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Digital Competences in Higher Education: An agenda for students' equal participation

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Abstract

In the modern online interconnected environment, digital competences have emerged as an umbrella concept that is considered as an important condition for learning, communication, civic participation and engagement, informed citizenship, employability, health and well-being. It incorporates information and data literacy, communication and collaboration, media literacy, the creation of online content, online safety and digital wellbeing as well as problem-solving, critical thinking and innovation (using digital tools and technologies). It is therefore, not only about technology related skills, but also about the attitudes and behaviour that relate to the online information and communication environment (e.g., the responsible, ethical and safe use and sharing of information; the ability to interact with others in the information society).

In the Higher Education context, the pandemic created an important emphasis within the education agenda to implement a systematic plan for developing HE students' digital competences in a fast-changing online learning and digital professional environment, and stressed even more the important role that academic librarians play in helping students to develop information and digital literacy skills so that they can be in a position to independently select, access and use accurate, reliable, trustworthy and credible sources of information and effectively use different digital tools and resources for their academic study. Despite this emphasis, some key unanswered questions still remain: Do we know, and do we understand the existing diversity of information and digital skills present in our students?' and 'Should we be approaching our students as a heterogeneous group or expect that they all arrive with a baseline set of skills?'.

Drawing from research conducted over the past few years to diagnose students' digital competences, this paper critically discusses the importance of understanding the wider context of a learner's experiences within the digital, media and information landscape, and in the 'continuum' of lifelong learning, where everyday life, work and education contexts converge, and as learning takes place in multiple contexts, both formal and informal. A fundamental question in HE should be how to understand and relate to students' different levels of digital experiences and competences within diverse online subject contexts, but also how to empower them to develop a proactive engagement with developing their own digital competences for life.

Keywords:

Digital competences, information literacy, digital literacy, media literacy, Higher Education, students, employability, digital citizenship

1. Introduction

Academic libraries can play an active and significant role in sustainable development via strategies that aim to address social inequalities in students. Librarians have professional skills that support a range of learning and can help to tackle and reduce inequalities in students, by means of empowering them with digital competences.

In the modern online interconnected environment, digital competences have emerged as an umbrella concept encompassing information literacy, digital literacy and media literacy skills that are considered to be an important condition for learning, communication, civic participation and engagement, informed citizenship, employability, health and well-being. Digital competences are not only about technology related skills, but ultimately about the behaviour and attitudes that relate to the online information and communication environment (e.g., the responsible, ethical and safe use and sharing of information; the ability to interact with others in the information society).

So what does this mean for the Higher Education context? The pandemic created an important emphasis within the education agenda to implement a systematic plan for developing HE students' digital competences, within a fast-changing online learning and digital professional environment.

It also stressed even more the important role that academic librarians can play in helping students to develop information and digital literacy skills so that they can be in a position to independently select, access and use accurate, reliable, trustworthy and credible sources of information, and also to effectively use different digital tools and resources for their academic study.

Drawing from research conducted over the past few years, to 'diagnose' students' digital competences, this paper critically discusses the importance of understanding the wider context of a learner's experiences within the digital, media and information landscape. This is the 'continuum' of lifelong learning, where everyday life, work and education contexts converge, as learning takes place in multiple contexts, both formal and informal.

2. Understanding students' different levels of digital competence

A fundamental question in HE should be how to understand and relate to students' different levels of digital experiences and competences within diverse online subject contexts. Also, how to empower students to adopt a proactive engagement with developing their own digital competences for life.

Despite this emphasis, some key unanswered questions still remain: Do we know, and do we understand the existing diversity of information and digital skills present in our students (and potentially the presence of a digital divide between those who are digitally competent and those who are not)?' and 'Should we be approaching our students as a heterogeneous group or expect that they all arrive with a baseline set of skills?'

