Digital teaching skills: *DigCompEdu CheckIn* as an evolution process from literacy to digital fluency

Competencias Digitales Docentes: DigCompEdu CheckIn *como proceso de evolución desde la alfabetización hasta la fluidez digital*

Competências digitais docentes: o DigCompEdu CheckIn *como processo de evolução da literacia para a fluência digital*

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Abstract

Today we live in an era where real and virtual are ever more intertwined, but also where there is still a long way to go when it comes to integrating digital technologies in educational environments. It is argued, therefore, that it is necessary to understand what it means to be digitally competent and, above all, to realize that this construct includes digital literacy and fluency as stages of an evolving knowledge. In this context, the `DigCompEdu CheckIn` *questionnaire allows teachers to identify their proficiency in the use of digital technologies and to suggest strategies to overcome existing difficulties and achieve what may be considered as digital fluency, that is, not only making use of digital technologies, but to understand when this use is cost effective to achieve the desired goals. This paper presents the preliminary results of a pilot study conducted in a higher education institution as an example of the relevance of* `DigCompEdu CheckIn` *as a self-assessment model for determining the digital proficiency stage in which teachers are and what is the appropriate training for them to evolve towards digital fluency. The feedbacks provided by the questionnaire, in addition to identifying the areas where teachers are most fragile, provide suggestions for improvement, allowing the design of specific training that adapts to individual needs. Thus, each teacher, at his own pace, can attend appropriate training, depending on the levels obtained in each of the questionnaire's six areas of competence.*

Key Words: *Digital Competence; Digital Literacy; Digital Fluency; Teacher Training*

Resumen

Hoy vivimos en una era donde lo real y lo virtual están cada vez más entrelazados, pero también donde todavía hay un largo camino por recorrer cuando se trata de integrar tecnologías digitales en entornos educativos. Se argumenta, por lo tanto, que es necesario comprender lo que significa ser digitalmente competente y, sobre todo, darse cuenta de que esta construcción incluye la alfabetización y la fluidez digitales como etapas de un conocimiento en evolución. En este contexto, el cuestionario `DigCompEdu CheckIn` *permite a los profesores identificar su competencia en el uso de tecnologías digitales y sugerir estrategias para superar las dificultades existentes y lograr lo que se puede considerar como fluidez digital, que no solo hace*

uso de las tecnologías digitales, sino también para comprender cuándo este uso es rentable para lograr los objetivos deseados. Este documento presenta los resultados preliminares de un estudio piloto realizado en una Universidad como un ejemplo de la relevancia de DigCompEdu CheckIn *como modelo de autoevaluación para determinar la etapa de competencia digital en la que se encuentran los profesores y cuál es la capacitación adecuada para evolucionar hacia la fluidez digital. Los* feedbacks *proporcionados por el cuestionario, además de identificar las áreas donde los profesores son más frágiles, proporcionan sugerencias para mejorar, permitiendo el diseño de formación específica que se adapte a las necesidades individuales. Por lo tanto, cada profesor, a su propio ritmo, puede asistir a la formación adecuada, dependiendo de los niveles obtenidos en las seis áreas de competencia del cuestionario.*

Palabras clave: *Competencia Digital; Alfabetización Digital; Fluidez Digital; Formación Docente*

Resumo

Vive-se hoje uma Era onde real e virtual se confundem cada vez mais, mas também onde ainda existe um longo caminho a percorrer no que diz respeito à integração das tecnologias digitais em ambientes educativos. Defende-se, assim, que é necessário compreender o que significa ser competente digital e, sobretudo, perceber que dentro deste constructo estão incluídas a literacia e a fluência digitais, enquanto etapas de um conhecimento em evolução. Neste contexto, o questionário DigCompEdu CheckIn, *vem permitir aos docentes identificar a sua proficiência ao nível do uso das tecnologias digitais e sugerir estratégias para ultrapassar as dificuldades existentes e alcançar aquilo que poderá ser a verdadeira fluência digital, ou seja, não só fazer uso das tecnologias digitais, mas compreender quando é que esse uso é efetivamente rentável para atingir os objetivos desejados. Neste texto apresentamos os resultados preliminares de um estudo piloto realizado numa instituição de ensino superior como exemplo da relevância do DigCompEdu CheckIn enquanto modelo de autoavaliação para determinação do estádio de proficiência digital em que os docentes se encontram e qual a formação adequada para a sua evolução no sentido de obtenção da fluência digital. Os* feedbacks *fornecidos pelo questionário, para*

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além de identificarem as áreas onde os docentes se encontram mais fragilizados, apresentam sugestões de melhoria, permitindo desenhar formações que se adaptam às necessidades individuais. Desta forma, cada docente, ao seu próprio ritmo, pode frequentar formação adequada, em função dos níveis obtidos em cada uma das seis áreas de competência que o questionário comporta.

