

TOWARDS A NATIONAL DIGITAL SKILLS FRAMEWORK FOR IRISH HIGHER EDUCATION

Review and comparison of existing frameworks and models

ALL ABOARD!

Enabling &
Empowering Staff &
Students to Flourish in
the Digital Age

www.allaboardhe.org

Towards a National Digital Skills Framework for Irish Higher Education

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This document provides a review and synthesis of a range of existing papers, policies and frameworks relating to digital skills and information literacy, with a focus on higher education. In addition, it summaries the development of a practicable draft framework for Irish Higher Education and presents the working model for the subsequent activities of the All Aboard project.

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¹ Listed in Appendix 3

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Introduction

“Digital technology is an important ally for higher education”

(Mary McAleese, National Forum 2015a, p.iii)

Digital technologies and online resources now permeate all areas of our lives in working, living, learning and social contexts. For students and staff in higher education digital skills are especially vital, but increasingly we all need to know how to use digital tools, find good quality information, be critically aware of the strengths and shortcomings of such information, be able to make sense, interpret and apply that information for our needs, then communicate our findings and, potentially, also develop both confidence and creativity in using and engaging with tools and resources. In Ireland, the government’s *Doing More with Digital* report found that

“Digital already supports almost 95,000 jobs both directly and indirectly in the Irish economy. These employment levels and positive growth prospects underline the importance of ensuring that digital is at the heart of Ireland’s economic agenda.” (Ireland, Department of Communications, Energy and Natural Resources, 2013, p.2)

While it has been forecast that by 2015 only 1 in 10 jobs will not require e-Skills the most recent progress report on digital skills in the general European population found that 47% of citizens did not have the basic skills to function in the digital society (European Commission 2015b).

In 2015 the *Mission-based Performance Compacts* of Irish Higher Education Institutions featured Digital capacity “as an important but as yet not fully defined enabler” of strategic change (Devine 2015, p.12). The National Forum commissioned report *Strategic and Leadership Perspectives on Digital Capacity in Irish Higher Education* recommended, therefore, that this lack of definition should be addressed by leadership taking steps towards mapping Continual Professional Development for academic staff, taking an outcomes-based approach.

The *National Forum Digital Roadmap* (2015a) meanwhile identified the need for the development of digital skills and competencies for staff and students alike, prioritising the development of “A co-ordinated, multi-level approach to foster digital literacy, skills and confidence among students at all levels of education” (Recommendation 4, priority 1).

The All Aboard project is a response to these calls (and their predecessors) and sets out to both develop a useful digital skills framework which spans the higher education sector and provide resources for training and skills development. This report focuses specifically on the development of the framework, identifying relevant previous and ongoing work elsewhere. The approach being taken is a collaborative one, working across institutions and across professional support areas.

Methodology

This report addresses a cross-institutional, cross-functional perspective on digital skills development in staff and students in higher education. It begins by considering the concept of digital literacies, looks at

work already done in this area, and finishes with a proposed framework for the development of digital skills in higher education in Ireland.

Clearly, this is an area in which there has already been substantial development at national and international areas, with an extensive and growing literature as well as emerging institutional and sectoral strategies. Our first priority was therefore to undertake a comprehensive review of this work, identifying the common threads and establishing the extent to which existing frameworks might be translatable or adaptable to the Irish HE context and the broad remit of the All Aboard project.

As an area of current research and scholarly activity, it was appropriate also to engage directly with many of those who would be considered ‘key players’ in the field, seeking advice, sharing ideas and ensuring that we are aware of trends and developments. In addition, we exploited a number of opportunities to present, and host discussions, at conferences and workshops scheduled over the time period of this study, using such events also to seek suggestions and feedback from as many participants as possible (both online and via handed-out and collected formats)².

We took some care to clarify the basic concepts and definitions (delineating for example between ‘skills’ and ‘literacies’) to develop a shared understanding and to help define the scope of the review. A systematic approach was taken to identify a wide range of existing or proposed national, European and international frameworks; those which were designed for specific domains (eg libraries, education, ICT and industry) or subject discipline oriented. From these we selected a number (12) which most closely aligned or matched with our project goals and which held most promise in being able to inform the development of an appropriate framework for Irish HE that spanned both the needs of staff and students. Appendix 1 provides a list of all frameworks considered.

Finally, we focused in on the key dimensions or themes of digital skills/literacies, identified through the literature and inputs from our broader consultations and discussions, and developed a proposed initial framework which we hope will form a useful basis for further discussion and as a practical tool for the subsequent phases of All Aboard. The intention is for an approach that is flexible, whilst being comprehensive and accessible. It aims to be adaptable to a range of different use-cases and professional development contexts within the sector,

Mapping Digital Skills in Higher Education

As eloquently captured in the reports of the *European High Level Working Group on the Modernisation of Higher Education* (2013 and 2014), new technologies and new pedagogies go hand in hand.

Technologies can open up new, previously impossible, opportunities for learning and provide creative potential for the design of educational materials and experiences. In addition, a renewed focus on the importance of sound learning design, research-informed and reflective practice in teaching in higher

² For an informal review of these activities visit the project blog at: <http://allaboardhe.org/2015/taking-stock-how-we-got-to-where-we-are/>

education has identified the scope for technology to enhance (as well as a clear, critical analysis of its limitations) the effectiveness of learning and teaching.

Building ‘digital capacity’ however is about more than simple ‘competency’ training and, rather, is about moving towards ‘confidence’ and nurturing opportunities for critical thinking, problem solving, creativity and innovation.

“The path to digital maturity consists of two interweaving developments: The first concerns achieving digital performance, while the second involves the transformation of the organization’s DNA, from industrial to digital. Both characteristics, performance and essence, are necessary for a sustainable digital future.” (Confalonieri 2015)

The National Forum’s study of the current state-of-play in Irish Higher Education, suggests that both e-learning and the implementation and embedding of a range of technologies in on-campus teaching are “fragmented, piecemeal and often unsustainable,” (2015a p.18). The vision for *Digital Capacity* outlined by the Forum describes a sector that is characterised by a learning experience and environment in which, among other things:

- Digital literacy and digital skills for teaching and learning are developed, supported and fully embedded.
- Students will have access to a range of technological supports and resources to enhance their learning in a manner that enables them to become lifelong learners in the digital world.
- Teachers will be fully enabled to use digital technologies/resources where appropriate, in order to enhance student learning within their disciplines
- Institutions collaborate with each other, and with the schools and further education sectors in order to build digital capacity for teaching and learning, with students as key partners in the process. (2015a, p. vi)

Skills for Students

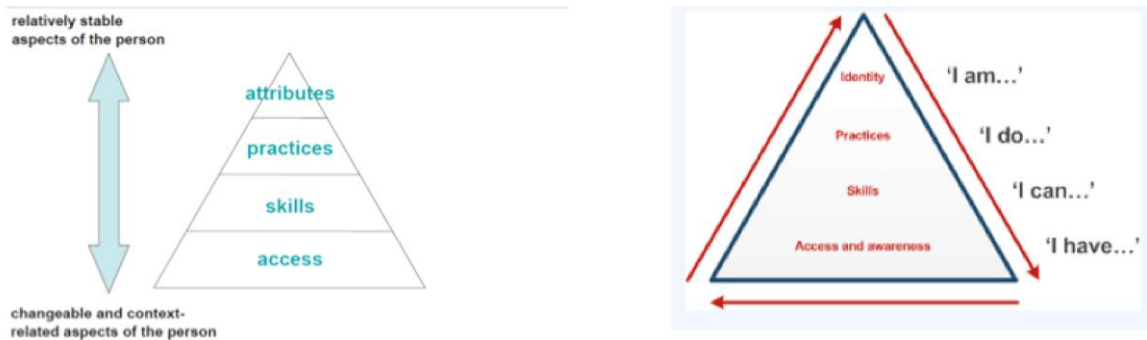
The engagement of students as partners is a key principle underpinning the National Forum’s Digital Roadmap, and JISC in the UK similarly identify engagement with students as one of the seven key challenges that institutions need to address.

“Staff and students have different digital literacy skills sets. Combining the digital bravery of the students with staff knowledge and expertise of a given domain can allow you to critically investigate digital practice in a subject.” (Pettiward 2015).

Amongst the recommendations in the Digital Roadmap document, the first is the need to prioritise “the strategic development of digital capacity in institutional and national policy and quality frameworks in a way that supports innovation for impact.” A particular priority identified is to develop “a co-ordinated, multi-level approach to foster digital literacy, skills and confidence among students at

all levels of education.” This should include the development of graduate attributes that incorporate digital awareness and literacy (2015a, p.30).

Because students have such familiarity with using technology in their everyday lives it is often assumed that they have the knowledge and the skills to apply it to their learning. However, as Beetham & Sharpe’s well-known pyramid model shows (Beetham & Sharpe 2009, Beetham 2010), deeper learning involves more than access and skills, the “I am” that reflects higher level capabilities.



Learning development pyramid (Beetham and Sharpe 2009, Beetham 2010)

The Roadmap (2015a, pp.6-8) in its summary of some of the “myths” associated with digital learning, emphasises this point. ‘The myth of the digital native’³ risks making inappropriate assumptions.

Students separate social and formal digital usage, and technology use for entertainment does not necessarily imply readiness to learn through digital systems; there is also a fundamental difference between relating to digital media as a ‘consumer’ of content and being a ‘producer’ or using the technologies as a set of tools for learning and the construction of knowledge, meaning and understanding.

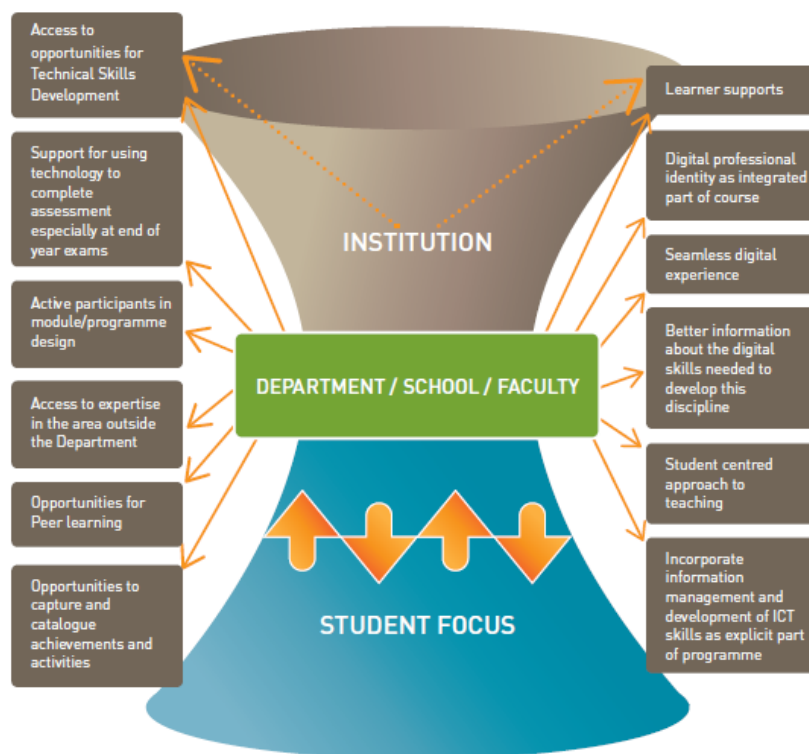
Students’ experience with technology is varied. Not everybody has access to broadband (though students’ expectation of the institution is certainly that WiFi should be a basic entitlement), and experience of and comfort with technology may well be very different for a mature student than for an 18-year old undergraduate. But all students face the challenge of new ways of engaging with learning. For some students the relationship with the institution begins online, and this relationship strengthens as they progress through their studies, for others there is a danger of alienation and an increasing sense of discomfort.

