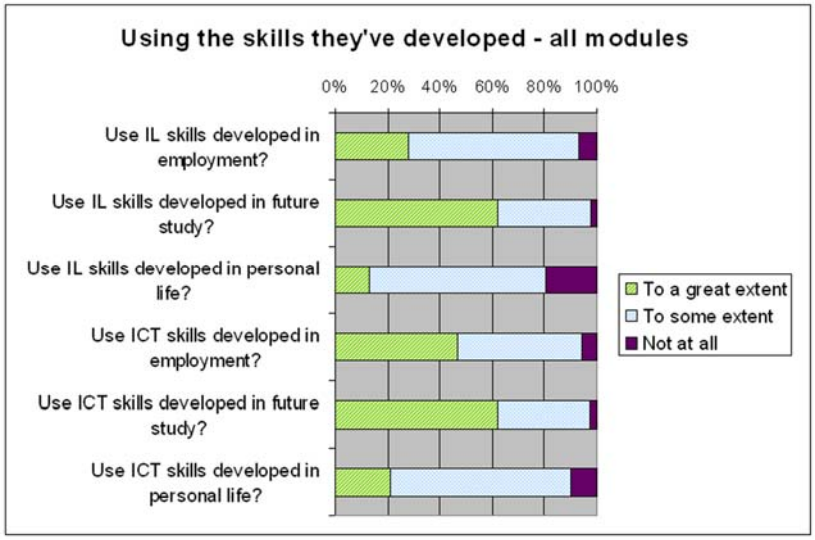

Figure 13: Student perceptions of the extent to which they will be able to use their skills in the future: responses to statements 14-19 (listed in Table 6)

A large majority of students think they will be able to use their digital literacy skills in their employment (over 90%), future study (almost 100%) and personal life (at least 80%). Several interviewees described the extensive use they make of their skills in all areas of life.

There are significant differences between at least one pair of modules for all statements. In terms of employment, SW1 students believe they will use IL skills more than do SW2 or HSC2 students and ICT skills more than HSC2 students. More SW2 students believe they will use both IL and ICT skills in employment compared with HSC2 students although the proportion of SW2 students who believe they will use IL skills to a great extent is smaller than for HSC2 students. In terms of future study, SW1 students believe they will use ICT skills more than do SW2 or HSC2 students. More SW1 students believe they will use IL skills in study compared with SW2 students although the proportion of SW1 students who believe they will use IL skills to a great extent is smaller than for SW2 students. In terms of their personal life, SW1 students believe they will use IL skills more than do SW2 students. More SW2 students believe they will use ICT skills in their personal life compared with HSC2 students although the proportion of SW2 students who believe they will use ICT skills to a great extent is smaller than for HSC2 students.

Table 6: Differences in responses to statements on using skills in employment, study or personal life

Statement		Differences between modules			Differences between demographic groups				
No.	Text	SW1 vs SW2	SW1 vs HSC2	SW2 vs HSC2	Gender	Age	PEQs	Disability	FAF
14	How much do you feel you will be able to use the IL (finding and using information) skills that you've developed by studying this module in employment?	χ^2=9.06 df=2 p<0.05	χ^2=11.33 df=2 p<0.01	χ^2=6.74 df=2 p<0.05	NS	NS	χ^2=14.34 df=2 p<0.001	NS	NS
15	How much do you feel you will be able to use the IL (finding and using information) skills that you've developed by studying this module in future study?	χ^2=9.63 df=2 p<0.01	NS	NS	NS	NS	NS	NS	NS

16	How much do you feel you will be able to use the IL (finding and using information) skills that you've developed by studying this module in activities outside employment and study?	χ^2=10.02 df=2 p<0.01	NS	NS	NS	NS	NS	NS	χ^2=7.39 df=2 p<0.05
17	How much do you feel you will be able to use the ICT (computing) skills that you've developed by studying this module in employment?	NS	χ^2=16.86 df=2 p<0.001	χ^2=8.92 df=2 p<0.05	NS	NS	χ^2=10.95 df=2 p<0.01	NS	NS
18	How much do you feel you will be able to use the ICT (computing) skills that you've developed by studying this module in future study?	χ^2=6.22 df=2 p<0.05	χ^2=7.18 df=2 p<0.05	NS	NS	NS	NS	NS	NS
19	How much do you feel you will be able to use the ICT (computing) skills that you've developed by studying this module in activities outside employment and study?	NS	NS	χ^2=8.66 df=2 p<0.05	NS	NS	NS	NS	NS

There are no significant differences between men and women, between age groups, or between students with a disability or with no disability.

