

# Pre-service Teachers' Understanding of Information and Digital Literacy

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# Executive Summary

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Information literacy (IL) can be defined as the set of skills, competencies and behaviours required for learning in the digital age. IL skills have been found to have a positive effect on student attainment and are essential for effective learning and teaching in the information society.

This study focused on students undertaking teacher training courses and aimed to examine preservice teachers' knowledge and awareness of IL and the presence of these skills on their initial teacher education (ITE) courses. The views of the teacher educators were also explored. Data was collected using two online surveys which were distributed to students and teacher educators on two university campuses (Dublin City University and Ulster University).

The data obtained from both questionnaires provided evidence on IL and students on ITE courses and the views of the teacher educators in the institutions north and south. Overall, the findings from the questionnaire distributed to students suggested that respondents:

- have an understanding of IL but tended to focus more on digital literacy (DL);
- consider it important for teachers to be information literate and for IL to be included on ITE courses; and
- included IL in their current practice and intended to do so in the future.

The majority of students reported receiving IL skills training although this seemed to be more focused on DL; they rated their skills highly and were successful in the basic IL skills assessments.

The provision of IL skills instruction was also found to have a positive influence on their ability to pass assessments and the inclusion of IL in their practice and the emphasis on DL may be more indicative of current teaching practices than institutions' interpretations of IL.

The findings from the questionnaire distributed to the teacher educators suggested that they thought IL and/or DL skills are included and developed on their courses in various ways, that these skills are assessed as part of other assessments, that they consider it important for teachers to be information and digitally literate and for these skills to be included on the ITE courses they are involved in, and that the majority include IL/DL in their current practice and intend to do so in the future. There were many similarities between the findings from this questionnaire and those from the student questionnaire, with the main difference in the findings being students' tendency to focus more on the digital skills.

# Introduction

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*Pupils need to develop information literacy (IL) skills in schools in order to be active members of a skilled workforce, for lifelong learning and digital citizenship. However, there has been little focus on the extent to which this happens in a classroom setting and on information competencies of teachers.*

(McKeever et al., 2017, p51)

Information literacy (IL) – knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner (CILIP, 2011) – is essential for effective learning and teaching in the context of the information society.

Whilst there is a significant body of literature on students' levels of IL, there is a lack on the topic of teachers' IL skills and the extent to which they teach these skills and there is a significant gap in the research on pre-service teachers and IL, that is, what is happening in teacher education courses.

The aims of this project were to outline for the first time the current situation in Northern Ireland and the Republic of Ireland with regards to teacher education students' perceptions and experiences of IL, the extent of their IL skills and if/how they integrate IL into their own teaching practice. This study also focused on digital literacy (DL) – the ability to find, interpret, evaluate, communicate and create information using digital technology (JISC, 2014) – as the majority of students now rely on technology to access information. This project aimed to make important empirical and practical contributions to the area of teacher education and to inform the scholarly empirical literature-base on IL and DL and pre-service teachers. It is intended to stimulate debate and discussion about the place of critical information literacy and digital literacy in the curricula of courses that prepare individuals to teach.

# Relevant Literature

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Existing research predominantly examines students' levels of IL but there has been relatively little focus on teachers' IL skills and the extent to which they teach these skills to their students. It is also important to note that the bulk of this research literature has been conducted by information professionals, and as a result the focus is from a library and information perspective rather than that of the teacher or student teacher / pre-service teacher. Most of the published work on pre-service teachers' knowledge of IL has been published in Library and Information Science journals and is therefore not reaching an education audience, which is a limitation within the existing research.

Duke and Ward (2009) reviewed a selection of literature published between 1998 and 2009 relating to the preparation of information literate teachers. They reported that the literature from this period indicated that teacher education programmes had made significant progress in addressing IL but that much work still had to be done as many teachers were continuing to graduate from courses with insufficient levels of IL and that they are often unprepared to teach these skills to their future students.

There is a significant lack of literature on the topic of the place of IL in teacher education. From the limited literature, it is clear that the importance of the place of IL skills instruction in teacher education has gained more recognition over the years. There is evidence that pre-service teachers are still not being adequately prepared in terms of IL, even though there are examples of IL being included on ITE programmes and a seemingly increased awareness amongst teacher educators of the importance of these skills (Kovalik et al., 2010, p.145).

Over the last thirty years IL in teacher education has become more prominent. As time has progressed and technology has advanced, it has been suggested that teachers would have to be information literate to be able to teach IL skills to their students. Liesener (1984, p.89) stated that "*Teachers must be information literate if kids are to be information literate*". If teachers are unaware of IL or lacking developed IL skills they will be unable to enhance their students' learning experiences or take steps to improve how they learn (Geçer, 2012).

The need for students to be digitally literate has also been emphasised in the existing literature (Krueger et al., 2000; Ntuli, 2016). Starcic et al. (2016) noted that a significant criticism of pre-service teacher education is that it fails to prepare these students to feel confident in the use of ICT in their teaching. Allen (2015) found that regardless of technological advancements, pre-service teachers are still relying on course book packages to structure lessons rather than utilising digital tools.

Ching and Ching (2012) found that pre-service students' past experiences with technology in school affected their likelihood to use ICT in their teaching and that if they had had negative experiences, they would be unlikely to include it in their practice. Burnett (2011) referred to the need for teachers to self-reflect on their personal levels of DL to inform their practice.

Duke and Ward (2009) note that many organisations and institutions involved with education in the US, Australia and New Zealand have created or recommended IL standards. Internationally, just one set of standards specific to teacher education exists. In 2011 the ACRL approved IL standards for teacher education created by the EBSS Instruction for Educators Committee. These standards were informed by the ACRL IL Standards for HE (ACRL, 2000) and aimed to outline the expectations for IL knowledge and skills for pre-service teachers as well as encouraging them to think about integrating IL into their teaching practice.