The growth in use of tablet computers, mobile phones and other portable and personal technologies means that students can engage with learning 24/7, and may have high expectations regarding

³ A topic which was also addressed and explored in some detail in the Seminar/workshop held in NUIG in March 2015 on “Marvellous Mapping: Reflecting on online identities and practices using Visitors and Residents Mapping” by Dave White and Donna Lanclos. <http://www.teachingandlearning.ie/event/navigating-marvellous-mapping-reflecting-online-learning-practices/>

responsiveness. Distinctions between formal and informal modes of communication (as well as types of learning) are increasingly blurred, and this can be a challenge. The range of resources available to the student is much broader than the information provided just by their institution, and students need support in developing the skills to analyse the quality (e.g. veracity, reliability, accuracy, currency) of resources for themselves and to be aware of protocols around, for example, fair use and copyright. Some students, comfortable with technologies, are increasingly seeing themselves as creators, not just as consumers, and it will be to the benefit of all to engage at that level.

The Roadmap document provides an illustration (2015a, p. 20, reproduced below) of the changes that students would like to see introduced at institutional level (as identified in the *National Survey of Students in Higher Education*).



Students are, of course, also focused on their longer term employment prospects and it is vital that they feel that their education provides them with the necessary skills and attributes for work as well as life. The employment ‘readiness’ of graduates and citizens is an identified priority at the European level where, for example, the Commission is leading a multi-stakeholder partnership, the *Grand Coalition for Digital Jobs*, to tackle the lack of digital skills and unfilled ICT-related vacancies across all industry sectors. Nationally, in Ireland, the Higher Education Authority’s (2015) survey of employers indicates that the education system is apparently not providing sufficient graduates with a number of important skills and recommends:

- A greater level of soft skills transferrable into the working environment, e.g. verbal and written communication, teamwork, grammar
- More technical skills such as, problem solving, analytical skills, data analysis

- An entrepreneurial spirit
- General presentation skills.

Any valuable digital skills framework should ensure that it also reflects some of these aspects, utilising and embedding technology where appropriate into curricula and graduate outcomes.

Skills for Students – example initiatives

From amongst the example frameworks and initiatives reviewed in this project (see pages 25-31) we can identify a number of exemplary projects that emphasise student engagement and skills development.

- The *Student Ambassadors for Digital Literacy (SADL)* project at the London School of Economics is an excellent example of how students can take responsibility for their own learning. They are incentivised to become ambassadors to improve their digital skills by receiving vouchers and given a statement on their Personal Development Aide Memoire (PDAM). The content of the workshops focuses on skills which are necessary and relevant for working and learning online such as blogging to reflect on learning and managing their digital footprint. The students have the opportunity to share their knowledge through peer learning and also to work with other departments.
- The shadow modules from the *Digidol* project at Cardiff University provide another example of students having the opportunity to learn using technology and through collaboration.
- The Deakin University Library *digital literacy tutorials* also underpin the concepts of finding quality information which can be available in many formats, the importance of knowing how to critique information and communicating responsibly online.
- The JISC *Digitally Ready* project developed a digital literacy workshop for students which is based on the “AAAR pirate” model of learning (Analyse, Acquire, Articulate & Reflect) and draws on the importance of self-assessment.

The experience in each of these examples highlights the importance of collaboration and co-ordination across support units, departments and other organisations. They also, in most cases, provide some form of recognition that demonstrates that the students have attained a certain level of proficiency or extent of engagement.

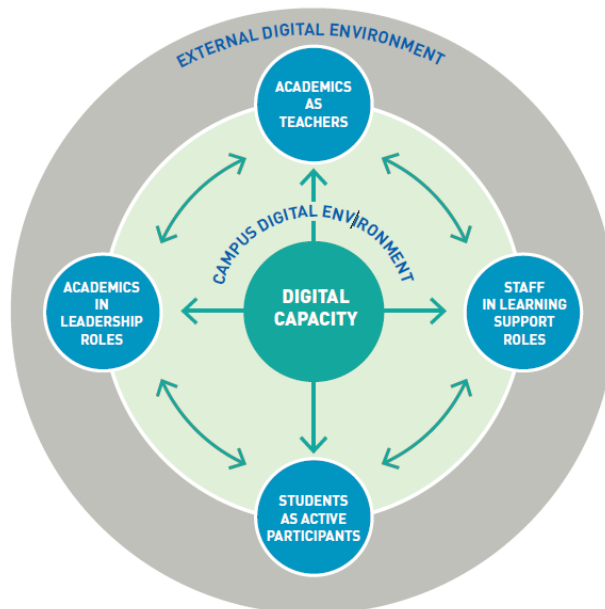
Skills for Staff

For staff, as for students, the development of high level digital skill-sets involves more than mere functional competency in the use of digital tools. There was, for example, substantial agreement (77%) among respondents to the *E-Learning in European Higher Education Institutions* survey (Gaebel et al 2014) that e-learning changes the approach to teaching and learning (ibid, p. 44). Staff may introduce digital innovations into their teaching practices in response to the challenges of changing expectations and learning experiences – for example, more part-time and distance learning students, and more

digitally savvy students – but innovations may also be introduced to enhance or even to radically alter traditional teaching. For example, initiatives in *digital humanities* allow hitherto undreamed of access to primary sources, and across the disciplines visualisations give us the ability to combine and interpret data in ways that provide new insights.

Today the use of tablets and mobile platforms have become part of everyday experience and we have seen the popularity of ideas such as MOOCs and of open educational resources, of BYOD (Bring Your Own Device), and of the flipped classroom and fully online learning. The mainstreaming of badges, gamification and learning analytics is just ‘on the horizon’, and 3D printing and wearable technology are expected to be considerably more widespread by 2018 (New Media Consortium 2014 pp. 5-6). There are social and pedagogical implications to all of these technological innovations and it is important that we address the balance between innovation and the learning experience of students. Staff in higher education need not only to know *how* to use the technologies, but to develop teaching strategies that incorporate an understanding of the impact on students’ learning of these new ways of engaging with learning and with information.

To prepare for and adapt to this changing environment, argues Tom Devine in a recently commissioned report for the National Forum (Devine 2015), the focus for university leadership “has shifted decisively towards questions of professional development of academic staff in their teaching roles and to the organisational factors that must be addressed in order to embed changes of scale and sustainability.” The leadership perspective, he concludes, should take into account the significant potential of bottom-up innovation whilst at the same time situating that in a wider strategic institutional context: “Significant digital capacity can only be built through sharing and alignment of perspectives that also include those provided by individual academic staff as practitioners, staff in learning support roles [professional services staff] and, of course, students themselves” (ibid p.2).



Alignment of Digital Capacity Perspectives (Devine 2015 Figure 1 p.21)

Staff need departmental and institutional support (particularly in terms of time and recognition) to develop the necessary skills: “Without a collective imperative at the level of academic programmes or a strategic perspective at the level of their academic department, and access to the necessary time for targeted CPD to explore its pedagogical potential and build confidence in its use in the classroom, many teachers perceive that it is difficult for them to use technology to its best effect in their teaching” (National Forum 2015a, p. ix). Recognising the importance of digital literacy at an institutional level, means facilitating processes such as workload allocation, reward (not just award) systems and, potentially formally acknowledging digital champions and encouraging digital innovation.

Broader professional development frameworks for academic staff, such as that currently being developed by the National Forum (or, similarly, the UK’s Professional Standards Framework (UKPSF 2011)) will of course need to retain a pedagogical and academic practice focus, but with an emphasis on *learning design* it will be possible to integrate the technology in a purposeful and considered manner.

The All Aboard initiative is a response to the need, not just for institutional-level support, but for a national strategic drive towards the provision of skills development opportunities, in keeping with the call from the Forum for such to be part and parcel of academic CPD and to offer “a consistent, seamless and coherent digital experience for students in Irish higher education [that] actively engage[s] with students and teachers to develop their digital skills and knowledge” (National Forum 2015a, p. ix).

In the original proposal for All Aboard, we also argued that one of the limitations of much existing work in digital literacies and skills development is that it has focused on only two primary constituent groups, students and academic staff, yet universities, IoTs and Colleges are complex organisations much of whose critical functions are undertaken by a range of other professionals (including Library, IT and technical officers) and a large number of administrative, clerical, financial and support colleagues. For many such staff the training offered to them tends to be directly linked to their current post, rather than raising awareness and knowledge of the institution’s broader work across all its spheres of activity. We feel that this has been an unfortunate oversight given the acknowledged importance of building collegiality, institutional engagement and indeed scope for future change of posts. Consequently, the framework which we aim to develop, will allow anyone working or studying in higher education to be able to see the range of activity and the broader technological landscape, regardless of their current role. An overarching map of the environment, with an indication of the sorts of specific knowledge and skills needed as well as where they overlap or cross boundaries between organisational structures and activities, is what we aspire to and which we believe could help to bolster that sense of belonging, co-ownership and opportunity.

Example Initiatives

From the number of useful digital skills frameworks and projects later in this document (see pages 25-31) the following provide relevant examples.

- In Deakin University there are digital literacy tutorials which showcase resources available for learning activities and assessment through staff videos based on concepts such as knowing how to use online tools to create engaging content.

- The Careers & Employability case study as part of JISC *Digidol* importantly focused on the need to develop digital literacy skills as a department and individually with a view to future requirements of students. Some approaches included setting up online communities and away days for discussions.
- The *Knowledge Hub*, which was also developed as part of the Digidol project, links people to content and tools through concept mapping software and is a very practical way of illustrating how skills might be put into practice for both staff and students.
- *In the making.....caught on camera* - Short case study videos to capture examples of technology being used by academic staff across the University of Bath as part of the JISC *PriDE* project, creating awareness of different types of technology and how it can be used for teaching and learning.
- In the professional domains such as Library and IT staff, there are professional development frameworks, specialist qualifications, etc. Such are often shaped by professional bodies, or even via national or European level coordination. One example of the latter, for IT staff in any company or organisation is the European e-Competence Framework (CEN 2014)/.
- For the general digital skills and capabilities of staff who are not technology-oriented specialists, frameworks that are aimed at public education and awareness, such as DigComp (Ferrari 2012) are more relevant and accessible⁴. The All Aboard approach is to build on such broader perspectives whilst enabling deeper levels of engagement for those who require (or desire) so to do.

Skills for the Digital Age - Terminology

There is considerable variation and even ambiguity around the terminology, concepts and elements that relate to digital skills, with the terminology used often being context-dependent. This variation reflects both the rapid development of digital technologies and the range of disciplines, industries and organisations that contribute to and shape them.

‘Digital’ is the term used most often to describe the inclusion of new information and communication media in very many aspects of education, work, entertainment and social aspects of life. Previous terms used to describe this were ‘online’, ‘networked’, or ‘computer-based’. Digital competencies incorporate several concepts, including established competencies of computer or ICT literacy, information literacy and media literacy, on to newer concepts of transliteracy and multimodal literacies. Each concept has developed in a particular context, domain or organisation.

⁴ Indeed, simple self-audit tools and personal portfolios such as that of Europass (<https://europass.cedefop.europa.eu/editors/en/cv/compose>) will be very useful adjuncts to our framework, facilitating learner autonomy/responsibility. The more detailed European e-Competence model for ICT Professionals also provides such tools: <http://profiletool.ecompetences.eu/>

The field is a rapidly evolving one, continually developing in response to innovations in the digital landscape and the consequent effects on society and culture. The various domains contributing to the concept have led to a “jargon jungle not easy to breach” (Ferrari 2012, p.11) and to a multiplicity of definitions that make it difficult to achieve consensus. The language and terminology used commonly refer to ‘skills’, ‘literacies’ or ‘competencies’ and sometimes to all three used together or interchangeably. These multi-literacies include the overlapping elements of information and data literacy, media and visual literacy and an evolving range of academic, communication, creative and participative domains. All of these domains are engaged with the digital sphere; meaning that today ‘digital skills’ extends in meaning well beyond the original narrower, IT skills based definition.