Students with higher PEQs are more likely than those with lower PEQs to believe they will be able to use both IL skills and ICT skills in employment (Figures 14 and 15). We have not so far found such a clear difference among our interviewees.

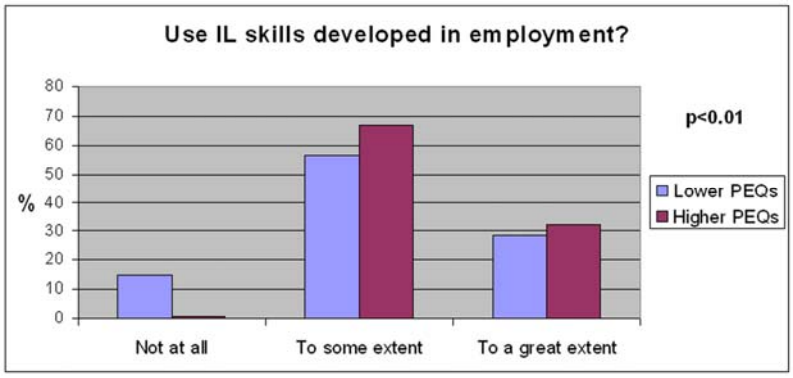

Figure 14: Responses of students with higher and lower PEQs to statement 14 (listed in Table 6)

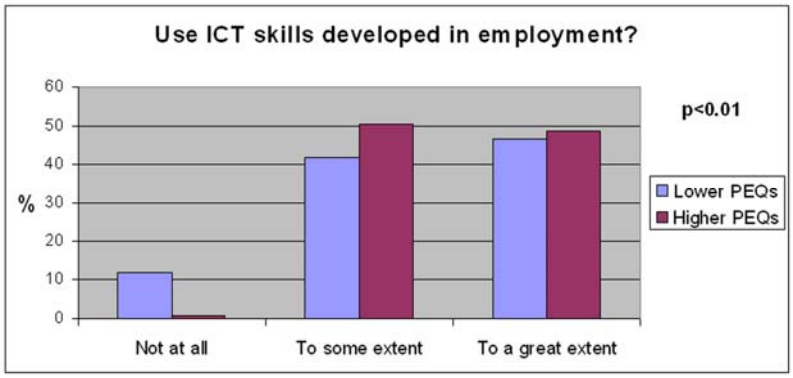

Figure 15: Responses of students with higher and lower PEQs to statement 17 (listed in Table 6)

FAF students are more likely than non-FAF students to believe they will use the IL skills they have developed in their personal life (Figure 16). Deirdre, who receives FAF support, mentions she often uses her IL skills at home because they enable her to help her children with their homework and with research to answer their questions.

Figure 16: Responses of students with FAF support compared with those with no FAF support to statement 16 (listed in Table 6)

Students are significantly more likely to believe they will use their ICT skills than they are their IL skills, both in employment and their personal life (Table 7). There is no significant difference in the degree to which they believe they will use their ICT skills, compared with their IL skills, in their future study. Our interviewees give far more examples for ICT use than they do for IL use at work and at home, but often mention how important their IL skills are for study.

Table 7: Differences in responses to statements (listed in Table 6) on the extent to which students believe they will use IL skills versus ICT skills, in employment, study and personal life

Area of life	Statements compared (extent of use of IL vs extent of use of ICT)	Result of comparison
Employment	Statement 14 versus statement 17	χ^2 =22.97, df=3, p<0.001
Future study	Statement 15 versus statement 18	NS
Personal life	Statement 16 versus statement 19	χ^2 =14.90, df=3, p<0.001

3.7 Value of skills to employers

Student responses to two statements about the extent to which students believe their skills are seen by employers as important are shown in Figure 17 and Table 8.

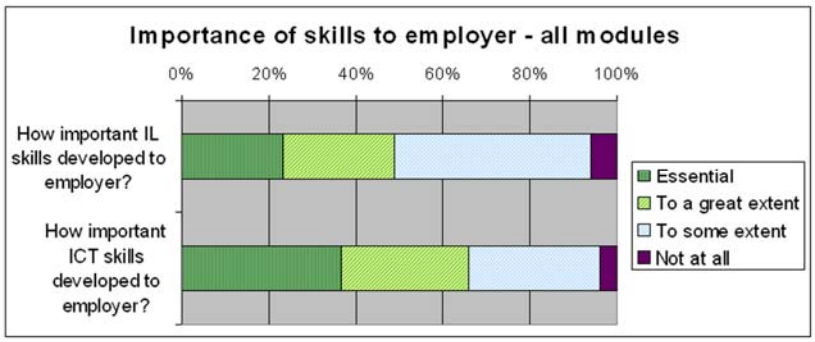

Figure 17: Student perceptions of the importance employers attach to skills: responses to statements 20 and 21 (listed in Table 8)

Only a very small minority of students (less than 10%) believe employers think digital literacy skills are not important. Students are significantly more likely to believe that ICT skills are important to employers than they are IL skills (χ^2=16.93, df=3, p<0.001).