Palavras chave: *Competência Digital; Literacia Digital; Fluência Digital; Formação Docente*

1. Introduction

The growing use of Digital Information and Communication Technologies (DICT) in education has led to new ways of teaching and learning at all levels of education, compelling educators to acquire digital competences to achieve the desired educational outcomes. To this end, schools have been adapting to a world that is increasingly more digital, where resources and devices that before were only used for social or recreational purposes are gaining more and more prominence in the classroom and also contributing to creating new formal, non-formal and even informal educational spaces.

Rethinking educational processes and establishing new ways to design how learning takes place is becoming increasingly important. In fact, learning is increasingly taking place in a mix of spaces, in the classroom and/or via distance learning, and today teachers and students are immersed in a digital culture that "has resulted in the coming together of the online and offline, to the extent that the school and the world have merged through network connections" (Pretto, & Avanzo, 2018, p. 49).

Teachers must, therefore, know how to use DICT to create sustainable learning scenarios, implementing teaching strategies that motivate learning and inspire creativity, by using digital tools that are part of their students' daily lives. Since society is increasingly more hybrid, this must be harnessed to create quality educational environments where young people who today are immersed in a digital culture can feel truly integrated.

That is why we have focused our attention on developing competences for open and interconnected digital education, combining natural educational practices, understood to be socialisation practices, with the benefits of using digital technologies. This notion is the result of an awareness that today's student "brings with them diversified knowledge acquired outside of the educational environment. They always have a mobile device at hand. They have discussions and share opinions in virtual spaces. They communicate through hypertexts, viral apps, games and the like" (Hansen, & Silva, 2016, p. 274).

With the emergence of this hyper-connected hybrid generation, that moves seamlessly between the real and virtual spaces, it has become imperative for teachers to develop digital competences so as to use DICT to achieve the desired educational outcomes. In this context, teachers must know how to use digital technologies to create sustainable learning scenarios, implementing teaching strategies that include the integration of DICT into motivating and creative environments, by using digital tools that are part of their students' daily lives.

This is particularly important because, since these students are increasingly accustomed to constant use of digital technology, teachers need help in learning how to adapt the use of these technologies to educational environments, working together to create quality learning environments, "learning to learn" in digital environments, "learning to work" in a digital society and "learning to use" all possible digital tools, thus achieving true digital fluency.

However, one must effectively understand what "digital competences" are and how they are linked to the concepts of "digital literacy" and "digital fluency" to be able to identify how to progress between these two concepts, to achieve genuine and full proficiency in the use of digital technology, particularly as regards the use thereof in an educational context. These concepts have been defined, and their meanings combined and confused. However, given their complexity, there has been no real consensus among authors.

In recent years, several programmes have been designed for a clearer understanding of what competences are required for a digitally enhanced education.

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Some also focus their attention on creating strategies to assess the respective digital competences and, *a posteriori*, act based on the needs of the stakeholders in the education process to effectively be able to use digital technology to create sustainable, innovative pedagogical scenarios.

We will provide a description of *DigCompEdu CheckIn*, a European framework that allows teachers to reflect on their strengths and weaknesses in using digital technologies in education and, based on the feedback received, discern what training they need to achieve digital fluency. The preliminary results of the framework underway will be presented as a means to illustrate the importance of this survey as a strategy for the self-assessment of digital competences, grouped into areas of competence, allowing each teacher to identify the areas in which they require more training and investment to achieve digital fluency.

The introduction of digital technologies in different scenarios and environments of human activity, including education and training, has contributed to the design of cooperation-based learning models and methodologies. Acquiring these types of co-operative and collaborative skills is of great importance in the area of education and must be common to all areas of people's lives.

The educational paradigm, therefore, must change, with schools placing value in digital education, that is, creating conditions to foster enriching pedagogical practices using digital technologies, and also by investing in digital education training for teachers.