Digital Literacies

Literacy or **literacies** is the most frequently used term in the contemporary discussions of the digital in education. It is used to bring together knowledge, attitudes and skills, and so encompasses the basic ability to use digital devices and applications as well as allowing for the development of a level of critical, reflective and strategic capability in various areas of application and practice.

The definition of ‘literacy’ thus has expanded and this is can be demonstrated (for example) in the official definition proffered by the National Council of Teachers of English in the US in 2013:

“Literacy has always been a collection of cultural and communicative practices shared among members of particular groups. As society and technology change, so does literacy. Because technology has increased the intensity and complexity of literate environments, the 21st century demands that a literate person possess a wide range of abilities and competencies, many literacies. These literacies are multiple, dynamic, and malleable. As in the past, they are inextricably linked with particular histories, life possibilities, and social trajectories of individuals and groups. Active, successful participants in this 21st century global society must be able to:

- Develop proficiency and fluency with the tools of technology;
- Build intentional cross-cultural connections and relationships with others so to pose and solve problems collaboratively and strengthen independent thought;
- Design and share information for global communities to meet a variety of purposes;
- Manage, analyze, and synthesize multiple streams of simultaneous information;
- Create, critique, analyze, and evaluate multimedia texts;
- Attend to the ethical responsibilities required by these complex environments.”

UNESCO (2006) has also considered the development of the term to now embrace “four discrete understandings of literacy:”

- Literacy as an autonomous set of skills;
- Literacy as applied, practised and situated;
- Literacy as a learning process;
- Literacy as text.

Paul Gilster is recognised as the first to have published the term “digital literacy” in his book *Digital Literacy* (New York, 1997) in which he defined the term as the “ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers.” Gilster identified that the growth in digital technologies required a different set of skills, attitudes and competencies than the tools and operations focus of ICT in the previous two decades. He understood that the ability to access, understand and critically analyse digital content and applications were increasingly important in an information and technology abundant environment, and he identified four key competencies: (a) assembling knowledge, (b) evaluating information, (c) searching, and (d) navigating in non-linear modes. In identifying critical thinking as the key aspect of digital literacy, Gilster’s emphasis on critical selection and evaluation moved digital literacy towards reflective competence and away (somewhat) from purely technical skills.

ICT Skills

During the 1980’s and for much of the 1990’s ‘ICT skills’ or ‘computer skills’ were the terms most frequently used and would have been understood to mean those skills and abilities necessary to operate the new computer-based technologies which might have included hardware (eg PC, Apple Mac) and software (such as word-processing, spreadsheets, etc).

As described above, the modern concept of ‘digital skills’ has evolved from this rather basic conception towards a set of more complex multi-literacies that are considered necessary to thrive (and not just to merely survive) in a digital world. The current concept now includes knowledge and attitudes/dispositions, in addition to skills and “the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyse and synthesise digital resources, construct new knowledge, create media expressions and communicate with others in the context of specific life situations in order to enable constructive social action and to reflect upon this process” (Martin and Grudziecki 2006).

Information Literacy

During the early years of ICT skills development, the trends towards student-centred teaching and independent learning caused librarians to redefine and expand the well-established concept of ‘bibliographic instruction’ to incorporate a broader range of approaches to dealing effectively with information and knowledge. The first use of the term *information literacy* can be traced back to

Zurkowski in 1974 and its use intensified as large volumes of unmediated information were made available as a consequence of digital technologies. The Association of College and Research Libraries noted in 2000 that “the uncertain quality and sheer abundance of information pose large challenges for society.” This required new skills in effectively finding, evaluating and managing information as “a means to empower people in all walks of life to seek, evaluate use and create information effectively to achieve their personal, social, occupational and educational goals” (UNESCO 2008).

The American Library Association definition of information literacy is to “recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (ALA 2000). This is probably one of the more widely known and adopted definitions for information literacy. The concept gained momentum as digital technologies continued to transform the sources and applications of knowledge, particularly in third level education. By 2000 SCONUL had developed a Seven Pillars model of information literacy for students in higher education which incorporated five stages of increased competence from novice to expert. This model was widely used to build learning outcomes for information skills and research training programmes.

In the following decade a number of other definitions and frameworks emerged. These include: ACRL 2000, ANZIL 2004, CILIP 2004, and CONUL 2000. Many of these iterations were a consequence of the evolving digital landscape as technologies permitted greater access to a wider range of information sources and expectations of expertise and skill were extended. By 2003 the concept of ‘the information society’ and the importance of information skills were well established and UNESCO’s Prague Declaration of that year emphasised the global importance of information skills.

Mackey (2010) presents information literacy as the ‘metaliteracy’ for a digital age because it provides the higher order thinking required to engage with multiple document types through various media formats in collaborative environments. “Metaliteracy promotes critical thinking and collaboration in a digital age, providing a comprehensive framework to effectively participate in social media and online communities, supporting the acquisition, production and sharing of knowledge in collaborative online communities.” (Mackey 2011, p.70).

SCONUL updated its original 7 pillars framework in 2011 to account for the changing terminology and concepts surrounding information literacy and to incorporate associated elements of digital literacy. The new framework is student and outcome focused. This model defines the core skills & competencies and attitudes & behaviours central to information literacy development in higher education. A series of “lenses” is being developed for different user populations to enable the model to be applied in specific situations. The first of these, developed by Vitae⁵ is *the Information literacy lens on the Vitae Researcher Development Framework using the SCONUL Seven Pillars of Information Literacy*. This application illustrates the converging impact of information and digital literacies on teaching, learning and research.

⁵ <https://www.vitae.ac.uk/>

The recently published ACRL Standards for Higher Education have adopted Meyer and Land's (2003) idea of 'threshold concepts' which has gained considerable currency in curricular development in recent years and is often used to address students' barriers to conceptual understanding. "Threshold concepts are those ideas in any discipline that are passageways or portals to enlarged understanding or ways of thinking and practicing within that discipline" (ACRL 2015). The *Framework* is organized into six frames, each consisting of a concept central to information literacy, a set of knowledge practices, and a set of dispositions.

1. Authority Is Constructed and Contextual
2. Information Creation as a Process
3. Information Has Value
4. Research as Inquiry
5. Scholarship as Conversation
6. Searching as Strategic Exploration

This approach has gained ground in a number of institutions (including in Ireland, DKIT) and its use in the context of information literacy is described in Townsend, Brunetti & Hofer (2011).

In summary then, information literacy definitions and frameworks have been seen as key underpinnings for survival in the complex information landscape and digital world in which we now live and work. That we need to move beyond purely operational/functional competencies and recognise the importance of nurturing higher order, critical thinking and problem solving skills is widely agreed and at the core of much of contemporary education policy.

Media literacies

The growth of 'media' (such as video, audio, TV, film, as well as print materials) in all its formats and its central role in culture, news, marketing, etc, over the past century necessitates greater attention and understanding of how such is constructed and interpreted – a 'media literacy' in other words, which helps analyse, interpret and subject to scrutiny how messages, representations and ideas are conveyed in such formats. Media literacy examines what we read, hear and see and assesses the effect of the medium as well as the message. It is a rapidly evolving field in tandem with the development of new media formats. However, its essential focus is on accessing, understanding and creating communication.

UNESCO in 2013 proposed a combined 'media and information literacy,' MIL, (encompassing news, television, film, computer, internet, digital and social media). "They want MIL to be understood as a composite concept that unifies many literacy types and also encompasses knowledge, skills and attitudes" (Sturdy 2015, p465).

Visual literacies

In a similar way, the increasing preponderance of visual images in all aspects of daily life has led to the use of the term 'visual literacies', originating in art education and extending beyond to cover

understanding of all forms of images (moving and still) and graphical representation. In recent times the rapid growth of data visualisation techniques (and, more informally perhaps, ‘infographics’), for example, adds new capabilities and new challenges to the skill-sets of those working in a wide range of industries as well as being increasingly important for active citizenship in terms of being able to make sense of and participate in argument and debate in the political, economic and cultural spheres.

Evolving definitions

There is an obvious overlap and convergence between these various literacies as they respond to and are shaped by the changes that digital technologies are bringing to all aspects of our lives. Martin and Gurdziecki in the DigEuLit project (2006) sought to integrate these in a multi-level system of digital competence, ranging from basic skills to more critical and evaluative approaches including attitudes and awareness as appropriate to their needs and life stage. “Digital literacy involves the successful usage of digital competence within the life situation.”

The concepts of digital literacies continue to evolve as new aspects of digital technologies gain prominence. The UK Futurelab ‘s Handbook (2010) provides a definition based on creating and sharing:

“To be digitally literate is to have access to a broad range of practices and cultural resources that you are able to apply to digital tools. It is the ability to make and share meaning in different modes and formats: to create, collaborate and communicate effectively and to understand how and when digital technologies can best be used to support these processes.”

2010 also saw Hayes and Payton define digital literacy as

“the ability to make, represent and share meaning in different modes and formats; to create, collaborate and communicate effectively and to understand how and when digital technologies can best be used to support these processes.”

When viewed through an education lens the working definition used by the DigiLit project in Leicester University, is particularly useful:

“Digital literacy refers to the skill, attitudes and knowledge required by educators to support learning in a digitally-rich world. To be digitally literate, educators must be able to utilise technology to enhance and transform classroom practices and to enrich their own professional development and identity. The digitally literate educator will be able to think critically about why, how and when technology supplements learning and teaching. “

Littlejohn, Beetham and McGill in 2012 offered another definition in an education context:

“By digital literacy we mean the capabilities required to thrive in and beyond education, in an age when digital forms of information and communication predominate”

Although 'literacy' or 'literacies' has now become established as the most commonly used term to encapsulate these ideas, they are not without (academic) challenge. The use of the term 'competency' or 'competencies' finds more favour amongst some groups and is growing more popular, although it is worth noting that there is substantial cultural loading with such a term in everyday English usage (for example, the problematic implication of 'incompetence' which has an altogether different connotation, such that some have suggested the possibility of 'un-competence' to denote those who have not yet acquired the skill under consideration, though it is unlikely that this awkward construction will gain a foothold!). It does have credence in HR and professional development contexts, where 'competency frameworks' are currently a popular means of detailing or defining skills required for individual posts. It is also well-established in European frameworks and projects, where it is seen now as meaning far more than the original rather black-and-white competent/not-competent/incompetent, or of able/not-able. Like 'literacy', the modern usage is seen to bring together knowledge, skills, attitudes and application. It perhaps has an added implicit notion of 'having achieved sufficient capability' to be deemed effective, in other words overcoming and going beyond a threshold.

The OECD defines the relationship between competence and skills as "A competency is more than just knowledge and skills. It involves the ability to meet complex demands by drawing on and mobilizing psychosocial resources (including skills and attitudes) in a particular context" (OECD 2005, p.4). The European Qualifications Framework places competencies at the highest level and defines them as "the proven ability to use knowledge, skills and personal, social and /or methodological abilities, in work or study situations and in professional and personal development." It is used in this context in the National Forum's *A roadmap for engagement in a digital world*, and by the High Level Group on the Modernisation of Higher Education's report *New modes of learning and teaching in higher education* (Recommendation number 4) (European Commission 2014).

"National authorities should facilitate the development of a national competency framework for digital skills. This should be integrated into national professional development frameworks for higher education teachers."

Ferrari, in 2012, expanded the definition to incorporate further digital developments and societal concerns, reflecting the far-reaching effect of digital technologies:

"Digital competence is the set of knowledge, skills, attitudes, abilities, strategies and awareness that is required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; behave in an ethical and responsible way; collaborate; create and share content and knowledge for work, leisure, participation, learning, socialising, empowerment and consumerism."

Working Definition

For the purpose of this report we can define digital skills, literacies or competencies as

the capabilities which fit someone for living, learning and working in a digital society, with the knowledge that a digital society is ever evolving.