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The six standards are:

1. The information literate teacher education student defines and articulates the need for information and selects strategies and tools to find that information.
2. The information literate teacher education student locates and selects information based on its appropriateness to the specific information need and the developmental needs of the student.
3. The information literate teacher education student organizes and analyzes the information in the context of specific information needs and the developmental appropriateness for the audience.
4. The information literate teacher education student synthesizes, processes, and presents the information in a way that is appropriate for the purpose for which information is needed
5. The information literate teacher education student evaluates discrete pieces of information as well as the entire information-seeking process.
6. The information literate teacher education student knows how to ethically use and disseminate information (EBSS Instruction for Educators Committee, 2011, p.421-425)

However, there is little evidence in the literature to suggest that these standards are being used to inform IL instruction on teacher education courses. Although many higher education institutions have made efforts to incorporate IL instruction into their curricula over the past two decades, it generally has not been a priority for the majority of universities and colleges (Badke, 2010). There are various examples of instruction programmes in place in different institutions but there is no standardised way of incorporating IL into teaching; this has to be planned to suit the needs and aims of each institution (Moore, 2002; Earp, 2009, Bury, 2011).

Research into pre-service teachers' information competence is inconsistent. While studies indicate that pre-service teachers are aware of the importance of IL (Stockham & Collins, 2012), results on competence levels is inconsistent. For example, Colaric *et al.* (2006) and Laverty *et al.* (2008) found that pre-service teachers information competence was moderate at best, while Tanni *et al.* (2008) conversely found that pre-service teachers were 'fluent and versatile information seekers', with Usluel (2007) arguing pre-service teachers level and duration of ICT usage during their university education has an important role in increasing IL self-efficacy.

Research into teachers' IL practice in their classroom, paints a similar picture. Smith (2013) noted that there was general confusion and lack of understanding among teachers of the term IL. Studies from across Europe indicate that aside from those teachers who upskill in the area of IL due to personal interest (Merchant & Hepworth, 2002), there is a general lack of skill in providing IL instruction in their classrooms (Probert, 2009; Korobili *et al.*, 2011; Alvarez & Gisbert, 2015).

Barriers to the provision of effective IL skills instruction include: a lack of time, lack of infrastructure, lack of resources such as computers and internet access (Korobili *et al.*, 2011), a belief that these skills would be dealt with through other subjects (Probert, 2009), lack of collaboration between teachers and librarians (Korobili *et al.*, 2011) with some studies suggesting that teachers do not view librarians as partners in education (Mokhtar & Majid, 2006). Finally, teachers lack of confidence in their own abilities in relation to IL is a barrier to their willingness to incorporate this kind of instruction (Williams & Wavell, 2006; Korobili *et al.*, 2011).

# Research Questions

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- What IL and DL skills are included in the curricula in two ITE programmes North and South?
- What are ITE students' understandings of the concept of IL and DL?
- What IL instruction have they received? How was this delivered?
- How competent are they in terms of their IL skills and DL skills?
- To what extent do they integrate IL skills into their teaching and classroom practices?

## Research Approach

Two online surveys were developed as part of this research, using the web-based survey tool Survey Monkey. Ethical approval for the surveys was sought from and given by both Dublin City University and Ulster University. The links to the surveys, along with an Information Sheet explaining about the study, were emailed to potential student and staff respondents. Both surveys ran for a three-week period, the student survey was open from 15 Feb to 8 March 2017 and the staff survey from 4 April to 25 April 2017. The first questions in each survey sought the consent of the respondent to have their responses included in the survey.

The student survey was distributed to 270 students: 80 students on the post-primary PGCE course at Ulster University (UU), 119 students on the Professional MEd at Dublin City University (DCU) and 71 students on the BSc at Dublin City University (DCU).

The three courses are all designed to prepare students for a career in teaching. The post-primary PGCE at UU is a one-year full-time programme, the Professional MEd at DCU is a postgraduate two-year full-time programme, and the BSc at DCU is a four-year full-time undergraduate degree programme.

The questionnaire aimed to provide insight into the students' perceptions and experiences of information and DL, the extent of their IL skills and if they integrate information and DL into their teaching practice. The response rate was 17.7%.

In order to gain teacher educators views on IL and DL, a questionnaire was also distributed to 51 lecturers at Ulster University (n=10) and Dublin City University (PME, n=20; B.Sc. in Education and Training, n=21). There were 19 respondents giving an initial response rate of 37.3%, however a number of these were incomplete; the average responses rate to the survey questions was 23.4% (n=12). In terms of what course/institution the staff respondents came from, 46% (n=6) were involved in the B.Sc. in Education and Training at DCU, 39% (n=5) were involved in the PME at DCU, and 39% (n=5) were involved with the PGCE at UU. (Note that staff at DCU teach across the B.Sc. and PME programmes.)