These results are supported by our qualitative data. Suzie for example says of her employer: 'well it is an essential part of our role, and now when they're looking for staff they're looking for staff who [are] already trained, a bit more than basic ICT skills'. However, more examples of ICT practices at work are given and also of managers who are positive about ICT, whereas most interviewees are not sure what their employers think about IL.

Table 8: Differences in responses to statements about the importance employers attach to skills

Statement		Differences between modules			Differences between demographic groups				
No.	Text	SW1 vs SW2	SW1 vs HSC2	SW2 vs HSC2	Gender	Age	PEQs	Disability	FAF
20	How important to your current or future employer do you think the IL skills are that you've developed by studying this module?	χ^2=11.93 df=3 p<0.01	χ^2=7.86 df=3 p<0.05	NS	NS	NS	NS	NS	NS
21	How important to your current or future employer do you think the ICT skills are that you've developed by studying this module?	NS	NS	χ^2=7.85 df=3 p<0.05	NS	NS	NS	NS	NS

There are significant differences between at least one pair of modules for each statement. SW1 students are more likely than either SW2 or HSC2 students to believe their employer thinks IL skills are important. SW2 students are more likely than HSC2 students to believe their employer thinks ICT skills are important.

There are no significant differences between demographic groups.

4. Discussion

The majority of learners studying the three modules believe that digital skills are important and can be used beyond the module in all areas of life, though ICT skills are regarded as more important and more likely to be used than information literacy skills in employment and, to some extent, in personal life. Digital literacy skills, particularly ICT skills, are thought to be of great importance to employers.

Most of our learners prefer to learn skills in the context of the subject they are studying and to be able to access skills guidance at the point of need. If generic guidance is provided outside the module, learners are concerned about 'missing something', the interruption to the flow of their learning if they have to go somewhere else to get the guidance they need, the extra time and effort involved in relating the task they do in the generic context to the task required for their module and, since module-specific feedback cannot be provided within the generic guidance, being unable to check that the result when applied to the module context is correct. Module-specific guidance containing detailed feedback saves them effort and provides greater support.

There is extensive evidence that learning is more effective when skills development is integrated into the curriculum (e.g. Beetham, McGill and Littlejohn, 2009; Ford, Foxlee and Green, 2009; Kingsley and Kingsley, 2009; Benfield and Sharpe, 2011). As Laurillard (1993) points out, knowledge has a contextualised character and cannot be separated from the situations in which it is used. Several studies have also shown the importance of linking ICT use in the learning environment to its use in

the professional environment, for example Markauskaite et al. (2006) for trainee teachers and Patel et al. (2009) for undergraduates in the health professions.

Not surprisingly, given that the two social work modules are practice-learning modules with an emphasis on the necessity of using skills in the workplace, many of the differences between modules are related to employment. Social work students, especially those at Level 1, are more likely than health and social care students to think skills are important, that they will be able use them in employment, and that their employer also thinks digital literacy is important. Levine et al. (2008) found that dentistry students value information literacy skills when the relevance to their professional practice is made clear. Edmunds, Thorpe and Conole (2012) found that ICT is perceived by students most positively in the work context.

However, the differences between social work students and health and social care students also carry over to study and personal life to some extent, with SW students on the whole being more likely than HSC students to think that they will be able to use their skills in these areas. Possibly, the value that SW students attach to skills in the workplace enables them better to 'transfer' skills use to other areas. Some studies indicate that learners, especially those that are work-based, need help in making such connections (Beetham and Oliver, 2010; Pegg et al., 2012). Edmunds, Thorpe and Conole (2012) found that the work context appears to be an important driver for technology use in other areas of life.

SW students at Level 1 are more likely than those at Level 2 to think skills are important and they will be able use them in all areas of life. Being relatively new to the OU, they may value the digital literacy skills needed for OU study, whereas by Level 2, they take such skills for granted.