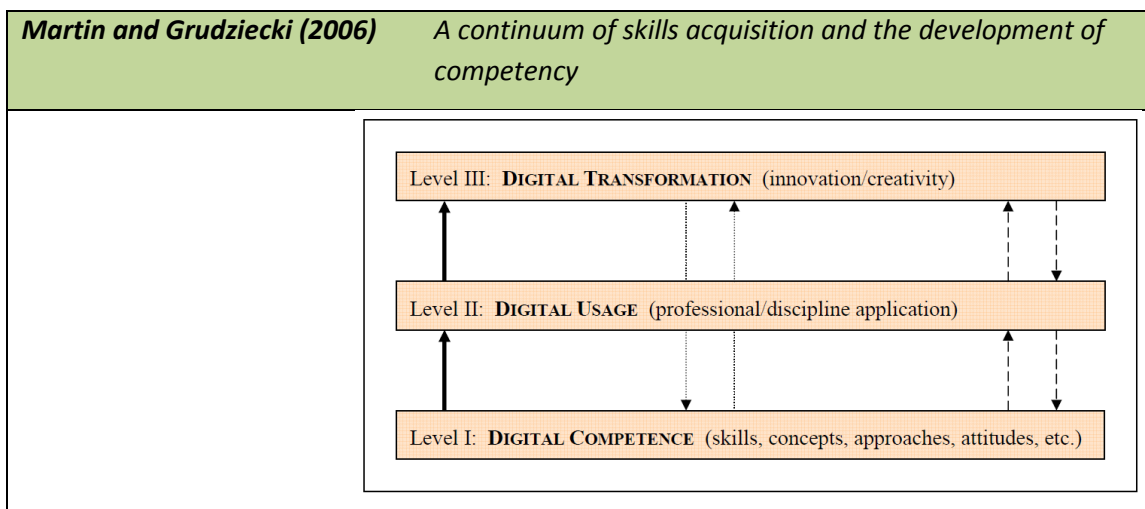
This is an extension of the definition used by JISC in *Developing students digital literacy (2014)*: *“the capabilities which fit someone for living, learning and working in a digital society. “*

Skills for the Digital Age - Models

Since Glister’s original definition, which paved the shift from traditional basic technical skills training: “digital literacy is about mastering ideas not keystrokes,” (Glister 1997) there has been a plethora of proposed models and frameworks for digital literacy/literacies, changing and adapting as new types of technology, media and information sources arise, whilst also trying to anticipate future employment trends where possible (informed by employer surveys, professional bodies and government policy). To provide a variety of lenses through which digital literacies may be considered, we present below short summaries of well-regarded examples.

Tornero (2004)	<i>Digital Literacy in four dimensions</i>
	Operational – technical skills to use computers and IT Semiotic – ability to use languages of the new media universe Cultural- new intellectual environment Civic – new rights and duties

Eshet-Alkalai (2004)	<i>Digital Literacy as a “survival skill in the digital era”</i>
	Photo-visual literacy - understanding visual representations Reproduction literacy- creative re-use Information literacy – evaluation of information Branching literacy – ability to understand hypermedia Social-emotional literacy – behaviour in cyber space

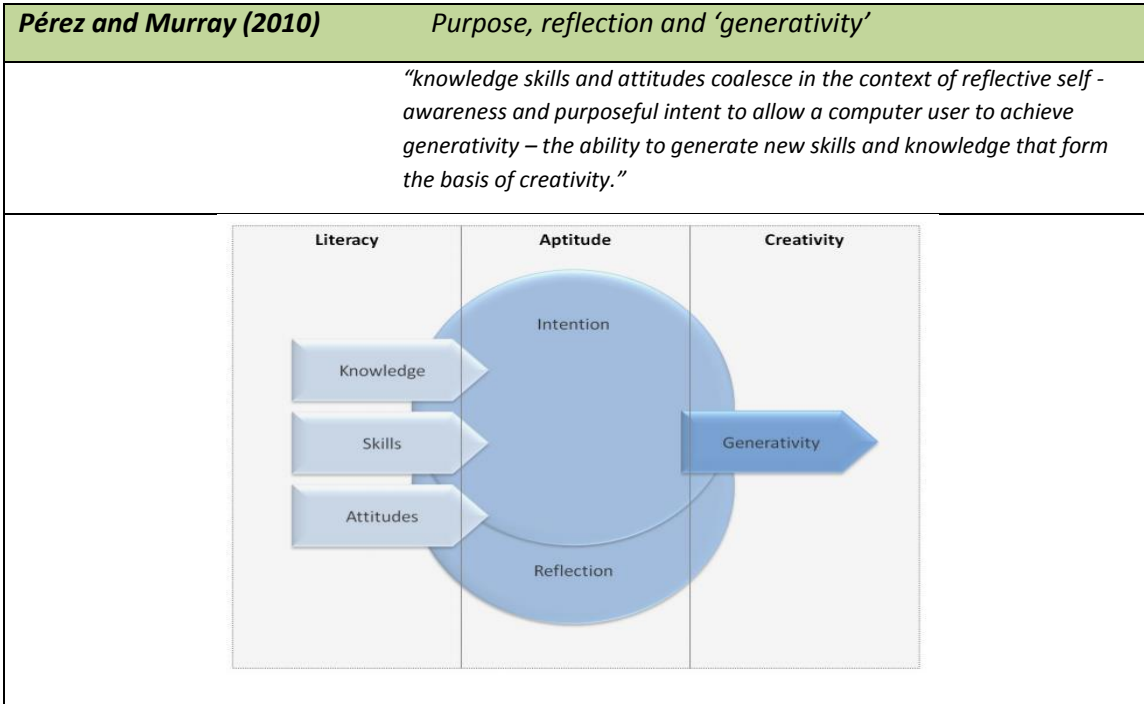


Bélisle (2006)	Three levels of digital literacy
	<p>(1) Functional model: the mastery of simple set of skills required to function effectively within a community.</p> <p>(2) Socio-cultural model: relates to attitudes, values and practices and the ability to select appropriate skills or practice for any given situation.</p> <p>(3) Intellectual empowerment model : deals with the link between new tools and new ways of thinking, innovation and empowerment.</p>

Bawden (2007)	Four concepts from media literacy⁶
	<p><i>Representation</i> - "Like all media, digital media represent the world, rather than simply reflect it"</p> <p><i>Language</i> - which looks the "the unique 'rhetoric' of interactive communication"</p> <p><i>Production</i> - "Literacy also involves understanding who is communicating to whom and why"</p> <p><i>Audience</i> - which considers the awareness of one's own position as an audience.</p>

Van Deursen and Van Dijk (2008)	Four sets of skills
	<p><i>Operational skills</i>: the skills to operate digital media</p> <p><i>Formal skills</i>: the skills to handle the special structures of digital media such as menus and hyperlinks</p> <p><i>Information skills</i>: the skills to search, select and evaluate information in digital media</p> <p><i>Strategic skills</i>: the skills to employ the information contained in digital media as a means to reach a particular personal or professional goal.</p>

⁶ Bawden's approach facilitates consideration of issues such as privacy, 'digital footprint', quality of information, credibility, reliability and bias, access protocols, navigation paths, as well as whose voices and viewpoints are heard and expressed, and whose are silent and why.

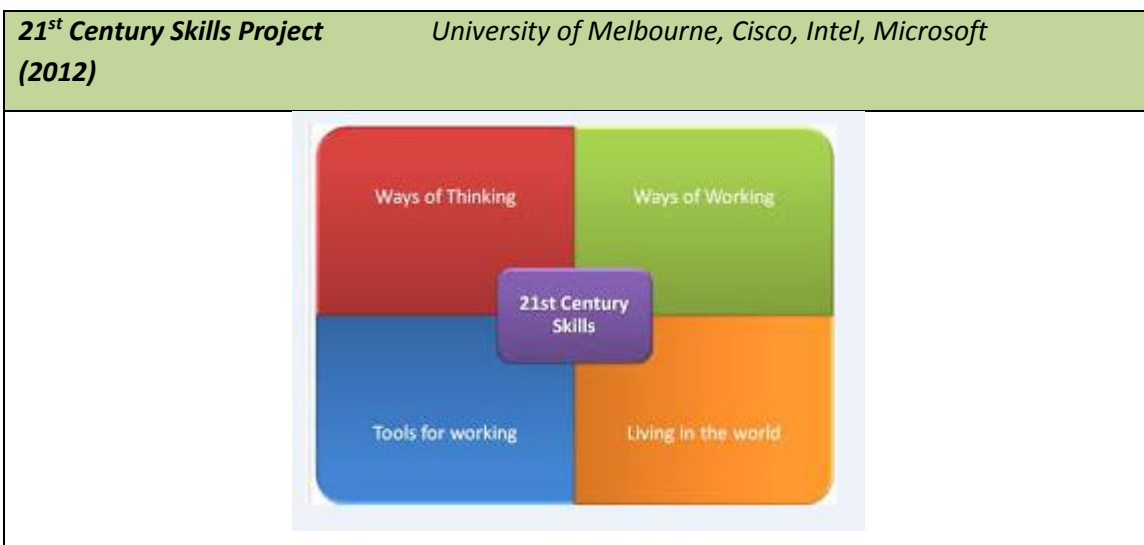
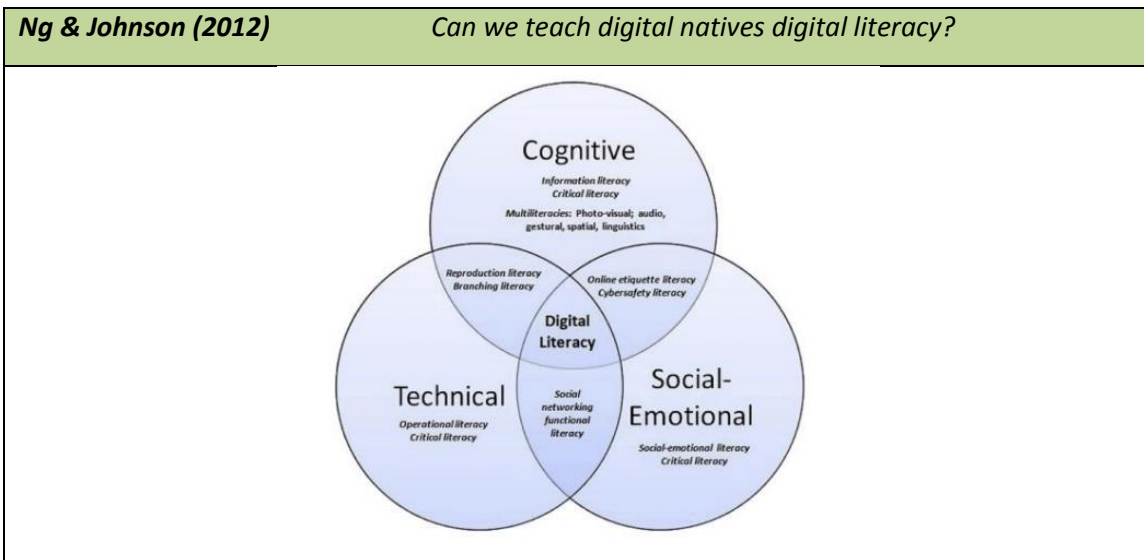



Belshaw (2011)⁷	<i>Eight essential elements of digital literacy</i>	
	Cultural	Confident
	Cognitive	Creative
	Constructive	Critical
	Communicative	Civic

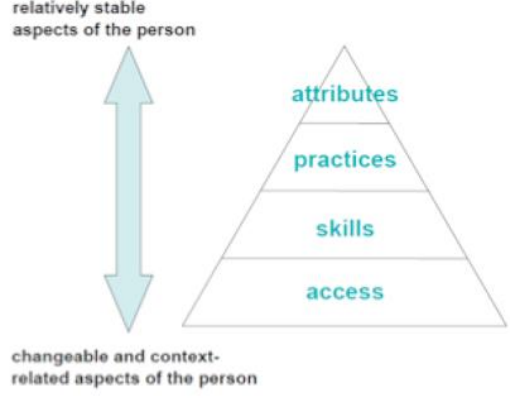

Ala-Mutka (2011)	<i>EC report on Mapping Digital Competence</i>
	<p>(1) Instrumental knowledge and skills for digital tool and media usage;</p> <p>(2) Advanced skills and knowledge for communication and collaboration, information management, learning and problem-solving, and meaningful participation;</p> <p>(3) Attitudes to strategic skills usage in intercultural, critical, creative, responsible and autonomous ways.</p>

⁷ Belshaw argues that digital literacy is context-dependent and more a 'condition' than a threshold. His work has also extended to the use of Digital Badges to recognise achievement and thus links with other aspects of the All Aboard project.