# Student Survey: Main Findings

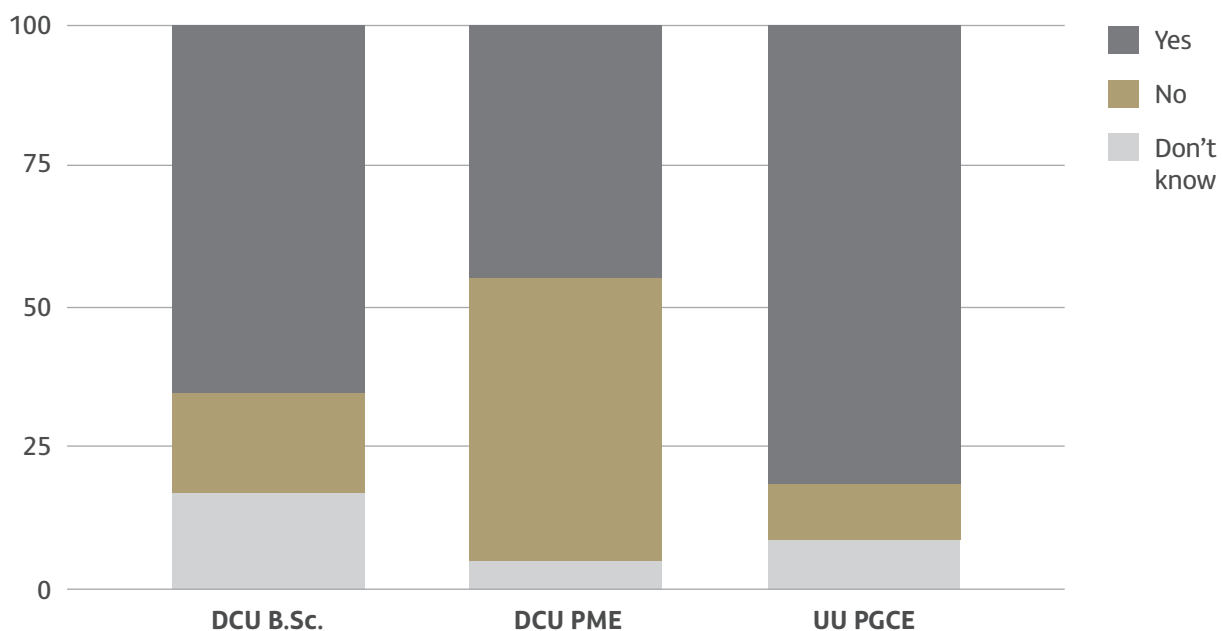
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## Information and digital literacy skills training

The overwhelming majority of respondents (92.5%) felt that it is important to include IL and DL skills training on ITE courses, and 62.3% said that they had received some IL or DL instruction, however as can be seen in Figure 1 below, this varied by institution.

*Figure 1: Whether students received IL or DL training as part of their course*

### Did you receive IL/DL training





The sources of this instructions received (see Table 1) ranged from digital media modules (n=7) and iPad training (n=4) to guidance given in module handbooks and lectures (n=1).

**Table 1: IL/DL training received**

IL/DL training received	Number of respondents
Digital/Digital media module	7
iPad Training	4
Generic training during course	3
iLearn	2
Training from unnamed external bodies	2
iTeach	1
Using technology and devices in teaching lecture	1
Evaluation and referencing training during course	1
Dropbox training	1
Digital Humanities class	1
Academic writing module	1
Use of ICT module	1
Esafety	1
Nerve Centre Training	1
Explain Everything Training	1
Frontier	1
Edmodo	1
Loop Moodle	1
Google+ Training	1
Digitally Safe Course	1
Using search engines for journal/academic reading	1
Guidance in module handbook and lectures	1

Forty-four respondents had received some guidance from library staff in relation to information skills - over half (52.3%) of those that received instruction from library staff indicated this happened in the library, while 22.7% said it happened in the classroom. Additionally, 13.6% said they received a tour of the library and 11.4% said they had received one-to-one instruction.

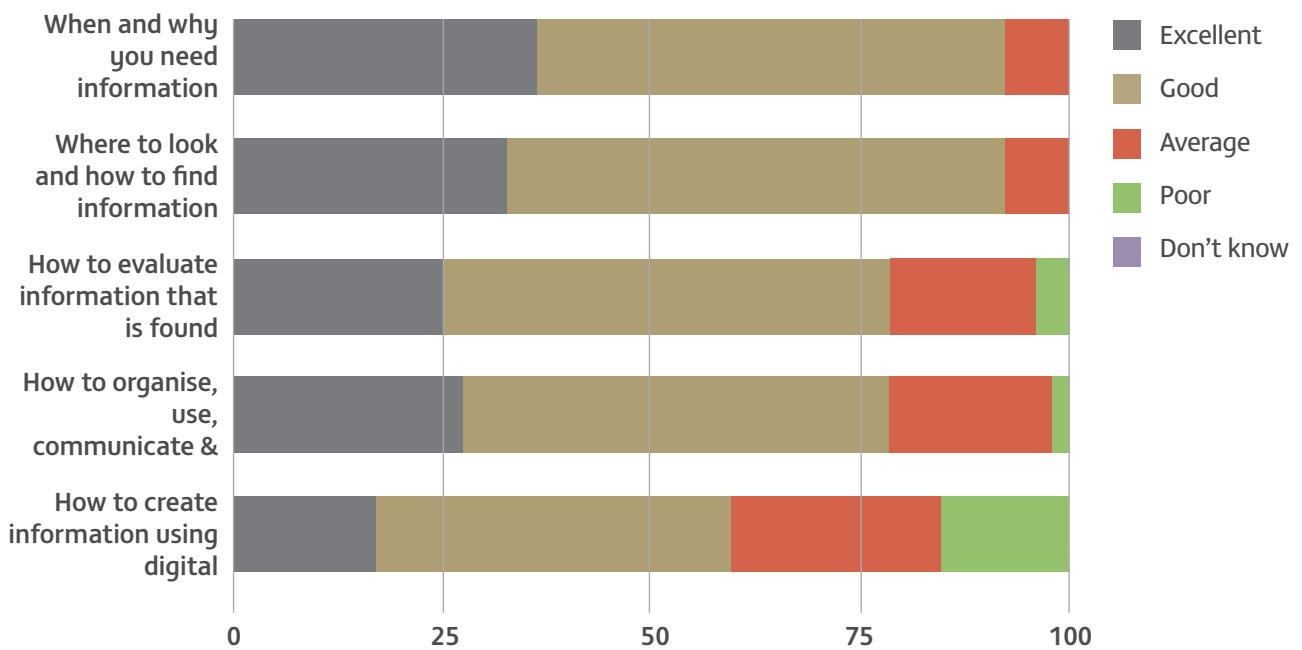
## Information and digital literacy skills rating and assessment

All of the students felt that it is important for a teacher to be information literate in the digital age. The most prominent reasons for this included ‘To enhance teaching and learning resources’, ‘the prominence of digital technology’ and ‘to relate to students and how they learn’.

They were also asked to rate their knowledge of different information skills / IL attributes. Their responses can be seen in Figure 2 below.