In my own childhood experiences, back in the '70s, information abundance or overload was not really an issue. It was more the problem of information scarcity. Sometimes, I try to envisage what I would have been like today, if I had access to digital technology and online connectivity from that very early age. Would I have been the same or different? I am now classed as a member of 'Generation X', someone who was not born with the Internet and, according to some research, I may even appear to struggle more than my 'Generation Z' citizens (after all the internet is all they know, they are the digital natives, and I am the digital immigrant). I still remember the day when I sent my first email and browsed the Web to find information for one of my assignments on Sherlock Holmes. I was already a university student, and I could count only eight websites on the topic. They were easy to evaluate and select from. These days, it may be more likely for a young person to be bombarded by masses of information, mixed up with some fake news, a bit of misinformation or disinformation, and occasionally some online scams and fraudulent websites that could even steal your personal data. In my days, I knew more about the Trojan horse that led to the fall of Troy than the pitfalls of the Trojan virus, a common type of malware that could erase any computer's hard drive.

However, when it comes to the development of information and digital literacy skills, or digital competences, as an overarching umbrella concept, research shows that the younger generation may not be necessarily equipped with the digital and information literacy skills required for today's modern interconnected world. In relation to students transitions into HE, particularly, we may want to consider the following findings from research.

Children face online risks: "The percentage of children who reported that they had been bothered or upset on the internet in 2020 varied by country [but there is]…a notable increase from 2010 when the range was from 6% to 25% across countries" (Livingstone, 2020). The Council of Europe Strategy for the rights of the child (2022-2017) includes a focus on children's rights on the Internet. But it is not only an issue of protection, restricting access to dangerous online content but also of critical literacy when accessing content that is important for taking part in everyday life activities. 'Digital Education Vision for the European Schools' is envisaging that every student "develops throughout his/her European School Education the digital competence to foster confident, critical, responsible and creative use of, and engagement with, digital technologies for learning, at work, and for participation in society" (Schola Europaea, 2019). Therefore, while digital skills relate to the use of information and communication technologies and to functional or technical skills to perform certain digital activities, such as using a computer, using software and applications, digital competences are defined in a way that encompass not only what young people can

effectively do, but also what behaviour and attitudes they should be developing towards technology and online connectivity, with responsibility as online citizens and confidence as creators of content.

In relation to research, which is of interest to libraries in particular, conducted by The National Literacy Trust (2018), in the UK (which forms the context of this work), is it also worth noting that results point to only 2% of children and young people possessing the critical literacy skills they need to tell if a news story is real or fake. In addition, latest research with young children in the U.K. by Ofcom (2019) suggests that "three in ten users aged 8-11 and 12-15 believe that if a website is listed by a search engine it can be trusted" and "only a minority of 8-15s who use search engines (23% for 8-11s and 33% for 12-15s) correctly identify sponsored links on Google as advertising" (a phenomenon that has remained unchanged in the last few years). Recent research on children's news consumption and attitudes in response to COVID-19 related information has also found that for half of 12-15 year old children (52%) it is "hard to know what is true and what is false about Coronavirus", while a quarter (24%) agree that they are "confused about what I should be doing in response to Coronavirus" (Ofcom 2020, p.2).

So where do libraries come along when it comes to the modern online information interconnected environment in HE and beyond? Libraries already play a key role in helping young people to develop information and digital literacy competences that will allow them to shape their personal information landscapes, to work with digital media, to participate in online social communication networks and explore a multitude of fields of knowledge as active creators of online content.

3. A look at everyday life

Bringing more context from the everyday life, we may begin with a simple proposition that, in an era of constant Internet connectivity, HE students enter the realm of university, not as digital 'tabula rasa' (i.e., with digital experiences largely unformed), but with existing information and digital skills and behaviour.

These have already been shaped by earlier encounters with the digital and online information environment and within different socio-cultural and environmental situations and they may act as barriers or as enablers to further information literacy and digital literacy development. For example, we know from research that lack of digital connectivity and fewer opportunities for digital skills development, within the continuum of one's everyday life, work and educational interrelated contexts, may act as a trigger of digital inequalities, which may lay hidden or undiscovered in students' educational journeys (Good Things Foundation, 2018; Moore et al., 2018; Ofcom, 2020b; UK Department for Digital, Culture, Media & Sport, 2017).