The differences between Level 1 and Level 2 SW students might also be related to the fact that most of the skills in the SW degree are delivered at Level 1. SW1 students may regard skills as more important than SW2 students, and be more likely to believe they will use their skills in all areas of life, simply because there is more emphasis on skills in their module. This argument is supported by the one difference between SW students and HSC students that goes against the general trend. HSC2 students are more likely than SW2 students to think that information literacy skills are important in their personal life. This could be because more skills are delivered in HSC2 than in SW2. A study by Gros, Garcia and Escofet (2012) also supports this idea. They showed that the ICT resources that students rate most highly are those proposed by teachers.

We found no differences between age groups. According to Prensky's (2001) original definition as those born after about 1980, our youngest age group (35 or under) can be categorised as 'digital natives' (or the 'net generation') who have grown up with technology. The two older age groups, however, are 'digital immigrants' because their first experiences of digital technology came later in life. Supporters of the digital native/digital immigrant concept would expect the youngest age group to hold different attitudes to the two older groups. Our analysis provides no evidence for this. An increasing number of studies have failed to find a direct relationship between age and the sophistication of technology skills (e.g. Helsper and Eynon, 2010; Bullen, Morgan and Qayyum, 2011; Margaryan, Littlejohn and Vojt, 2011). In any case, as for example Kumar (2010) and Margaryan, Littlejohn and Vojt (2011) have pointed out, digital natives may appear comfortable with technology, regularly using e.g. mobile phones, Google, and social networking, but may not understand its use in an academic or professional setting, or know how to use digital tools to support their own learning.

We found three differences between men and women. Men are more likely than women to be happy to do a generic activity, to show a preference for deciding for themselves when to do a skills activity, and to do a skills activity if it is provided separately from the module. However, men do not show an

overall preference for deciding for themselves when to do an activity. These differences imply that, although they may not actually prefer it, men are more *willing* than women to work on their skills independently of their study of the module, both in time and 'space'.

We found only one difference between students with different levels of previous educational qualifications. Higher PEQs are more likely than lower PEQs to believe they will be able to use their digital literacy skills in their employment. We can think of three explanations for this. First it could be because higher PEQs are more likely to have a technically demanding job in which they can use their skills. Second, they may be less likely to find work tasks intimidating or be more confident about using their skills in the workplace. Third, they may be better at 'transferring' skills learned in a module context to other contexts, so are more able to relate their skills to the workplace. However, our analysis so far suggests that neither the second or the third explanation is correct. Among our interviewees, higher PEQs are just as likely as lower PEQs to show low confidence in their skills. And there is no difference in the extent to which higher PEQs think they will use their skills in the 'other' contexts of future study and personal life.

Those students in receipt of support from the OU Financial Assistance Fund have a low household income. FAF students are more likely than non-FAF students to complete a skills activity that is separate from the module, to believe digital skills are important in their personal life and in future study, and to believe they will use information literacy skills in their personal life. Part of the funding FAF students receive allows them to buy a PC and they may, as a result, value the PC, and what they can do with it, more than non-FAF students, who are more likely to have a PC already or can afford to buy one.

Jelfs and Richardson (2010) showed that, while some disabled students tend to take a more surface approach to learning compared with non-disabled students, the effect on students' approaches to studying is relatively slight. We might expect therefore to find little difference between disabled and non-disabled students in their views on digital literacy skills development. We found, however, that disabled students are more likely than those without a declared disability to believe that digital skills are important, and that they will use the skills they have acquired in their personal life. It is possible that these students already see technology as something that can help with problems resulting from their disability, so are more likely to regard digital literacy skills as important. Our qualitative data also suggest that digital literacy skills may be valued as a means to facilitate personal social interactions.

To conclude, if we as learning designers wish to maximise engagement with skills learning then, on the basis of our analysis so far, we should deliver digital skills development activities in the context of the subject that the student is studying and provide skills guidance at the point that they need it. This creates a smoother, more motivational learning experience, suits the majority of students and does not disadvantage any of the demographic groups we have considered here. We should also make it clear to students why digital literacy skills are important and useful, not only to the subject they are learning and/or to their professional practice, but to all areas of their life.

In terms of future research, given the differences we found between Levels 1 and 2, we now plan to explore the views of students at Level 3. We are also collecting annual questionnaire data which will allow us to explore changes in perceptions with time, both among students generally and in individuals as they move through their degree. Selwyn (2008) and others have highlighted the need for such longitudinal studies.

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References

Bawden, D. (2008) Origins and concepts of digital literacy. In Lankshear, C. and Knobel, M. (Eds.) *Digital literacies: concepts, policies and practices.* New York, Peter Lang Publishing.

Beetham, H., McGill, L. & Littlejohn, A. (2009) Thriving in the 21st century: learning literacies for the digital age (LLiDA project).