Figure 2: How students rated their IL skills/knowledge

### Knowledge of...



As can be seen from the data above, the majority of students rated themselves as ‘excellent’ or ‘good’ when it comes to knowing why information is needed and how to find information, however there are significantly less students in these categories for the evaluation of information and creating information using digital technologies. In an effort to drill down further into students’ ability to find information, students were asked to rate their ability to search library databases to find information and to search the internet to find information. As can be seen from the figures below, students rate their abilities relatively similar in both regards. However, some minor differences can be noted: more students rate themselves as ‘excellent’ at searching the internet and no student rated themselves as ‘poor’ at searching the internet for information.

Figure 3: Rating of ability to search library databases

Overall, how would you rate your ability to search library databases to find information?

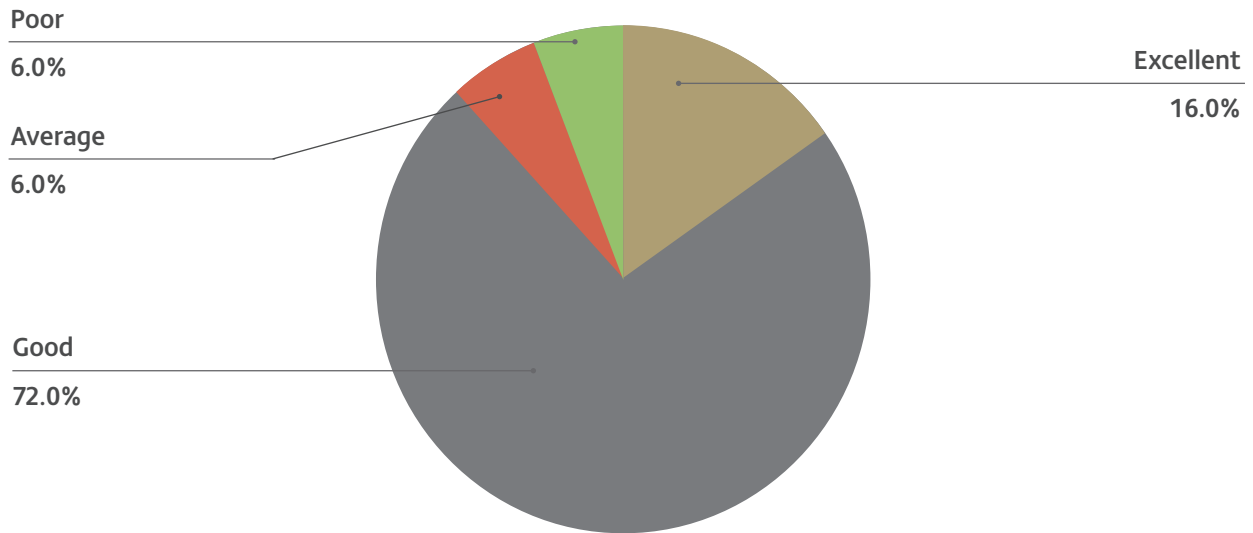
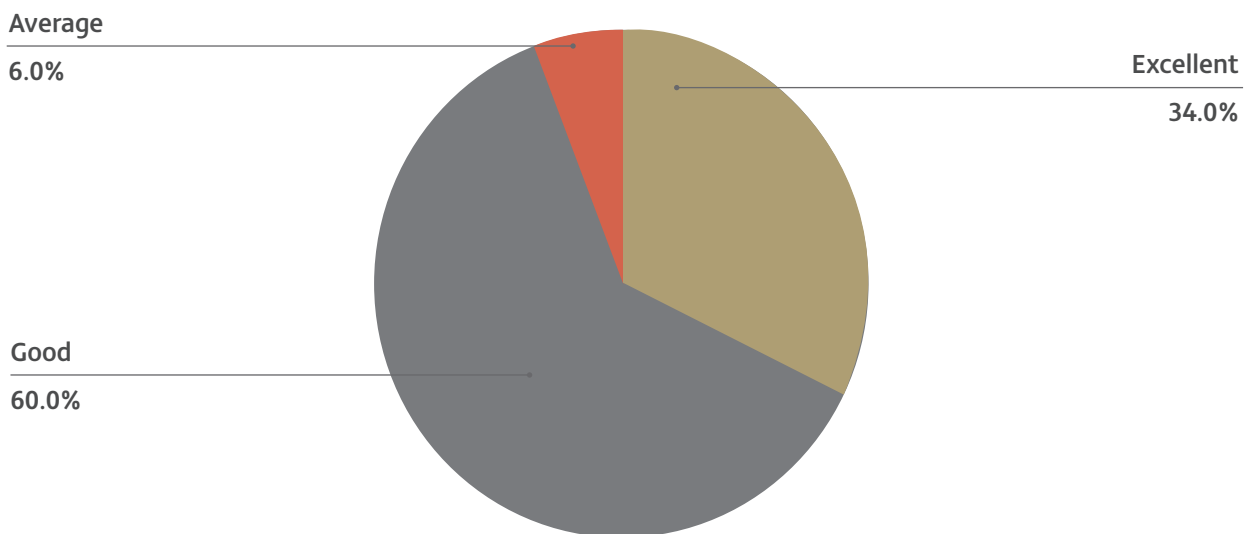


Figure 4: Rating of ability to search the internet

Overall, how would you rate your ability to search the internet to find information?