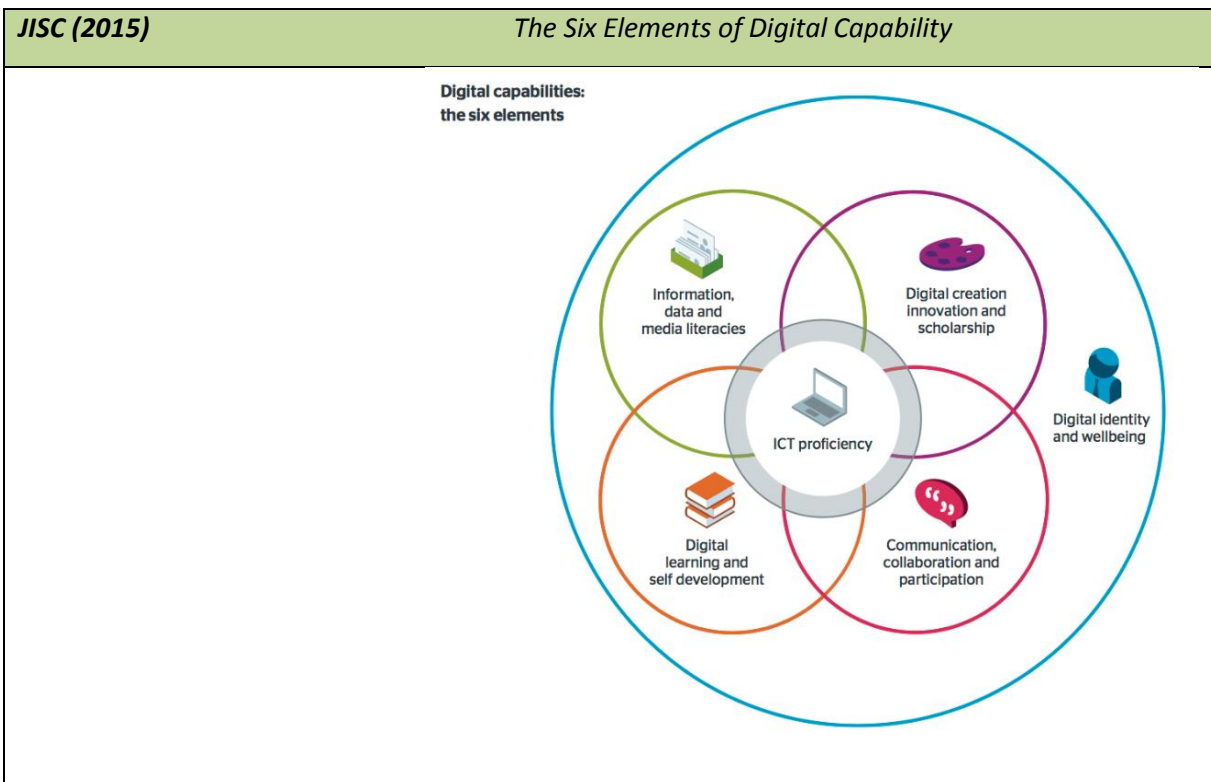
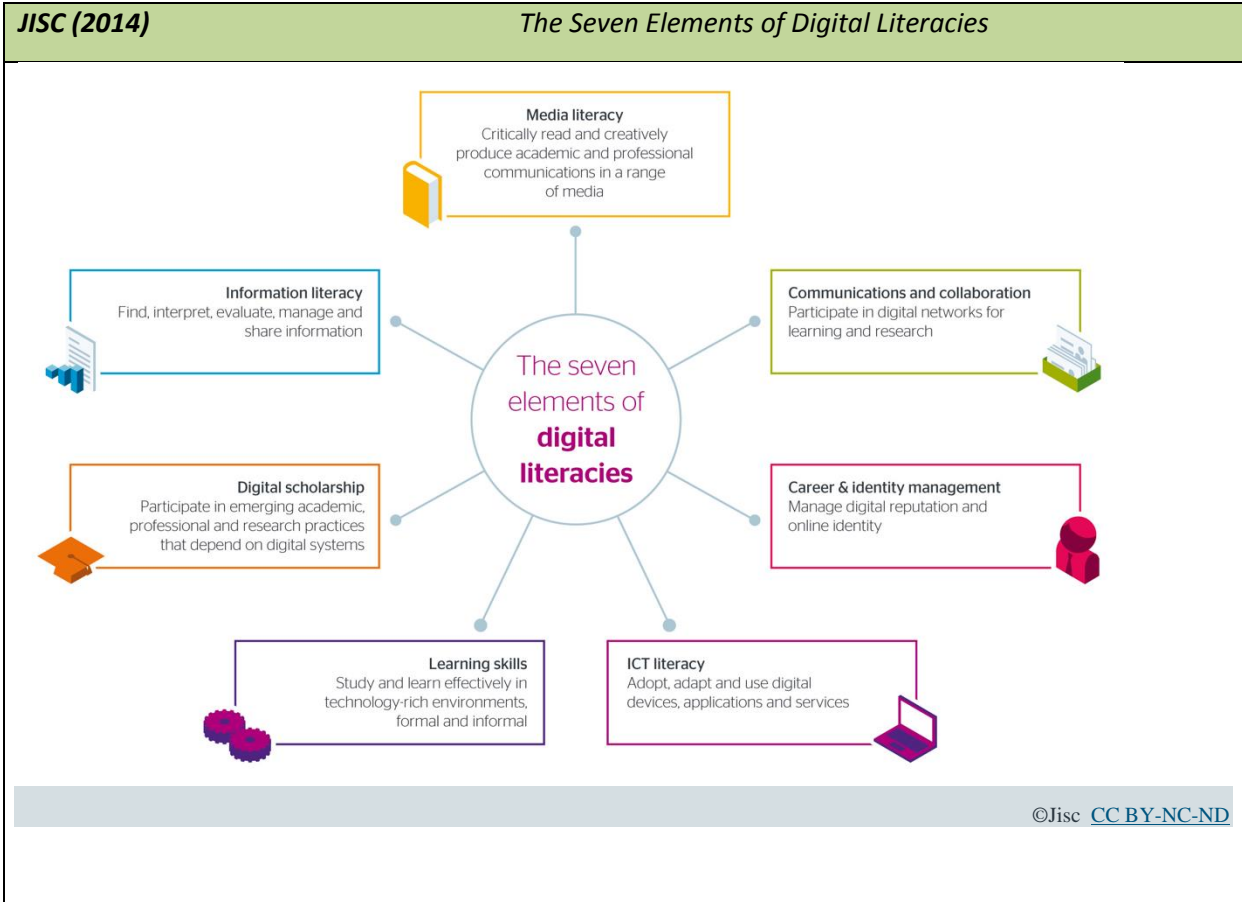
Ferrari (2012)	Multi-faceted approach
	<p>Information management</p> <p>Collaboration</p> <p>Communication</p> <p>Creation of Content & Knowledge</p> <p>Ethics and responsibility</p> <p>Evaluation and Problem-solving</p> <p>Technical operations</p>



Walker & White (2013)	<i>Four components</i>
	<p><i>Procedural competence</i> - skills to use and application</p> <p><i>Socio-digital competence</i> – ability to choose and use tools and language in a given context</p> <p><i>Digital discourse competence</i> - ability to carry out extended tasks using digital tools</p> <p><i>Strategic competence</i> – ability to deal with problems, repair mistakes and fill in gaps in knowledge.</p>

Beetham & Sharpe (2009,2010)⁸	<i>Four components</i>
	

⁸ Beetham and Sharpe’s model has been one of the most widely used in practice, adopted and adapted by a large number of projects and frameworks. It has also been adapted to consider the professional development of lecturers in terms of their teaching practice by Bennett (2014) and formed the Digital Practitioner Framework of Ecclesfield, Rebbeck and Garnett (2012).



These last two models come from one of the major players in the field of digital literacies in higher education, the UK's JISC, which has funded and supported a wide range of projects and initiatives, including developing common practice and guidelines. Their *Developing Digital Literacies* portfolio of projects helped to build and extend frameworks, taking on board Beetham and Sharpe's work and leading to a model which aimed to capture the range of literacies and skills pertinent to higher education. This 'seven elements' model has been in widespread use but has just recently been revised in new work on 'digital capabilities' (Beetham 2015).

Skills for the Digital Age – Frameworks and Examples in Practice

The examples in the previous section were of underpinning conceptual models for digital and information literacy. Translating such into practice requires more detail and, usually, some contextual embedding. A number of organisations and institutions have built such frameworks, often directly mapped from the models (this is particularly the case with the Beetham & Sharpe and JISC supported models). Once again, there is a very large range of examples, indeed in Appendix 1 we list over 60 examples.

Whilst there are many similarities and overlaps it is a useful exercise to compare and contrast. In the following table we provide a selection of these, chosen to illustrate the range of approaches taken, scales of implementation, and relevance to higher education. In Appendix 2 we provide a little more detail on some of the projects that have used such frameworks in practice, to indicate, in practical terms the types of activity that staff and students engage in to achieve the goals of their project.

A selection of example frameworks for digital and information literacy

Framework	Primary audience	Domain	Description											
<p>ANCIL – A new curriculum for information literacy</p> <p>Built on research at the University of Cambridge as part of the Arcadia Project (which explored the future of the research library in the digital age), this curriculum is now being adapted and used in a number of institutions.</p> <p>http://ccfil.pbworks.com/f/ANCIL_final.pdf</p>	<p>Students, Librarians & Information specialists</p>	<p>Information literacy</p>	<p>10 strands, each of which has 4 levels of attainment.</p> <table border="1" data-bbox="1447 427 2049 922"> <tr> <td data-bbox="1447 427 1742 499">Transition to HE</td> <td data-bbox="1742 427 2049 499">Managing information</td> </tr> <tr> <td data-bbox="1447 499 1742 587">Becoming an independent learner</td> <td data-bbox="1742 499 2049 587">Ethical dimension of information</td> </tr> <tr> <td data-bbox="1447 587 1742 675">Academic literacies</td> <td data-bbox="1742 587 2049 675">Presenting and communicating</td> </tr> <tr> <td data-bbox="1447 675 1742 762">Mapping the information landscape</td> <td data-bbox="1742 675 2049 762">Synthesis and knowledge creation</td> </tr> <tr> <td data-bbox="1447 762 1742 922">Resource discovery in your discipline</td> <td data-bbox="1742 762 2049 922">Social dimension of information</td> </tr> </table>		Transition to HE	Managing information	Becoming an independent learner	Ethical dimension of information	Academic literacies	Presenting and communicating	Mapping the information landscape	Synthesis and knowledge creation	Resource discovery in your discipline	Social dimension of information
Transition to HE	Managing information													
Becoming an independent learner	Ethical dimension of information													
Academic literacies	Presenting and communicating													
Mapping the information landscape	Synthesis and knowledge creation													
Resource discovery in your discipline	Social dimension of information													
<p>Deakin University Digital Literacy Framework</p> <p>An example of an institutional approach, in which programmes and courses are required to map to these skills.</p> <p>http://www.deakin.edu.au/_data/assets/pdf_file/0008/268748/DL_framework_2014-CC_rev-2015.pdf</p>	<p>Students and staff, particularly course designers</p>	<p>Digital literacy</p>	<p>Setting 8 questions/criteria for good practice, the framework also details Graduate Learning Outcomes (Elements of digital literacy: Find, Use, Disseminate) at Foundation, Proficient and Advanced levels. The questions are:</p> <p>Does the practice/Is the practice:</p> <ul style="list-style-type: none"> • address digital literacy? • consistent with principles of good learning, teaching and assessment? • integrated with discipline learning? 											