In the 2022 infographic by the Good Things Foundation, we can see facts and stats related to the UK digital divide. The UK is leading the world as a digital nation but only in the UK there 10 million people who struggle to use the internet independently and are being left

out. 36% of workers who experience a digital divide lack key digital skills for work and 11% worry about online safety. If we consider where our diverse student body is coming from (for example in the UK many international students come from countries where digital connectivity and digital skills development may have been more challenging for them), the digital exclusion challenge becomes even more prominent. We need to place digital inclusion strategies at the heart of HE. Many of the students we meet may be coming from the other side of the divide.

However, when we are approaching the concept of information and digital literacy in HE we tend to consider students as situated not in the fabric of their previous holistic experiences of information and digital literacy but only within their present HE learning experiences. In other words, we may overlook students' experiences in the everyday life, their previous education and the workplace. We may not ask about them, we may not have awareness of them, and we may take the existence of information and digital literacy skills for granted.

Our students can easily be on the wrong side of the digital divide. IFLA's digital literacy statement says that "Differences in digital skill levels and attitudes often replicate those seen in society as a whole. The digital divide follows much the same fault-lines as pre-existing gender, economic, social and educational inequalities. It is not just a question of digital natives and digital immigrants; young people too can find themselves on the wrong side of the divide" (IFLA, 2017).

The current pandemic crisis has accelerated the need to diagnose and understand more systematically students' pre-existing knowledge, behaviour and experiences gained within these interrelated contexts, as well as their interplay in shaping academic performance and outcomes, identifying equally gaps and areas of strength in students. Identifying where digital competences gaps and strengths may lie, within the boundaries of specific disciplinary areas and future work-related expectations, can become a crucial step in helping students to develop further and collaboratively empower each other in certain digital areas, building new digital skills, where required, and professional level expertise. Designing tailored digital skills support may also further accelerate this process and ameliorate student anxiety and confusion with using specific digital tools or adopting particular behaviours within the online environment.

There is a new agenda for libraries to play a key role in developing digital readiness in students within the educational environment, mastering not only digital technologies, but also expected information related and digital literacy behaviours. Defined by IFLA, Media and Information Literacy is 'the knowledge, the attitudes, and the sum of the skills needed to know when and what information is needed; where and how to obtain that information; how to evaluate it critically and organise it once it is found; and how to use it in an ethical way. The concept extends beyond communication and information technologies to encompass "learning, critical thinking, and interpretative skills across and beyond professional and educational boundaries" (2011).

IFLA also states that "to be digitally literate means one can use technology to its fullest effect - efficiently, effectively and ethically – to meet information needs in personal, civic and professional lives… It implies compliance with the same standards of behaviour online as offline, respect for the human rights of others, and the necessary openness to move beyond national and language boundaries, and cultural and religious differences". It also requires media and information literacy skills. IFLA goes on to say that "Libraries of course will have to take steps. They should position digital literacy as a core service of libraries, with adequate planning, budget and staff. For librarians to be able to teach digital literacy, they may need training themselves. It may be necessary to form partnerships with external actors in order to provide best service to users". Higher education institutions should also: "Apply the skills and knowledge of librarians, in academic libraries and embed in learning management systems, to improve digital literacy among students and researchers" (IFLA, Media and Information Literacy, 2011).

4. Students' Digital Skills Exploration

At Robert Gordon university (RGU) we have introduced a Digital Skills Quiz that explores students' needs for further support by means of using simple YES/NO answers to basic questions around four areas:

1) The first area is digital proficiency (e.g., how to log on to university services, how to use the university App which is used for accessing a number of student systems and information, the timetable, and our online learning system, how access the university Wi-fi, how to use ASK RGU, which helps to find which university services students may require to use, the remote university drive and the printing facilities).