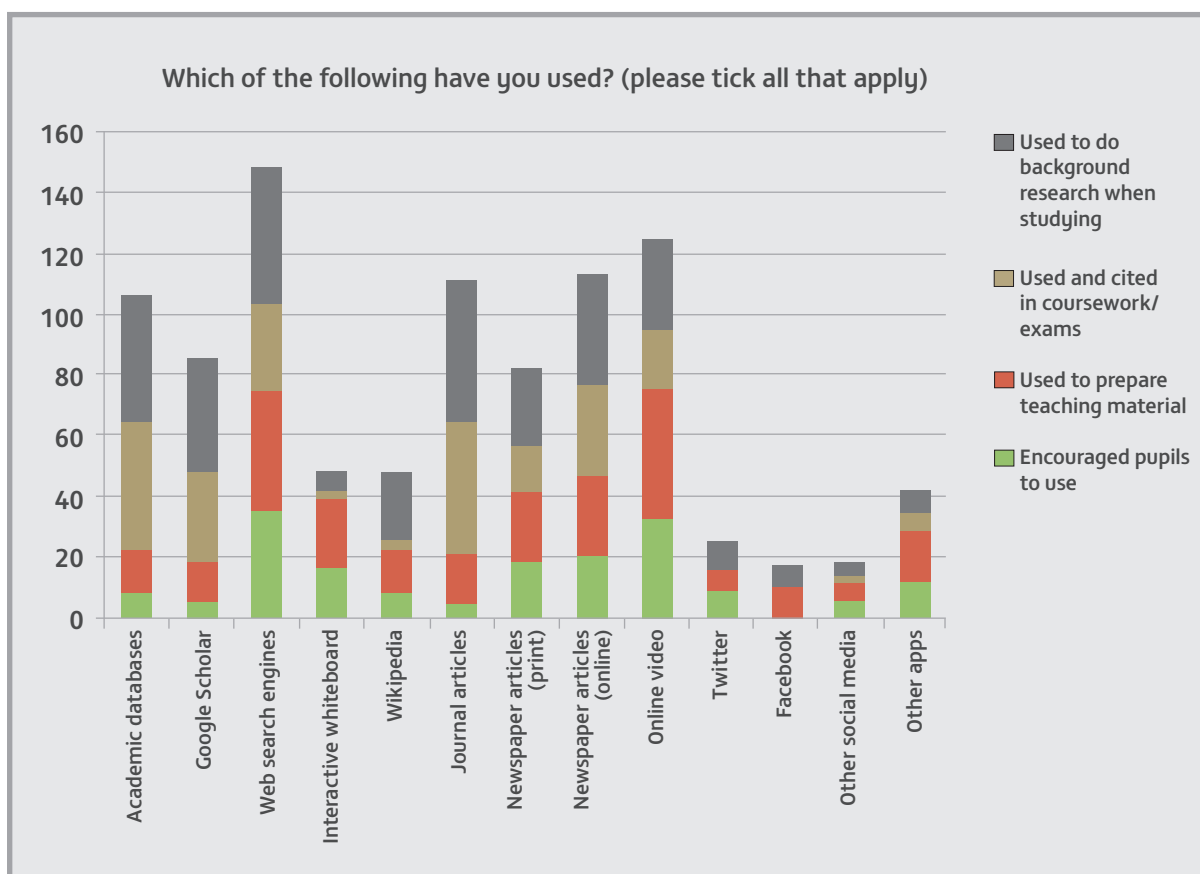
The students were asked questions which aimed to assess aspects of their IL skills. Although relatively basic in their nature, these questions aimed to provide insight to the students' skills, specifically their ability to identify resources. Firstly, they were presented with a reference to a chapter in a book and asked to identify it. Of the 50 respondents, 64% (n=32) correctly identified the reference as being a book chapter, 20% (n=10) incorrectly identified it as a reference to a book and 16% (n=8) incorrectly identified it as a reference to a journal article. Second, they were presented with a link to a video and asked to identify various aspects of it. Of the 50 respondents, all correctly identified the title, 78% (n=39) correctly identified when it was uploaded, 96% (n=48) correctly identified where it was sourced from and 88% (n=44) correctly identified who uploaded the content.

## Information behaviour

The students were also asked a number of questions on their use of different resources when researching and studying, producing work for assessment, and preparing teaching materials. They were also asked about which resources they would encourage their pupils to use.

There were 51 responses to this question. The most popular resource used for background research when studying was journal articles, with 46 respondents selecting this; 44 said that they used Web search engines such as Google and 41 said that they used academic databases. The most popular resources used and cited in coursework or exams were journal articles (n=43), academic databases (n=41) and Google Scholar and online newspaper articles equally (n=30). The most popular resources used to prepare teaching materials were online videos (n=43), web search engines (n=39) and online newspaper articles (n=26). When asked about which resources they would encourage pupils to use, the most popular answers were web search engines (n=35), online videos (n=32) and online newspaper articles (n=20).

*Figure 5: Resources used by students*





When asked about their use of digital information, the majority of respondents (68.0%) said that they frequently evaluated the information to determine its accuracy and appropriateness and 75.5% stated that they frequently use information they have found online ethically and know how to appropriately cite their sources.

### Information and digital literacy in practice

The questionnaire also focused on students' current information and DL practice in their teaching and future practice. The majority of respondents (74.0%) indicated they currently incorporate IL and DL into their teaching with students providing example such as 'Using ICT' (n=3), 'using iPads' (n=3) and 'using Edmodo' (n=1). The majority of students (92.2%) also indicated an intention to incorporate IL and DL into their future teaching practice. A small number provided supporting reasons for this, e.g. because it is important (n=2), for gathering, identifying and evaluating information (n=2) and to engage students (n=2).

# Staff Survey: Main Findings

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In the first section of the questionnaire, staff were asked a series of questions relating to IL and DL skills training on the ITE courses at their institutions. In the first question, staff were asked what kind of IL or DL skills they developed as part of their modules. Responses (n=11) are displayed in the table below, with the most common types of training being searching for resources online, evaluating resources, accessing and searching databases, and identifying key words and phrases.