Beetham, H. & Oliver, M. (2010) The changing practices of knowledge and learning. In Sharpe, R., Beetham, H. and de Freitas, S. (Eds.) *Rethinking Learning for a Digital Age.* London, Routledge.

Benfield, G. & Sharpe, R. (2011) Supporting learners in a digital age (SLiDA): synthesis report. Oxford, Oxford Brookes University.

Bullen, M., Morgan, T. & Qayyum, A. (2011) Digital learners in higher education: generation is not the issue. *Canadian Journal of Learning and Technology.* [Online]. Available: http://cjlt.csj.ualberta.ca/index.php/cjlt/article/view/550 [accessed on 11 March 2013].

Edmunds, R., Thorpe, M. & Conole, G. (2012) Student attitudes towards and use of ICT in course study, work and social activity: a technology acceptance model approach. *British journal of educational technology,* 43**,** 71-84.

Ford, P. J., Foxlee, N. & Green, W. (2009) Developing information literacy with first year oral health students. *European Journal of Dental Education,* 13**,** 46-51.

Gilster, P. (1997) *Digital Literacy,* New York, Wiley.

Gros, B., Garcia, I. & Escofet, A. (2012) Beyond the net generation debate: a comparison of digital learners in face-to-face and virtual universities. *The international review of research in open and distance learning,* 13**,** 190-210.

Hargittai, E. (2010) Digital na(t)ives? Variation in internet skills and uses among members of the ‘‘net generation’’. *Sociological Inquiry,* 80**,** 92-113.

Helsper, E. J. & Eynon, R. (2010) Digital natives: where is the evidence? *British educational research journal,* 36**,** 503-520.

Jelfs, A. & Richardson, J. T. E. (2010) Perceptions of academic quality and approaches to studying among disabled and nondisabled students in distance education. *Studies in Higher Education,* 35**,** 593-607.

JISC InfoNet (2012) Digital literacy. [Online]. Newcastle upon Tyne, Northumbria University on behalf of Jisc Advance, Available: http://www.jiscinfonet.ac.uk/infokits/collaborative-tools/digital-literacy [accessed on 13 March 2013].

Kingsley, K. V. & Kingsley, K. (2009) A case study for teaching information literacy skills. *BMC Medcal Education,* 9.

Kumar, S. (2010) The net generation's informal and educational use of new technologies. *In Education,* 16.

Laurillard, D. (1993) *Rethinking University Teaching: A Framework for the Effective Use of Educational Technology,* London, Routledge.

Levine, A. E., Bebermeyer, R. D., Chen, J.-W., Davis, D. & Harty, C. (2008) Development of an Interdisciplinary course in information resources and evidence-based dentistry. *Journal of Dental Education,* 72**,** 1067-1076.

Margaryan, A., Littlejohn, A. & Vojt, G. (2011) Are digital natives a myth or reality? University students' use of digital technologies. *Computers & Education,* 56**,** 429-440.

Markauskaite, L., Goodwin, N., Reid, D. & Reimann, P. (2006) Modelling and evaluating ICT courses for pre-service teachers: what works and how it works? In Mittermeir, R. T. (Ed.) *Informatics Education - The Bridge between Using and Understanding Computers, Proceedings of the 2nd International Conference on Informatics in Secondary Schools, Evolution and Perspectives (ISSEP 2006), Vilnius, Lithuania, 7-11 November 2006.* Berlin, Springer.

Nix, I., Hall, M. & Baker, K. (2012) “Why bother?” Learner perceptions of digital literacy skills development: learning design implications. In Beldius, H. (Ed.) *Proceedings of the 11th European Conference on e-Learning, University of Groningen, The Netherlands, 26-27 October 2012.* Groningen, The Netherlands, Academic Publishing International Limited.

Patel, V. L., Yoskowitz, N. A., Arocha, J. F. & Shortliffe, E. H. (2009) Cognitive and learning sciences in biomedical and health instructional design: A review with lessons for biomedical informatics education. *Journal of Biomedical Informatics,* 42**,** 176-197.

Pegg, A., Waldock, J., Hendy-Isaac, S. & Lawton, R. (2012) Pedagogy for employability. York, The Higher Education Academy.

Prensky, M. (2001) Digital natives, digital immigrants part 1. *On the Horizon,* 9**,** 1-6.

Selwyn, N. (2008) An investigation of differences in undergraduates' academic use of the internet. *Active Learning in Higher Education,* 9**,** 11-22.

Thorpe, M. & Edmunds, R. (2011) Practices with technology: learning at the boundary between study and work. *Journal of Computer Assisted Learning,* 27**,** 385–398.