2) The second area is online learning (e.g., what online studying behaviours are expected, how to use the university virtual learning environment, how to access and use the online (Leganto) reading lists and the Turnitin plagiarism detection system, that is used to check their work for originality, understand how to submit their online assignments, and use MS Teams, Zoom and Blackboard Collaborate for online classes).

3) The third area is digital behaviour and safety.

4) Finally, the fourth are includes effectively using Microsoft office tools which are important for compiling coursework and performing academic learning activities (e.g., managing and organising learning content using tools such was One Drive, Office 365 and Excel).

Students 'No' answers to the quiz direct them to key areas for learning, which provide documents and audio-visual resources around the themes. For example, in relation to theme 3 on 'digital behaviour and safety' these address the university's online code of conduct with recommendations which are given in the form of a video, the university policy on dignity (e.g., based on problems such as bullying and harassment) and an online university course on cyber security awareness (e.g., addressing digital footprint issues).

In academic session 2021-22 the 'Digital Literacy' Institutional research project was also run in collaboration with leading teams from a number of schools at Robert Gordon University. The project supported by a QAA 'Enhancement Award' and its aim was to drive and support the development of digital literacy skills among RGU students in different discipline areas. In line with UK and global strategic priorities, the project aim was to identify pockets of digital inequalities in students, to enhance their digital capacity as future digital citizens and professionals, and open conversations around information and digital literacy training and support for students and staff.

The project addressed a number of areas highlighted in the 'Teaching and Learning Framework' of RGU: 'Technology Enabled Learning' so that graduates are supported to use relevant technologies, in versatile and innovative ways but also develop the digital mindsets and behaviours expected in the digital environment. Another equally important area is 'Flexibility and Inclusion' as RGU is committed to embracing an ethos of borderless education, offering learning opportunities regardless of demographic differences. The project supported students as 'Future Professionals' with key digital competences for future work and as continually evolving learners who are committed to 'Lifelong Learning'. The project also embraced 'Authentic Learning' by means of engaging students to self-reflect and appraise work-based digital skills and related learning.

Together with participant academics, digital competences areas needs were examined in a way that reflects disciplinary needs. The work engaged a total of 35 members of staff in discussions across nine schools. Following the consultation meetings, a total of seven schools administered a discipline-based digital competences self-assessment tool to students in different schools (Aberdeen Business School, Creative and Cultural Business, Engineering, Health Sciences, Law School, Nursing, Midwifery and Paramedic Practice, and Pharmacy and Life Sciences). In addition, interviews were conducted with students which provided helpful insights into the survey results and helped to contextualise key findings. Finally, internal and external resources on the development of specific digital competence areas were collated in the form of a digital skills toolkit that can be used by academic staff to support their students.

In the past few years since work on digital competences started by the author, data have been collected from a total of 860 students. However, for this paper data are reported on the results from the latest round of research and the surveys that were administered in the academic year 2021-22. Overall, 371 questionnaires were returned to offer a useful snapshot of students' self-assessment of digital skills for further discussion.

The theoretical frameworks that formed a basis for the survey, included the European Digital Competence Framework for Citizens (Carretero et *al.,* 2017) and The Digital Capabilities framework, developed by JISC (2012). The former places focus on the diversity of digital environments and digital literacy skills needed for work, learning, and everyday life digital participation. The latter focuses on the Higher Education learning context in

particular and explores developing digital skills with a view to requirements for both students and educators.

UNESCO in 'A Global Framework of Reference on Digital Literacy Skills' discuss numerous instruments that have been developed by national, regional, international and commercial agencies for assessing digital literacy or digital competence. Based on their mapping of different frameworks they concluded that the competences described can all be mapped to the DigComp 2.0 framework.

The 'Digital Literacy' project incorporated three aspects: a) the effective use of constantly-changing digital tools and media for learning, work and everyday-life, b) digital behaviours expected of students as learners, professionals and digital citizens (such as online communication, teamwork and the ethical sharing of information) and c) the need for the development of a mindset that values the importance of lifelong digital learning and development.