**Table 2: Type of training received**

Type of training	Number of respondents
Searching for resources online	2
Evaluating resources	2
Accessing and searching databases	2
Identifying key words and phrases in academic writing	2
Accessing and using information	1
How to do a literature review	1
How to cite/references online resources	1
How to use loop	1
Use of Google	1
Research terms	1
Accessing web pages	1
Accessing and using journal articles	1
Evaluating video content	1
Discussing digital literacy	1
Religious literacy	1

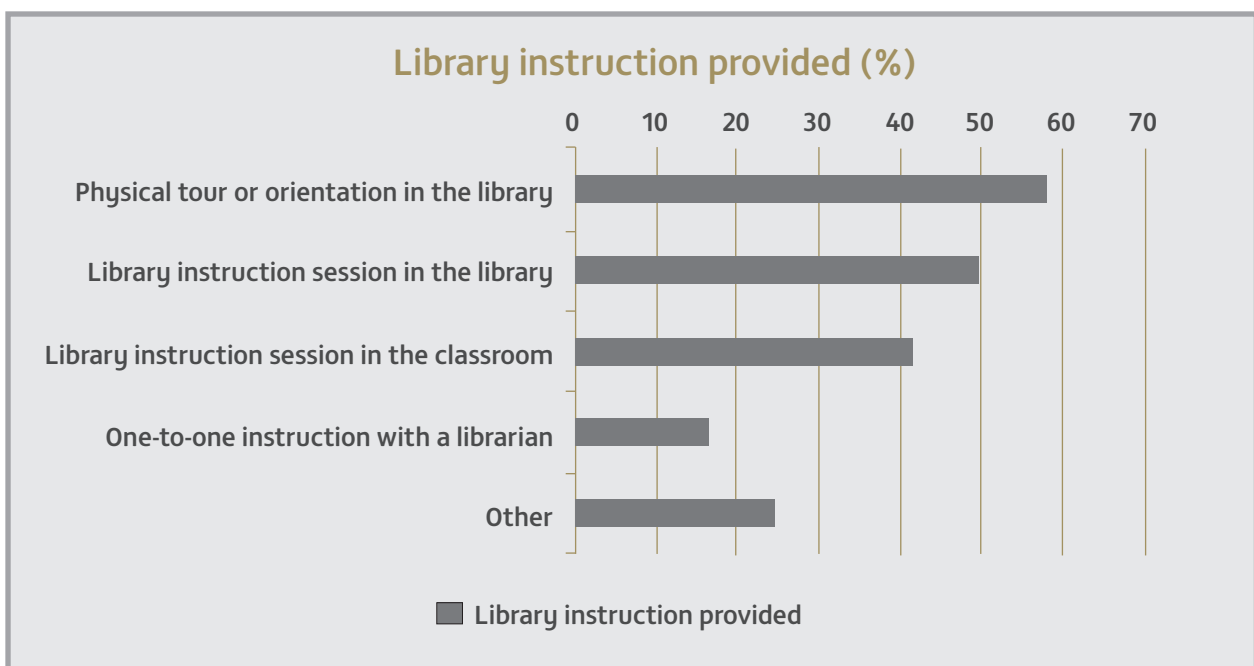
Leading on from this, the staff were asked how they assessed the students IL and DL skills. None of the responses indicated that any formal assessment of the skills took place, but rather that this took place as part of other assignment work. Respondents stated that there is *'no direct evaluation - as it reflects in their assignments'* and that it is *'not intentionally assessed but is evident in their essays and the web resources they choose to use with their pupils'*. A full categorisation of responses can be seen in Table 3 below.

**Table 3: Method of assessment**

Type of training	Number of respondents
Through an assignment	6
Evidence of accessing specific resources	2
Class activities	2
Summative assessment	1
Assessment of the quality of resources used with their pupils	1
Assessment of referencing	1
Assessment of presentation skills	1

When asked about the inclusion of library instruction in their courses, responses show a high level of access to library orientation tours (58%), instruction in the library (50%) and library instruction in the classroom (42%), with far fewer students having access to one-to-one instruction with a librarian. See Figure 6.

**Figure 6: Library instruction provided**



### Views on information and digital literacy

The next section of the questionnaire examined staff attitudes to IL and DL. All respondents indicated that they felt it was important for teachers to be information literate saying, for example, that they ‘need to be able to advise students where to go for further information’ and ‘it is vital for teachers to understand how to source, evaluate and use information’. Similarly, respondents felt it important that universities include instruction on IL (92%) and DL (100%) in their curricula for ITE programmes. One respondent said that IL material is important because:

*Students can, understandably, be preoccupied with content and often don't pay attention to how that content is presented or what agenda may be behind it. It is, therefore, important that lecturers highlight such matters and that critical thinking skills are embedded within university programmes*

Other respondents said that DL material is important because:

*Student teachers need to be educated in digital literacy if they are expected to foster this among their students. Including it in the curricula also highlights its importance and encourages student teachers to engage with it professionally and take it seriously*