On the other hand, developing cross-cutting skills is currently on the education agenda, with different international bodies such as UNESCO, the European Union and the World Economic Forum pointing out, with regard to the development of such skills, the role digital technology can play in creating learning environments that benefit the learning processes of students directly, not only because they exist in schools, but because "the potential contribution implies a stage of transformational adoption of digital technologies from a methodological perspective. Digital technologies, understood as 'technologies for learning', are a key element of change in the classrooms" (Generalitat de Catalunya, 2018, p. 5).

1.1. Digital competences

Defining "competence" has given rise to slightly different definitions, depending on how the term is used by the various authors. There are also those, such as Boterf (2005), who acknowledge that it is difficult to define the term without diminishing the breadth of its meaning. However, it is commonly accepted that the concept encompasses a set of knowledge, ideas, attitudes, diverse cognitive resources, and action and assessment schemes to, as Perrenoud (1999, 2001) says, address diverse situations.

In the field of education, competences can be understood to mean "a complex combination of knowledge, skills and attitudes that lead to effective human action in different contexts. They are diverse in nature: cognitive, metacognitive, social and emotional, physical and practical." (Martins, 2017, p. 5).

Today, with all the demands of a fast-paced global world where the transition between analogue and dialogue is widespread, it has become imperative that the competences of both teachers and students also include the ability to make critical and informed use of different digital technology resources, in order to enhance their own teaching and learning processes.

As such, and to explain the notion of "competences for the 21st century" to teachers, Pedro and Matos (2019), state that "digital information management and organisation competences, linked to metacognition, communication and collaboration, and to ethical and social aspects, must be regarded as core skills, thus encompassing the different practical, technical, pedagogical, scientific and ethical dimensions" (p. 349), which, in essence, resembles the TRACK model defined by Mishra and Koehler (2006), and claims that teachers should be capable of combining teaching, content and technology.

So, how does one define what digital competences are? The concept naturally encompasses the ability to work in digital environments, incorporating the technological and digital component in the pedagogical component. However, this "digital competence" should translate into the ability to bring knowledge and attitudes to bear for the effective use of digital technology in the classroom.

As explained in the document published by Generalitat de Catalunya (2018), the digital competences of teachers must include the ability to mobilise and transfer knowledge, strategies, skills and attitudes, by using digital technologies to address specific situations. The document states that digital competences should help teachers:

a. Facilitate students' learning and the acquisition of their digital competence.

b. Carry out processes for improving and innovating teaching according to the needs of the digital era.

c. Contribute to their professional development in accordance to the changes that take place in society and in schools. (p. 11)

Therefore, to develop these competences, teachers need to be critical, especially when it comes to discerning the use that can be made of the different digital technologies and the resources to which they provide access (European Parliament and the Council, 2006; INTEF, 2017; Ilomaki, Paavola, Lakkaka, & Kantosalo, 2016), and have the creativity and confidence to use the different digital resources to achieve the desired goals in respect of employment, education, leisure, inclusion and engagement in society (INTEF, 2017). Indeed, as Ilomäki, Lakkaka, and Kantosalo (2011) explain, the definition of digital competence is somewhat linked to political and regional issues, "reflecting beliefs and even wishes about future needs, and has its roots in the economical competition in which the new technologies are regarded as an opportunity and a solution" (p. 1).

The majority of the authors, therefore, acknowledge that digital competences are not limited to those which enable the development of tasks for personal benefit, but that mastering these skills can also contribute to achieving collective goals (Erstad, 2006; Gansmø, 2009; Ilomäki *et al.,* 2016; From, 2017; Ferrari, 2012; Claro *et al.*, 2012).

In the field of education, teachers' digital competences must necessarily demonstrate not only their own work capacity, but also their ability to use digi-

tal competences to facilitate and advance learning by their students, thus helping to enhance development of the student's digital competences. Ranieri, Bruni and Xivry (2017) specifically explain that the concept includes different types of knowledge:

- Digital and media knowledge and competences – being able to use effectively media languages and digital tools with the awareness of socio-ethical implications

- Didactic transposition of digital and media knowledge and competences – the capacity to teach the media, applying pedagogical and didactic knowledge to digital technologies

- Didactic transposition of disciplinary contents through the use of media and digital technologies – the ability to use the media to teach a specific subject matter. (p. 11)

Ferrari (2012) also explains that digital competences include "learning domains; tools; competence areas; modes; purposes" and that the concept is complex since it is

a set of knowledge, skills, attitudes, abilities, strategies, and awareness that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, and socialising (p. 30).