However, it was also important to explore the need for workplace digital skills, not just baseline skills that would relate to any area and to help students develop skills around utilising digital tools, safely preparing and sharing online documents, with attention to personal data protection and ethical guidelines, which are part of the expected online professional code of practice in many professions, the correct handling, online management and curation of documents.

5. Overview of Digital Competences Tool

The Digital Competences Tool (DCT) was developed as an outcome of the above and previous related projects (Martzoukou et al. 2020; Martzoukou et al. 2021), and it offers an appraisal of self-assessed digital competences. It addresses a number of important areas for everyday life, study and work in the digital online environment. The aim of the DCT is to help academics and support staff, who work directly with students in HE, to identify pockets of digital skills inequalities in a discipline focused way, and support planning for the enhancement the digital capacity of students as future digital citizens and professionals.

The DCT includes 11 strands that capture a variety of digital skills. These are described below.

5.1 Everyday Participation as Digital Citizen

This strand deals with digital citizenship skills that address everyday life skills such as well-being and the right to information, which are important for promoting the fundamental principles of democracy, socialisation, human rights and the rule of law. It is important to specifically note this item, as The Council of Europe (2017) defines digital citizenship as "the capacity to participate actively, continuously and responsibly in communities (local, national, global, online and offline) at all levels (political, economic, social, cultural and intercultural)". Universities should prepare the workforce of the future to be both ready for digital work life ahead as well as graduating as good or better digital citizens.

Our earlier research found that students who have higher competence levels in everyday life digital activities also considered themselves more competent in their digital skills for academic study overall (Martzoukou et al. 2020; Martzoukou et al. 2021). Students should be supported to adopt a positive, proactive and enthusiastic approach to digital skills development in all areas of life (everyday environment, education, workspace).

When students embark on their academic study it is expected that they may not have advanced digital skills in specific areas, and they will be developing them throughout their study and via future practical experience. Exploring everyday life digital interactions and competences at that early phase will therefore help academics to understand more about potential attitudes towards digital tools and behaviours of students, offering guidance and support at the right time. As students move on to a higher level, the digital competences tool can be used to explore more specialised digital skills, expected as part of a course/area of study or the professional context.

5.2 ICT Proficiency

This strand deals with skills to handle technological devices, software, web browsers, search engines, university digital administrative services & learning management systems, personal digital services and communication platforms.

5.3 ICT Productivity

This strand deals with data management, i.e., using tools, such as calendars, task lists, project and time management apps, to make learning more efficient.

5.4 Information Literacy Skills and Information Identification

This strand deals with skills to distinguish scholarly/academic, professional and popular online information and using online tools for finding, gathering and evaluating and organising digital information (e.g., using search engines, academic databases, online information curation and referencing tools) as well as skills for sharing digital information respecting and acknowledging the work of others.

5.5 Digital Research Skills

This strand deals with skills for finding, organising, storing, analysing and interpreting digital research data together with skills for understanding ethical, legal, and security guidelines.

5.6 Digital Communication Skills

This strand deals with skills for participating professionally in a range of digital networks, understanding expected behaviour/code of practice in online environments, communicating respectfully, inclusively & confidentially, recognising false or damaging online communications, and actively sharing specialist ideas in a range of online communication media.

5.7 Digital Innovation Skills

This strand deals with skills for developing new ideas and projects using online tools and technologies, working collaboratively on different aspects of a creative/innovative

project/service design, managing the process as a team, and promoting new online tools and opportunities to others.

5.8 Digital Wellbeing

This strand deals with skills for feeling comfortable, in control and safe when using digital technologies, recognising that digital information and media can cause distraction, overload, and stress, and disconnecting when necessary, acting positively against cyberbullying and other damaging online behaviours, managing online and real-world interactions in ways that support healthy relationships and using digital media to access services, monitor health conditions, and participate in the community.