			<ul style="list-style-type: none"> • involve authentic assessment in support of graduate employability in the discipline? • use the affordances of the digital technology? • cater for a diverse student body? • consistent with effective evaluation procedures for the assurance of graduate outcomes? • sustainable?
<p><i>DIGCOMP – A framework for developing and Understanding Digital Competence in Europe</i></p> <p>A European-wide project which has developed surveys, evaluation tools and led to, and informed, policy formation. http://ftp.jrc.es/EURdoc/JRC83167.pdf</p>	Students, adult learners, citizens	Digital literacy	<p>Foundation, intermediate and advanced proficiency levels for each of 5 skill areas:</p> <ul style="list-style-type: none"> • Information • Communication • Content Creation • Safety • Problem Solving
<p><i>Digidol – Learning literacies framework</i></p> <p>Example of an implementation in a particular university (Cardiff). One of the JISC supported projects. http://digidol.cardiff.ac.uk/learning-literacies-framework/</p> <p>A framework for a Cardiff Graduate – http://digidol.cardiff.ac.uk/files/2013/05/Graduate-Final.pdf</p>	Students, Staff, Subject Librarians	Digital, information & academic literacies	<p>Adapting and building on Beetham & Sharpe model and linking with Graduate Attributes.</p> <ul style="list-style-type: none"> • Attributes • Practices • Skills • Access • Awareness <p>Core tasks are identified as:</p>

<p>A framework for Subject Librarians supporting learning literacies - http://digidol.cardiff.ac.uk/files/2013/05/Subject-Librarians-LLF-draft-050613.pdf</p>			<ul style="list-style-type: none"> • Finding information • Managing information • Developing/Producing information • Sharing information
<p><i>Digitally Ready – Digital literacies and work placement framework</i> An institutional example (University of Reading) focussing on employability and skills.</p> <p>http://blogs.reading.ac.uk/digitallyready/files/2012/10/WRPL.jpg</p>	Students, Staff	Digital literacy	<p>An adaptation of Beetham & Sharpe for effective e-learning and application to real world contexts. Three levels:</p> <ul style="list-style-type: none"> • Access – opportunities to experience and explore relevant digital technologies • Skills – opportunities to develop expertise in using relevant digital technologies • Practices – opportunities to practice digital skills in a ‘real world’ context. <p>Makes use of the AAAR model of learning (Analyse, Acquire, Articulate, Reflect).</p>
<p><i>European E-Competence Framework</i></p> <p>A reference framework relevant to working in ICT, representing an implementation of the European Qualifications Framework to a specific sector.</p> <p>http://ecompetences.eu/wp-content/uploads/2014/02/European-e-Competence-Framework-3.0_CEN_CWA_16234-1_2014.pdf</p>	ICT professionals	ICT, Digital literacy, Professional skills	<p>A comprehensive listing of 40 competences at different levels of attainment, in 5 main themes:</p> <ul style="list-style-type: none"> • Plan • Build • Run • Enable • Manage

<p>Profile tool: http://profiletool.ecompetences.eu/</p>			
<p><i>Vitae Researcher Development Framework – an information literacy lens</i></p> <p>Uses the SCONUL Seven Pillars to identify detailed skills and knowledge for academic researchers.</p> <p>https://www.vitae.ac.uk/vitae-publications/rdf-related/information-literacy-lens-on-the-vitae-researcher-development-framework-rdf-apr-2012.pdf</p>	<p>Faculty and postgraduate students</p>	<p>Research, information literacy</p>	<p>The Vitae framework itself is very detailed but based on four primary domains:</p> <ul style="list-style-type: none"> • Knowledge and intellectual abilities • Personal effectiveness • Research governance and organisation • Engagement, influence and impact
<p><i>Mozilla Web Literacies Framework</i></p> <p>Established by the non-profit Mozilla Foundation, this aims to empower users of web technologies by building knowledge and understanding of the underlying mechanics and tools.</p>	<p>Teachers, learners of all types</p>	<p>Web skills, digital literacy</p>	<p>With a range of resources and tools, this framework provides a list of detailed, specific skills ranging from navigating the web to coding. There are three strands:</p> <ul style="list-style-type: none"> • Explore – Reading the Web • Build – Writing the Web • Connect – Participating on the Web <p>There is an additional strand related to teaching.</p>
<p><i>PriDE – Professionalism in the Digital Environment</i></p> <p>An example of an institutional implementation (University of Bath)</p> <p>https://digilitpride.wordpress.com/digital-literacy-statements/</p>	<p>Students, Staff</p>	<p>Digital literacy</p>	<p>A range of detailed definitions and attributes developed for each Faculty of the institution. Adaptation and extension of JISC framework.</p> <p>Also used the TALENT scale transformational model and operated at the level of entire faculties. The core definitions were built on:</p>

https://digilitpride.wordpress.com/			<ul style="list-style-type: none"> • Access • Skills • Practice • Attributes
<p><i>SCONUL – Seven Pillars of Information Literacy</i></p> <p>This is a key framework which has been adopted and adapted by a number of institutions and organisations. In addition, it is available in a number of ‘lenses’ which provide a specific focus on particular applications or perspectives. The most directly relevant to the All Aboard project is : <i>‘The SCONUL 7 Pillars through a Digital Literacy Lens’</i>.</p> <p>Core model: http://www.sconul.ac.uk/sites/default/files/documents/coremodel.pdf</p> <p>Digital literacy ‘lens’: http://www.sconul.ac.uk/publication/digital-literacy-lens</p>	All those in HE and libraries	Information and Digital literacy	<p>The framework provides details in terms of what the learner understands and is able to do. The core pillars are:</p> <ul style="list-style-type: none"> • Identify • Scope • Plan • Gather • Evaluate • Manage • Present
<p><i>Open University (UK) Digital and Information Literacy Framework</i></p> <p>An institutional example, but one of particular interest in considering the context of part-time, distance and mature learners using distributed systems and network access to resources.</p> <p>http://www.open.ac.uk/libraryservices/subsites/dilframework/</p>	Students, adult learners	Information and Digital literacy	<p>A 5 stage framework mapped against the OU’s own levels of study.</p> <ul style="list-style-type: none"> • Understand and engage in digital practice • Find information • Critically evaluate information, online interactions and online tools • Manage and communicate information

			<ul style="list-style-type: none"> • Collaborate and share digital content
<p><i>UNESCO ICT Competency Framework for Teachers</i></p> <p>Internationally recognised framework which sets out a range of key dimensions appropriate to teachers at all levels.</p> <p>http://unesdoc.unesco.org/images/0021/002134/213475e.pdf</p>	<p>Staff, teachers, students, policy-makers</p>	<p>ICT skills and digital literacy</p>	<p>There are 3 dimensions:</p> <ul style="list-style-type: none"> • Technology literacy • Knowledge deepening • Knowledge creation <p>which run through each of 6 themes:</p> <ul style="list-style-type: none"> • Understanding ICT in education • Curriculum and assessment • Pedagogy • ICT • Organisation and administration • Teacher professional learning

Developing a Framework for Irish HE

In *All Aboard* we aim to develop a framework for digital skills that will be of use across the Irish higher education sector. The principal criteria that we have identified for the framework are that it:

1. should be built on a detailed review and analysis of existing frameworks, the extant research literature and relevant policy at national and international levels;
2. be relevant to the particular needs of the sector (at the current and projected level of 'digital capacity'), as identified in the consultation process for the National Forum's Digital Roadmap and other surveys, focus groups and feedback conducted as part of the All Aboard project itself or by other bodies;
3. should be informed by the experience, knowledge and professional networks of the collaborating partners and Irish HE institutions;
4. should be flexible and serve as a useful point of reference against which individual groups and institutions can map their own programmes, staff development and student learning activities;
5. provide an accessible and broad picture, open to everyone (all categories of staff and student) and not, of itself, limited to particular roles or job categories⁹;
6. provide a sense of co-ownership on which engagement and participation can be built;
7. be appealing, thought-provoking and sufficiently imaginative as to enthuse and encourage individuals and groups to engage in developing their digital skills and confidence.

In parallel to this review of the literature and policy landscape, the All Aboard project team undertook a range of activities to collate suggestions and ideas from the wider community, in addition to hosting a number of design sessions at which a range of possible approaches and structures were considered. These included:

- an open call for suggestions of what should be included in such a framework issued via social media channels and on the project website;
- question and answer sessions following presentations at conferences and workshops;
- consultation sessions at key conferences and events, facilitated via the use of twitter hashtags, online forms, and the use of printed postcards handed out in bulk to audiences and collected subsequently;
- informal and formal contact and communication with experts in the field.

Combining these different contributions, unsurprisingly, yielded a set of key recurring themes and topics which reflect the categories in many of the frameworks discussed in the previous section.

⁹ Although with obvious 'points of entry' for particular types of work, role or interest rather than overly generic/abstracted.

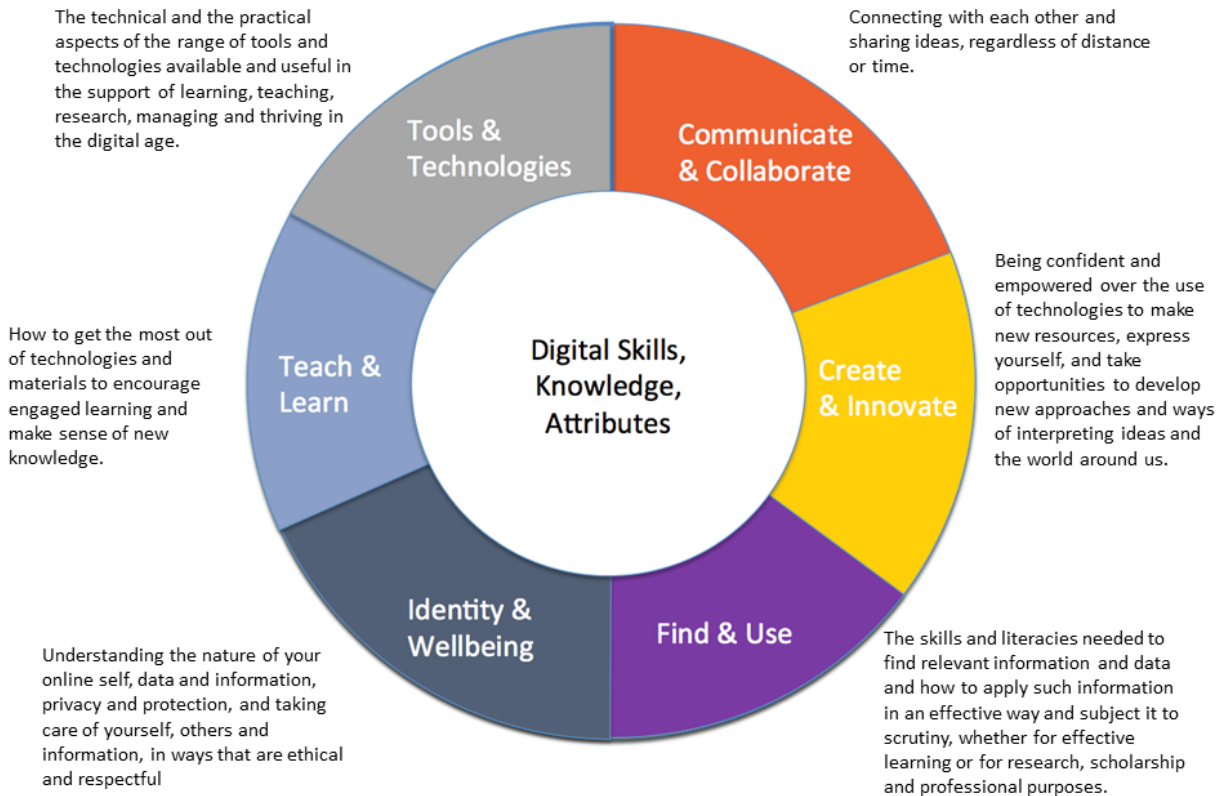
Indeed, a number of contributors pointed to specific frameworks with which they were already familiar (particularly those of JISC, SCOUNL, UNESCO and ANCIL).