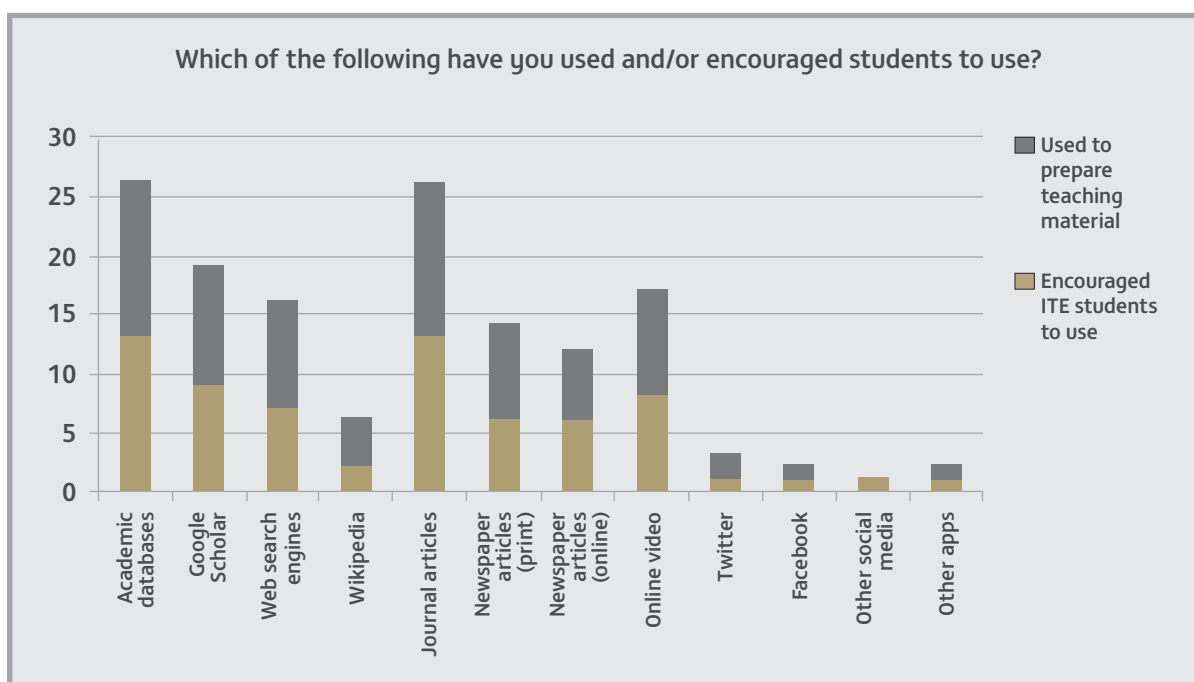
and

*Students' first port of call is likely to be online, therefore it is crucial that they are equipped to secure wide (and critical) access to what is available.*

## information behaviour

The staff were asked questions regarding their information behaviour. Staff members use a range of resources when preparing their teaching materials and also encouraged their students to use these resources. As can be seen in Figure 7 below, the most commonly used resources included academic databases, Google Scholar, web search engines, journal articles, and online video.

**Figure 7: Resources students have been encouraged to use (n=13)**





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Many teacher educators (85%) indicated that they have included IL and/or DL skills in their teaching with comments including ‘I conduct a session on DL, explaining what it is and why it is important’, ‘students prepare resources and material for assessment; students source and share journal articles from DCU databases’ and ‘It would be discussed as it may arise, particularly in the context of evaluating historical evidence’. When specifically asked whether or not discussion on the topic of ‘fake news’ had occurred, approximately half (54%) of respondents indicated that it had. One respondent said ‘Only recently when discussing video content providers. This came up as a result of the Trump election. We discussed the need to check sources and their affiliations’. Another said ‘I have only recently become aware of the term myself’. The majority of teacher educators (69%) also indicated that they intended to embed IL and/or DL skills training into their courses in the future.



# Conclusions

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The following section summarises the main findings of the report and draws together conclusions from the data gathered from both ITE students and teacher educators from Ulster University (PCGE) and Dublin City University (BSc in Education and Training; and PME). This section begins by summarising the current literature in the area which provided the motivation for this cross-border study. Conclusions are then drawn from the findings from both questionnaires, followed by overall conclusions and recommendations for future work.

## Current literature

1. While the need for student teachers to be information and digitally literate is recognised, relatively little literature has been published on teachers or student teachers' attitudes to or competence with IL and DL .
2. Research that has been conducted with pre-service teachers reveals that competence levels are inconsistent and are heavily reliant on the level and duration of ICT usage during their university education.
3. Practicing teachers also display inconsistent levels of competence with IL and DL and are hampered by barriers such as: lack of time, lack of infrastructure and lack of resources.

## Pre-service teachers' information and digital literacy skills survey

1. Pre-service teachers across the institutions see the value in receiving IL and DL skills training.
2. A large proportion of students report having received IL and DL skills training, however many associate this with ICT training such as the use of iPads.
3. Pre-service teachers rate their IL and DL skills highly, with the exception of 'how to create using digital technology'.
4. When conducting background research and sourcing material for assignments and exams, student teachers predominantly use what would generally be considered as more traditional information sources - journal articles, web search engines, academic databases and online newspaper articles.
5. When preparing teaching materials and encouraging their students to engage with information, student teachers predominantly use online video, search engines and newspaper articles.
6. In the classroom, a small number of student teachers currently use resources such as iPads and Edmodo as a means of incorporating IL and DL skills with their students.

## Teacher educators' information and digital literacy skills survey

1. Staff employ a range of strategies to develop IL and DL skills in their students such as: searching for resources online, evaluating resources and access academic databases.
2. No formal assessment of IL or DL takes place, rather this is incorporated as an element of assignment work such as: evidence of accessing resources, and through class activities.
3. Staff believe that institutions should include specific instruction on IL and DL skills.
4. Staff members use a range of resources when preparing their teaching materials such as: academic databases, journal articles, google scholar and online video. Staff also encourage students to engage with these resources.

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The findings from the pre-service teacher and teacher educator surveys above indicate that both staff and students recognise the importance of IL and DL and the need to include specific instruction as part of ITE programmes. ITE students and staff engage with a range of digital resources and actively encourage their use, however the data presented above indicates that a structured and more focussed approach to IL and DL skills training may result in a better understanding of the concepts, their use in teaching, and the assessment of these skills prior to completion of ITE. Subsequent research could focus on best practice internationally in terms of embedding IL and DL instruction in initial teacher education courses as well as exploring the scope for explicitly utilising the IL standards for teacher education created by the EBSS Instruction for Educators Committee. The need for critical information and digital literacy skills is not going to decrease in the future. Our student teachers need to have the skills and competencies to use a wide range of information sources and tools, to incorporate them into their classroom teaching and learning practices, and to enable pupils to also understand the importance of critically engaging with information and the skills to evaluate, use and create information effectively.