5.9 Digital Creation Skills

This strand deals with skills for designing digital content, capturing, editing, and producing with digital media as well as creating, sharing, and showcasing digital artefacts, with audience and purpose in mind. It includes coding and designing apps, digital games, virtual environments, and interfaces, document formatting and presentation, social media content creation, video/vlogs/podcasts creation, infographics, online posters, blogs/wikis, audio/vlogs/podcasts, simulation/virtual reality tools and data visualisation.

5.10 Digital Learning and Development

This strand deals with skills for participating in online learning opportunities and resources collaboratively and supportively, adopting new ways of learning online, using online tools to take notes, annotate, collate and curate learning materials, review, and revise learning, record learning events/outcomes and receive/respond to online feedback about academic work.

5.11 Digital Identity Management

This strand deals with skills for managing online profiles on different digital media for individual, professional, and academic purposes, understanding how online personal data are collected and used in different systems, using privacy settings appropriately, being aware of the potential positive or negative impact of online communication on online reputation, making sure outcomes of learning and other achievements are accessible online, and using online analytics to explore impact and influence on others.

5.12 Digital Abilities to Complete Academic Work

An additional strand ‘Digital Abilities to Complete Academic Work’ is also included. This strand deals with digital skills for addressing the overall requirements of academic work, taking into consideration students’ individual perceptions of areas that they consider important for their academic success. The notion of these skills may differ significantly from one individual to another. The purpose is not to explore what these may be on an individual level but to gauge perceived overall individual confidence

5.13 Digital Competences Scale

The Digital Competences tool uses a scale that measures digital competences on the basis of Novice (Level 1) to Expert (Level 5), representing different levels of knowledge and self-sufficiency for performing specific digital tasks. Unlike other surveys, we decided to clearly define the scale dimensions for clarity and to highlight the importance of independent learning as students move from a novice to an expert level where they can confidently show others how to complete certain digital tasks.

6.0 Keys Research Results

Students assessed themselves as 'intermediate' in several individual areas and in their overall self-perceived digital competences to complete their academic work. However, there were also many instances of lower competences reported, across the different categories. In this study these were reported in the form of 'red' (more than half of the population self-assessed at 'novice' and 'basic' levels) level. These 'red' areas are summarised below:

- e-democracy (e.g., accessing voting information and political information online; taking an active role in democratic processes online).
- Blog/Wiki content creation.
- Video Creation.
- Data visualisation (e.g., Excel, SPSS, Tableau).
- Infographics (e.g., Canva).
- Designing and administering data collection instruments online (e.g., online surveys, Microsoft Forms, online interviews).
- Analysing digital research data using different tools (e.g., spreadsheets, textual data analysis software).
- Designing online communications for different purposes (e.g., online discussions, blog messages, Twitter threads to persuade, inform, entertain, guide, and support).
- Developing new ideas and projects using online tools and technologies (e.g., setting up a work or study group online, using online tools in innovative ways to create presentations).
- Promoting new online tools and opportunities to others (e.g., proactively promoting creative ideas and projects).
- Using online tools to take notes, annotate, and collate learning materials, review, and revise learning (e.g., Evernote, OneNote, Google Apps, Scribble).

- Using online tools to record learning events/outcomes and use them for self-analysis, reflection, and showcasing of achievement (e.g., in an e-portfolio or learning blogs.

In qualitative feedback students mentioned a number of digital skills that were important for their learning including developing ICT proficiency, using the online learning tools, communicating and learning with others online, developing online information literacy and research skills, developing teamwork skills and employability.

Students also offered examples of how everyday life digital skills development played a role in how these skills were utilised in the education environment and placed emphasis on the use of the Internet in the context of work, everyday life and education, showing the interplay of the different contexts were digital literacy develops.

In addition, the students felt that the pandemic helped to further accelerate digital skills in different contexts, however, there is still lack of confidence in the work environment and more advanced digital skills are required to be developed, while education could help to bridge that gap by means of starting with basic skills that would help to build confidence.

Students shared many ideas about how their digital skills could be further developed, for example by means of incorporating digital tools and processes in teaching and assessment, increasing staff engagement and training with new digital tools, offering clear explanations of how certain digital skills relate to the discipline and the working environment and, overall, encouraging students to develop a more proactive attitude towards developing their digital skills.