The initial, emergent broad categories were:

- finding (effectively/systematically) and using information and digital resources;
- applying and using information and resources in an effective manner;
- using tools to learn and to support the learning of others;
- managing one's online identity (factored into this also were concerns regarding security, personal safety ("cyberbullying" and "trolling" were mentioned as risks) and data security;
- creating materials in a variety of media formats;
- using a range of tools for communication and collaboration;
- higher level critique of information sources, of technological dependency, commercial restrictions and wider societal implications.

The project team then tried to use this to construct some general (accessible and 'action-oriented') headings for distinct areas, with some discussion around the merits and drawbacks of considering the 'critique' dimension as being folded into each of the main categories (ie an understanding that there are different levels from basic awareness, skill and confidence, to critical appreciation and, indeed, to an ability to creatively contribute to the shaping of new skills and resources). In terms of issues around personal online identity, etiquette, professionalism and the risks in engaging in online activity, such were highly topical in news media at this time with considerable concern around issues such as cyberbullying, the leaking of data and personal information, etc. The initial thoughts were to consider a category that combined the issues of Identity management, safety and of what was termed 'digital citizenship' (i.e. good citizenship). The terminology for this particular domain was agreed to be somewhat awkward but at the time in which the final draft framework was being completed, Helen Beetham released the latest version of the JISC framework in which she advocated the used of the term "wellbeing" as a potentially very effective means of encapsulating these ideas. Following contact, and her agreement, we adopted that nomenclature.

The resultant categories were as in the following diagram. Whilst it is always possible to contest the exact wording of such categories and indeed to appreciate that they can be subject to a range of interpretations, it was proposed that they formed a firm basis for the subsequent development of the framework and could be supplemented/augmented easily by some explanatory text and the provision of examples of practices within each. An example, is the category 'Find & Use' which may, for some in an academic environment, sound overly simplistic and not necessarily convey that it encapsulates both basic search techniques and higher level systematic analysis and scholarship. However, because the project aims to embrace all levels of activity and all those who work and study in higher education, an accessible heading was deemed appropriate.



Each category, at this stage, also consisted of large numbers of suggested topics and sub-topics consisting of a mixture of skills, technologies, applications, attitudes and dispositions. A variety of potential visual representations were explored (to, if possible, avoid reliance solely on a purely list/tree structure), some of which were ‘field tested’ in presentations and amongst colleagues. Popular diagram formats and infographic styles were reviewed and compared, the danger in any metaphor-based representation being that the metaphor is over-stretched, misleads or indeed conflicts with the overall intention of the framework or the demands of each particular domain.

With particular focus on criteria (5) and (7) from our earlier list of requirements for the framework (see page 32), this was considered an important decision. For sustainability and scalability, such frameworks need to be embraced by the ‘user’ community. The ethos of All Aboard is to promote engagement and generate the feeling of a participatory ‘campaign’. More traditional approaches to effect change or promote development within academic contexts usually involve complex committee structures, policy documents, metrics, etc., which whilst embodying a professional (and legitimate) approach run the danger of being added to a raft of other such policy initiatives and have little impact on changing the prevailing culture which so often shapes practice. Bearing such considerations in mind, one of the project team (B. McSharry) proposed the use of a subway/metro map to capture the components of the framework, as in the following diagram.

There is an expectation that different ‘levels’ or extent of engagement are possible in each category, as with most of the frameworks we have reviewed, which might naturally consist of: (a) general awareness and information regarding the topic; (b) practical and effective skills being demonstrated; (c) a critical awareness and ability to both engage in debate as well as contribute creatively to the domain. This is the perspective which informs the development of the resources (self-study materials, workshop packs, videos, etc.) corresponding to each of the lines and stations.

More detailed discussion of how individuals, groups and organisations might use and connect with the framework and its associated resources will be presented in the next document in this series: ‘Using the National Digital Skills Framework for Higher Education’.

Conclusion

We have provided an overview of some of the key frameworks and models used to define and develop digital and information literacies in higher education. We do not claim that this is completely comprehensive since the scale of such work, internationally, has been considerable. However, the examples considered and discussed hopefully are illustrative and representative of the major trends and core themes. By undertaking this review and selection of examples, combined with consultations undertaken by the National Forum (in its ‘Building Digital Capacity’ theme) and the All Aboard project team, we have identified a set of broad categories which we believe form a solid basis for a national framework for digital skills which is of relevance not just for students and academic staff, but for all those engaged in work or study in the sector.

Further, we have developed a means of articulating such a framework which we hope will help to promote engagement and participation, whilst also providing a systematic means of developing resources, shaping curricula, facilitating workshops, and for nurturing a sector-wide ‘campaign’ around digital skills and digital confidence – all of which are the core aims of the next phase of All Aboard.

The Metro-map representation has been well-received both within and beyond Irish HE and we intend to use it as the platform for subsequent work, releasing revised editions in due course as the project evolves, resources take shape and as consultations continue.

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Appendix 1 – Digital Skills and Information Literacy Frameworks reviewed

The following is a list of frameworks which were reviewed and compared as part of the research for this report. Further details on each are available via the links.

[A European approach to media literacy in the digital environment](#)

[A framework for developing competencies in open and distance learning](#)

[ACRL Association of College & Research Libraries – Framework for Information Literacy for Higher Education](#)

[ACRL Thresholds at Dundalk Institute of Technology](#)

[ALDinHE learning development mapped to UK PSF](#)

[ALA American Library Association Information Literacy Competency Standards](#)

[ANCIL \(A new curriculum for information literacy\)](#)

[ANZIL Australia and New Zealand Information Literacy Framework](#)

[AQF Australian Qualifications Framework](#)

[AUA Association of University Administrators Continuing Professional Development Framework](#)

[Australian Charter for the Professional Learning of Teachers and School Leaders](#)

[Bloom’s Digital Taxonomy Verbs \(Infographic\)](#)

[Bringing together the pieces of the jigsaw: the experience of developing and implementing an institutional CPD framework \(University of Lincoln\)](#)

[British Columbia Digital Literacy Standards](#)

[California ICT Digital Literacy Assessments and Curriculum Framework](#)

[Childrens media literacy in the nations, 2011](#)

[CIPD — competence and competency frameworks](#)

[CMALT professional development framework - Certified Membership https://www.alt.ac.uk/get-involved/certified-membership](https://www.alt.ac.uk/get-involved/certified-membership)

[CILIP Professional Knowledge and Skills Base \(PKSB\)](#)

[CILIP Professional Recognition Framework](#)

[Common European Framework of Reference for Languages: Learning, Teaching, Assessment](#)

[Competency Assessment Toolkit for Technical Staff \(CATTS\) \(University of Southampton\)](#)

[Competency Framework for Teachers of English for Academic Purposes \(BALEAP\)](#)

[Concordat for the Career Development of Researchers https://www.vitae.ac.uk/policy/concordat-to-support-the-career-development-of-researchers](https://www.vitae.ac.uk/policy/concordat-to-support-the-career-development-of-researchers)

[CONUL Integrating Information Literacy into the Curriculum](#)

[Creative skillset: achieving industry best practice in education](#)

[Creativity at work: design thinking as a strategy for innovation](#)

[Deakin University Digital Literacy Framework, Graduate Learning Outcome 3](#)

[Deakin University Library \(2015\) Digital Literacy Tutorials](#)

[Defining Essential Skills in the Canadian Workplace: Final Report](#)

[Design principles for the Essential Digital Literacy Skills qualification \(Wales\)](#)

[Developing digital leaders course \(Oxford Brookes University\)](#)

[DigEuLit a European Framework for Digital Literacy](#)

[DIGICOMP – A framework for Developing and Understanding Digital Competence in Europe](#)

[Digidol \(Cardiff University\) Learning Literacies Framework](#)

[Digidol - A framework for a Cardiff Graduate](#)

[Digidol - A framework for Subject Librarians supporting learning literacies](#)

[Digidol Deliverables – Knowledge Hub](#)

[DigLit Leicester : supporting teachers, promoting digital literacy, transforming learning](#)

[DigiLit Leicester Secondary School Digital Literacy Framework](#)

[Digital Agenda for Europe A Europe 2020 Initiative](#)

[Digital and Media Literacy: A Plan of Action](#)

[Digital Capabilities 6 elements \(Beetham, H\)](#)

[Listing of Frameworks mapped to the 6 elements of digital capability](#)

[Digital Practice and the UK Professional Standard Framework](#)

[Digital Transformation A Framework for ICT Literacy \(ETS\)](#)

[Doing more with Digital: National Digital Strategy for Ireland Phase 1 Digital Engagement](#) – Department of Communications, Energy and Natural Resources

[e-competences tools eCOTOOL](#) (International toolkit – VET certificates)

[eLearning Competency Framework for Teachers and Trainers-European Institute for E-Learning](#)

[e-skills UK IT Professional Standards](#)

[ECDLEuropean Computer Driving Licence](#)

[ETF/Coralesce EdTechAssess tools for the FE and Skills sector](#)

[European Charter for Media Literacy](#)

[European Commission Learning Opportunities and Qualifications in Europe](#)

[European Commission Education, Training, Culture and Youth](#)

[European e-Competence framework](#)

[European Pedagogical ICT Licence](#)

[European Reference Framework – key competencies for Lifelong Learning](#)

[Fostering Quality Teaching in Higher Education: polices and practices \(IMHE – Institutional Management of Higher Education-OECD\)](#)

[Framework for 21st Century Learning \(Partnership for 21st Century Skills\)](#)

[Framework for the innovation process \(Imperial College London – EE Project\)](#)

[FutureLab Digital Literacies Across the Curriculum](#)

[Go-On UK Basic Digital Skills](#)

[i-curriculum \(European framework identifying information skills and curriculum for living and working in the digital age\)](#)

[ICT skills 2 map of ICT-related competencies for guidance practitioners](#)

[Imperial College London: enterprise framework](#)

[Information and Communications Technology Council \(Ontario\) Digital Competencies](#)

[Information Literacy Framework for Wales](#)

[Information Literacy Lens on the Vitae Research Development Framework using SCONUL 7 Pillars](#)

[Innovative Learning: Key Elements for Developing Creative Classrooms in Europe](#)

[Innovation and Transformation Fund Projects – Leadership for Higher Education](#)

[Inspecting further education and skills: framework](#)

[International Computer and Information Literacy Study: Assessment Framework](#)

[Instructional Designer Competencies](#)

[iskills assessment ETS \(Educational Testing Service\)](#)

[ISTE Standards Administrators](#)

[ISTE Standards Teachers](#)

[IT Project Management Skills Framework](#)

[JISC Content Framework](#)

[JISC Developing Digital Literacies: seven elements of digital literacy](#)

[JISC Content Framework](#)

[JISC Developing Digital Capability Bloom's Digital Taxonomy](#)