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# Appendices

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## Appendix A: Student survey

- Q1. I confirm that I have been given and have read and understood the information sheet for the above study and have asked and received answers to any questions raised.  
Yes / No
- Q2. I understand that my participation is voluntary.  
Yes / No
- Q3. I understand that the researchers will hold all information and data collected securely and in confidence and that all efforts will be made to ensure that I cannot be identified as a participant in the study.  
Yes / No
- Q4. I agree to take part in this study.  
Yes / No
- Q5. What does it mean to you to be information literate in the digital age?  
Open-ended question
- Q6. Digital information literacy involves the ability and skills to: know when and why you need information; be able to find appropriate information online; evaluate, use and communicate it in an ethical manner; and be able to create information using digital technologies. Please rate your knowledge of the following (Excellent; Good; Average; Poor; Don't know):
- Knowledge of when and why you need information
  - Knowledge of where to look and how to find information
  - Knowledge of how to evaluate information that is found
  - Knowledge of how to organise, use, communicate and share information
  - Knowledge of how to create information using digital technologies
- Q7. Did you receive any information literacy / digital literacy training while on your course?  
Yes / No / Don't know
- Q8. Do you think it is important for a teacher to be information literate in the digital age?  
Yes / No / Don't know
- Q9. How important is it for university-based teacher education courses to include digital information literacy in their curriculum?  
Important / Neither important nor unimportant / Unimportant / Don't know
-



Q10. Which of the following have you used? (please tick all that apply)

	Used to do background research when studying	Used and cited in coursework/exams	Used to prepare teaching material	Encouraged pupils to use
Academic databases				
Google Scholar				
Web search engines such as Google, Bing, Yahoo				
Interactive whiteboard				
Wikipedia				
Journal articles				
Newspaper articles (print)				
Newspaper articles (online)				
Online video				
Twitter				
Facebook				
Other social media				
Other apps				

Q11. Have you ever brought information literacy and/or digital literacy skills into your teaching and classroom practices?

Yes / No / Don't know

Q12. Do you intend to integrate information literacy and/or digital literacy skills into your future teaching and classroom practices?

Yes / No / Don't know

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- Q13. The following citation is for:  
Kennedy, M. M. (1999). The problem of evidence in teacher education. In: Roth, R. (Ed). The Role of the University in the Preparation of Teachers (p87-107). London: Falmer Press.  
A book / a chapter in a book / a journal article / an ERIC document
- Q14. For the following citation:  
GaStateULibrary 2009. Boolean operators [Online]. Available from: <http://www.youtube.com/watch?v=7tm-sDKCnO4&feature=related> [Accessed 8 July 2010].  
What is the title of the video?  
When was it uploaded?  
What site was it sourced from?  
Who uploaded or created the video?
- Q15. Overall, how would you rate your ability to search library databases to find information?  
Excellent / Good / Average / Poor
- Q16. Overall, how would you rate your ability to search the Internet to find information?  
Excellent / Good / Average / Poor
- Q17. I carefully evaluate the information I find to determine whether it is accurate, believable, appropriate for my use  
Frequently / Occasionally / Rarely
- Q18. I use information I have found online ethically and know how to appropriately cite references  
Frequently / Occasionally / Rarely
- Q19. Please indicate what kind of library instruction you received during your course, if any. (Tick all that apply)  
Physical tour or orientation  
Library instruction session in your classroom  
Library instruction session in the library  
One-to-one instruction with a librarian
- Q20. What is your gender?  
Open-ended question
- Q21. What university course do you attend?  
Dublin City University: Professional Master of Education  
Dublin City University: BSc  
Ulster University: PGCE
- Q22. Thank you for completing the questionnaire. If you wish to add any other comments about pre-service teachers' understanding of information literacy in the digital age please do so here.  
Comment box
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## Appendix B: Staff survey

- Q1. I confirm that I have been given and have read and understood the information sheet for the above study and have asked and received answers to any questions raised.  
Yes/No
- Q2. I understand that my participation is voluntary.  
Yes/No
- Q3. I understand that the researchers will hold all information and data collected securely and in confidence and that all efforts will be made to ensure that I cannot be identified as a participant in the study.  
Yes/No
- Q4. I agree to take part in this study.  
Yes/No
- Q5. Please indicate what kind of library instruction is provided during your course, if any. (Tick all that apply)  
Physical tour or orientation  
Library instruction session in your classroom  
Library instruction session in the library  
One-to-one instruction with a librarian
- Q6. What information literacy and/or digital literacy skills (if any) do you develop or include as part of your course?  
Open-ended question
- Q7. How do you determine if students have developed these skills?  
Open-ended question
- Q8. Do you think it is important for a teacher to be information literate?  
Yes / No / Don't know
- Q9. How important is it for university-based teacher education courses to include information literacy in their curricula?  
Important / Neither important nor unimportant / Unimportant / Don't know
- Q10. Do you think it is important for a teacher to be digitally literate?  
Yes / No / Don't know
- Q11. How important is it for university-based teacher education courses to include digital literacy in their curricula?  
Important / Neither important nor unimportant / Unimportant / Don't know
-

Q12. Which of the following have you used and/or encouraged students to use? (please tick all that apply)

	Used to prepare teaching material	Encouraged students to use
Academic databases		
Google Scholar		
Web search engines such as Google, Bing, Yahoo		
Interactive whiteboard		
Wikipedia		
Journal articles		
Newspaper articles (print)		
Newspaper articles (online)		
Online video		
Twitter		
Facebook		
Other social media		
Other apps		

Q13. Have you ever brought information literacy and/or digital literacy skills into your ITE teaching?

Yes / No / Don't know

Q14. Do you intend to integrate information literacy and/or digital literacy skills into your ITE teaching in the future?

Yes / No / Don't know

Q15. Have you had any discussion with your students about 'fake news' and how to equip students and pupils to recognise fake news?

Yes / No / Don't know

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Q16. What is your gender?

Open-ended question

Q17. How long have you been involved in teacher education?

4 yrs or less / 5-9 yrs / more than 10 yrs

Q18. What course(s) are you involved in the delivery of?

Dublin City University: Professional Master of Education

Dublin City University: BSc

Ulster University: PGCE

Q19. Thank you for completing this questionnaire. Please use the space below if you have any other comments you wish to add about information literacy / digital information literacy and pre-service teachers in Northern Ireland / Ireland.

Comment box