Overall, one of the key ideas deriving from student data was that digital literacy development is important is different parts of life, education and work and exposure to digital tools and processes can help to develop a 'digital mindset' that is transferable from one context to another.

In addition, comparisons between different generational groups were found with Generation X students (i.e., mature students) self-assessing more at 'basic' levels, while 'intermediate' and 'advanced' skills featured more prominently in the younger groups of students (Millennial and Generation Z) in an number of areas from ICT productivity, to finding digital information using databases, to organising digital information to referencing digital information sources, adhering to a referencing style and understanding how to share information publicly online, respecting and acknowledging the work of others (e.g., using creative commons licensing, providing references/citations to original works). Also, the same was found in relation to digital creation skills such as blog/wiki creation, video creation and data visualisation and Infographics creation, digital research (e.g., designing and administering data collection instruments and designing online communications for different purposes), digital innovation, digital learning and development, digital identity management (e.g. understanding how your online personal data are collected and used in different systems and use privacy settings appropriately, using online analytics to explore

your impact and influence on others, acting positively against cyberbullying and other damaging online behaviour and digital wellbeing).

In relation to 'Digital Abilities to Complete Academic Work', Generation Z students had the highest proportion of 'advanced' digital skills. However, all three generational groups self-assessed at 'intermediate' level, which may be an indication of the need for additional support across the board of digital skills.

7.0 Digital Literacy Toolkit

Based on the results of the survey the project developed the 'Digital Literacy Toolkit' (Martzoukou, 2022), which is available as a freely available eBook. The toolkit includes advice around all key digital skills areas with recommendations for training, both internal and external in the form of internal and external resources, including webinars, courses, audio-visual material and reading. The approach followed uses a traffic light system with an emphasis on 'red' and 'amber' areas for upskilling that become areas for further development. The aim, however, is to identify both gaps and pockets of strength within the student population so 'green' (more advanced areas) can also be noted.

8.0 Conclusion

As emerging models of online teaching and learning begin to challenge traditional teaching and learning paradigms, and with increasing demands for global connectivity in education, work and everyday life, existing digital divides that are unexplored may be further accelerated in or students.

The design and results of this study have demonstrated that the concept of digital competences is not only complex but also constantly developing and, as new tools, technologies and digital behaviours emerge, incorporating ongoing discussion and dialogue about what is expected of students, and in what stage of their learning journey, is important.

This research supported that students should develop not only technology mastery (i.e., the abilities, competences, capabilities and skills required for using digital technology, media and tools) but also digital mindsets (consisting of attitudes and behaviours necessary to develop as critical, reflective and lifelong learners). It is the task of all staff who are involved in teaching and learning to help students develop this dual perception of digital skills and emphasise the importance of lifelong digital learning and development, with awareness of the diversity of learning contexts and the learners involved. When thinking about the diversity of students' skills and backgrounds and designing support in the overall continuum of students' learning for life, this involves, past and present learning experiences but also future anticipated development of core digital skills and behaviours. This may also mean critically reflecting on the digital competences of staff and ensuring that training and support for upskilling is available, where and when that is required. Information and digital literacy are not static skills. They develop throughout one's everyday life, work and

education. For that reason, it is important to understand how they develop from an early age and supported at different stages as our digital world is evolving.

As part of this growing skills agenda, we are currently working on an European Erasmus + project on "Information and Digital Literacy at school: A bridge to support critical thinking and equality values for primary education using children's literature and transmedia', a collaboration with several EU partners. The project is managed by Universität Jaume I De Castellon in Spain with the Ionian university as one of the project partners. The project involves 8 partners from 6 European countries (Spain, Italy, Turkey, Finland, Greece and United Kingdom) to advocate for the urgent need to promote information and digital literacy in primary schools, as a key pillar for the education of a democratic citizenship based on critical thinking and values of equality. It is necessary to turn to early education and intervention in order to tackle existing digital divides.

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