[JISC Digital Student 'Digital students are different' posters](#)

[JISC Implementing the UKPSF \(Professional Standards Framework\) in the Digital University](#)

[JISC Literacies Framework](#)

[JISC PADDLE \(Personal Actualisation & Development through Digital Literacies in Education\) project framework for FE staff](#)

[JISC Technology in HE' report in collaboration with UCISA and emerging work under 'digital leadership' strand of Digital Capabilities challenge](#)

[JISC The Design Studio](#) – list of conceptual frameworks for digital literacy

[LEARN Canada 2020](#)

[Leicester City Digital Literacies Framework](#)

[London School of Economics \(LSE\) Digital and Information Literacy](#)

[ANCIL \(A new curriculum for information literacy\)](#)

[Digital and Information Literacy Framework \(ANCIL\)](#)

[SADL Project Blog](#)

[MacArthur Foundation Digital Media & Learning](#)

[Manchester Metropolitan University Leadership and Management Competency Framework](#)

[Metaliteracy \(Coursera\)](#)

[Mozilla Web Literacies Framework](#)

[Teach Like Mozilla](#)

[Multimedia competency survey](#) (Ritzhaupt & Martin)

[Napier 3E framework for embedding in the curriculum](#)

[National Council of Teachers of England; multimodal literacies and technology](#)

[National Information Literacy Framework Scotland](#)

[National Strategy for Higher Education to 2030](#)

[Naace ICT Framework](#)

[Naace Self-Review Framework](#)

[NCCA ICT Framework](#)

[Next Generation User Skills \(Digital Skills Partnership for Yorkshire & Humber and the Scottish Qualifications Authority\)](#)

[NIACE Citizens' Curriculum](#)

[National Framework of Qualifications \(Ireland\)](#)

[Nottingham Trent University Digital Practice Framework](#)

[NUS Student Union National Competency Framework](#)

[Ontario Adult Literacy Curriculum Framework Competency D: Use Digital Technology](#)

[Open Education Resources \(OER's\) ready to research](#)

[Professional Standards for Teachers and Trainers in Education and Training-England](#)

[Review and Plan for Technology in Action \(RAPTA\)– Part one: learning teaching and assessment](#)

[Review and Plan for Technology in Action \(RAPTA\) – Part two: Leadership and management](#)

[SEDA Professional Development Framework](#)

[Sheffield Hallam University Teaching Approaches Menu](#)

[Skills Framework for the Information Age \(SFIA\)](#)

[SONUL Seven Pillars Digital Literacy Lens](#)

[SCONUL Seven Pillars of Information Literacy: Core Model](#)

[Student Employability Profiles – The Higher Education Academy](#)

[Studio schools CREATE skills framework](#)

[Southampton \(e Languages\) Digital Literacies toolkit](#)

[SWGfL Digital Literacy Curriculum Overview](#)

[Teaching and Learning in Irish Higher Education: a roadmap for enhancement in a digital world 2015-2017](#)

[TECH Partnership in transitions](#)

[Technology in Higher Education: defining the strategic leader](#)

[The procurement competency framework \(Scottish Government\)](#)

[The University of Edinburgh Competency Framework – Leadership and Management](#)

[Tomorrow's Doctors \(General Medical Council\)](#)

[Towards a European Qualifications Framework for Lifelong Learning](#)

[TPACK \(technology, pedagogy and content knowledge\)](#)

[The 5 Resources Model of Critical Digital Literacy \(University of Greenwich\)](#)

[The Association of University Administrators \(AUA\) JISC mapping digital literacies to CPD](#)

[The Digital University framework](#)

[The elearning Africa report 2012](#)

[The Estonian Lifelong Learning Strategy for 2014-20](#)

[The framework for higher education qualifications in England, Wales and Northern Ireland](#)

[The NHS Knowledge and Skills Framework - Appendix 2 Core Dimension 1 : Communication](#)

[The Open University Digital and Information Literacy Framework](#)

[Undergraduate levels framework \(Open University\)](#)

[The UK Professional Standards Framework for teaching and supporting learning in higher education](#)

[The UK Quality Code for Higher Education](#)

[Thriving in the 21st Century: Learning Literacies for the Digital Age \(LLiDA\) project](#)

[Trends in Digital Scholarship Centers](#)

[University of Aberdeen National Academic Role Profiles](#)

[UKOER Synthesis & Evaluation](#)

[UK Adult Media Literacy Report](#)

[UK Charter for Media Literacy](#)

[Ulrich's HR Competency Model](#)

[UNESCO GLOBAL MIL \(Media & Information Literacy\) Assessment Framework](#)

[UNESCO ICT Competency Framework For Teachers](#)

[Universities Human Resources CPD Framework](#)

[University of Bath: Digital Literacy](#)

[PriDE \(Professional in the Digital Environment\) digital literacy statements](#)

[University of Nottingham Competency Framework](#)

[University of Plymouth Guide to Digital Literacies](#)

[University of Reading \(Digitally Ready\) Digital literacies and work placements framework](#)

[Digitally Ready: Evaluation of the Digitally Ready Project \(Framework\)](#)

[Vitae Research Development Framework](#)

[Concordat for the Career Development of Researchers](#)

[Information Literacy Lens on the Vitae Research Development Framework using SCOUNL 7 Pillars](#)

[Vitae Handbook of social media for researchers and supervisors](#)

[Web accessibility standards](#)

Appendix 2: Example Projects & Case Studies of Practical Implementations of Digital/Information Skills Frameworks.

(1) SADL – Student Ambassadors for Digital Literacy

SADL was an example of implementing the ANCIL framework and the project ran from October 2013 until July 2014, funded by the UK's Higher Education Academy (Changing Landscapes programme). It was managed by the Learning Technology and Innovation unit and staff from LSE Library, Teaching and Learning Centre (TLC) and the Students' Union.

The objective was to find out how digital and information literacies underpin the academic practices of undergraduate students and, importantly, how this also impacted on their professional and personal lives. SADL was also part of continuing work to embed digital, academic and information literacy support in the undergraduate curriculum following a review which had been carried out in 2012 (Bell et al, 2012). The project set out to blend and integrate the more established information literacies training already provided by the LSE Library, training which looked at how to *find, appraise, use* and *manage* information in many forms and to understand the role of technology in developing such capabilities. "SADL was also an opportunity to work with students as partners to develop appropriate digital and information literacy resources for all LSE undergraduates and to explore the potential of peer support". (Secker, J et al 2014, p2).

Prior to engaging with the project, an initial survey demonstrated (a fairly typical situation for many institution) that there was an over-reliance on using Google and little use of library resources. A post-activity survey showed considerable improvement with more awareness of resources available and the importance of critiquing information.

Twenty ambassadors were recruited from first, second and third years within the Departments of Social Policy and Statistics. SADL was promoted to students as an opportunity to improve their digital skills. They were offered Amazon vouchers as rewards for each workshop they attended and for engaging in activities such as blogging or sharing their learning with peers. They also got a statement on their Personal Development Aide Memoire (PDAM) record and the project trialled Mozilla badges.

The project had four scheduled interactive workshops which included activities such as group work, using search engines, reading list approaches, information behaviour for managing, storing and citing information and securing online identity. The students also learnt from staff and were prompted to share tools and approaches already used and give feedback. There were small group activities in each workshop to talk about ideas using different online tools, posters, post-its etc. There were vouchers offered for writing blog posts or sharing ideas with fellow students through study groups, social media or email.

Teaching resources developed have been made available as OERs (Open Educational Resources) and videos, blogs and twitter feeds were all created and shared. The overall attendance was very good with students' key motivation being the desire to develop digital literacy skills, rather than simply collect vouchers! The feedback from student ambassadors included the need for a more robust structure for the student ambassador role with better planning for content in workshops and timing throughout the

year. Students are not prolific users of social media and are not inclined to communicate their learning. The blog wasn't considered to be a useful medium for peer learning. The "support from the Students' Union and the academic departments is also key to the success of the project" (Secker, J et al 2014, p7).

This project is an interesting example of attempting to both situated information literacies within academic disciplines and the promotion of staff-student learning communities. Further implementations will build on the findings of the first pilot groups, with many of the student ambassadors continuing to develop their roles.

(2) Digidol (Cardiff University)

This project had a number of strands and activities, full details of which can be found in the links (see earlier table and Appendix 1). Of particular note were some specific roles and responsibilities associated with the development of a digital literacies curriculum and the range of activities targeted at students and staff.

For example, a student led strand complemented a core academic curriculum with a Leader role which was a student who was responsible for collating the workshop materials and activities and using collaborative learning to design study resources for other students (and ultimately to be released as OERs). Workshop and activity sessions included: using brainstorming, discussions, group reading and writing up, compiling shared notes, essay proposals and marking and creating self and peer study aids. Students used a wide range of digital technologies and had opportunities to experiment with different online collaborative environments and multimedia tools as well as a mixture of face-to-face (non-technology) approaches to collaborative learning. One of the recommendations to emerge was the need to provide more flexible learning spaces that were able to facilitate a broader range of approaches to teaching and learning and in which technologies could be readily integrated.

Another strand focused on aspects of careers and employability and aimed to develop staff's awareness of the relevance of digital literacies in such a content and how such might be considered in terms of curriculum, course materials (including the careers website, for example) and the existing Cardiff Award Scheme (through workshops with graduates).

(3) PriDE (University of Bath)

A wide range of activities were supported, including the following examples.

- *Enhancing critical thinking and writing* – using reflective blogging to compile arguments for essays, forming class discussions and a blend of the informal side of blogging whilst also preparing for formal assessment.
- *Enhancing learning through online student presentations* – preparation undertaken in advance of a seminar which resulted in better feedback and increased participation. Students also discovered new skills and become more aware of their online identity and associated issues.
- *Virtual Organising: a Virtual Team Activity Using Web Conferencing Software* – students worked in groups on a case study using Adobe Connect as a group space. They had to produce

PowerPoint presentations and discuss in break-out rooms as well as writeup a reflection for their individual assignments. This activity was useful for working on subject focused digital literacies.

- *Digitally Enhancing the Bath Award* – originally established to give student recognition for extra-curricular activities with a view to developing an optional element to include core skills and competencies linked to digital literacies.
- *Managing your online professional identity* - a careers workshop focused on building and maintaining online identity and understanding how to use social media in your career.
- *In the making.....caught on camera* - this produced a number of case study videos of academic staff demonstrating how they use digital technologies in their academic practice.

(4) Being Digital - the Open University

A broad set of activities and materials, which included:

- *My digital identity*: making a good impression online, knowing your audience and managing your online reputation.
- *Communication Online* – adopting good practice and being aware of the rules.
- *Filtering information quickly* - build searching methods to handle information overload to refine and then evaluate your results
- *Pathways* - to obtain a deeper understanding (assess your skills, knowledge and confidence using web tools and environments):
- *Keeping-up-to-date* (using blogs, twitter, RSS)
- *The right tool for the job* (key questions to ask when selecting the right tools online)
- *Exploring your information landscape* (information universe & getting to know the online library)
- *Self-assessment: understanding digital practices* – understanding your audience (digital identity, communication online, scams and hoaxes & targeted Google search).
- *Self-assessment: creating information* – adding content to web pages, blogs, practicing netiquette.

(5) Managing your Digital Footprint

This project provides an interesting example of taking a ‘campaign’ style approach to digital literacy, involving students, staff and support services in Edinburgh University. Themes covered include managing an effective online presence, keeping safe online, managing privacy and “e-professionalism.” The project was supported by the Students’ Association, the Institute for Academic Development and the Careers Service amongst others, indicating the extent to which digital literacy and skills can span a range of activities, remits and interests. Further information is available at <http://www.ed.ac.uk/schools-departments/institute-academic-development/about-us/projects/digital-footprint>

Appendix 3: All Aboard Project – Consortium & Team Members

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