Given that the above is such a comprehensive (and complex) definition, the next section discusses how this concept can include a journey, advancement, from basic knowledge and skills, with which one can associate the term "literacy", to full, comprehensive and thorough mastery of digital competences, that is, "fluency".

1.2. Digital Literacy and Fluency

Because the term "digital competences" is such a complex concept, as discussed above, it is no wonder that it is so hard to define. It is for this very reason that it is often so difficult to understand that digital competence is not synonymous with digital literacy or fluency. In fact, we believe these steps are a part of the concept of "digital competence".

As Briggs and Makice (2011) argue, just as one speaks of fluency in a given language or in the practice of a musical instrument, digital competence requires effective practice. These authors state that "because first-hand experience is so critical to learning, the process to become fluent demands an investment of time and patience, with ourselves and with those around us" (p. 61).

Indeed, digital literacy encompasses that which is essential in the field of digital competence: making effective use of digital tools for social engagement, collaborative work involving communication, critical thinking, and problem-solving skills (Cartelli, 2010; Martin, & Gudziecki, 2006). Thus, upon stating that

digital literacy was rigorously defined as the ability to use digital technologies, to navigate, collect, analyze, and evaluate the information and knowledge, to construct new information, to create digital expressions, and to communicate with others both during the learning process and while performing one's job (Kim, 2019, p. 5),

these words appear to be mistaken for a possible definition of digital competence. However, the two are connected insofar as digital literacy should be considered the first step towards digital competence.

Nonetheless, achieving digital fluency requires mastering a whole range of other skills, namely the ability to go beyond critical thinking to create new knowledge, to face new challenges (Miller, & Bartlett, 2012; Sparrow, 2018) and, besides knowing the "what" and the "how", integrating the "when" and "why" (Briggs, & Makice, 2011). It was in this regard that an attendee at a workshop held by the Na-

tional Research Council in 2006 stated that while literacy is "functional", fluency is "expressive, adaptive and able to deal with ambiguity" (p. 29).

Different authors also refer to the ability to go beyond mere knowledge and, with already acquired skills, react to a constantly evolving and changing society, adapting to new situations and building new knowledge (Miller, & Bartlett, 2012; Sparrow, 2018; Ashford, 2015; Glewa, & Bogan, 2007; Hsi, Pinkard, & Wooley, 2005). In this regard, Niessen (2013) states that digital fluency involves creating and communicating complex ideas and new meanings, as well as being able to understand all these concepts and meanings. These new meanings, this new understanding, this ability to always create something new is the result of constant advancement, especially with regard to the link between a world that flows between the analogue and digital, and where digital is constantly adapting to the needs of the populations (Papert, & Resnick, 1995; Niessen, 2013).

More than digital literacy, digital fluency involves gaining

the cross-cutting, transecting nature of the skills required to meet the challenge of critical engagement with online information: traditional critical thinking skills, but also internet-specific technical knowledge and ICT-specfic competencies (Miller, Bartlet, 2012, p. 38).

Another issue pointed out by different authors concerns the critical spirit (to which digital literacy and competence also relate), namely the ability to sometimes know "what not to do" (NRC, 2006), and even to understand when using digital makes it difficult to achieve goals.

In short, the definition provided by Briggs and Makice (2011) includes some of the fundamental characteristics of digital fluency:

an ability to reliably achieve desired outcomes through use of digital technology. This ability is helped or hindered by the situational forces and the digital fluency of others. A digitally fluent person knows not just what to do with a technology and how to do it, but also when and why to use it at all (p. 120).

We must add that this definition should also include critical thinking and information literacy skills, as well as knowledge and techniques that enable these skills to be applied to new contexts, thus creating new challenges and opportunities (Miller, & Bartlett, 2012, p. 51).

Aware of the complexity of these concepts and of all that they encompass, several international organisations have sought to list all the competences that should be developed in an educational context to complete the digital literacy stage and reach digital fluency. Benchmarks and models have already been created to improve teaching and learning processes through digital technologies.

Sales, Moreira and Rangel (2019) present some of these models and their characteristics, referring to the most relevant and recent models, namely the International Society for Technology in Education, the United Nations Educational, Scientific and Cultural Organization (UNESCO), the National Institute of Educational Technologies and Teacher Training (INTEF-Spain), the Innovation Center for Brazilian Education (CIEB) and the EU Science Hub, the European Commission's science and knowledge service.

The next section provides a more detailed explanation of the work carried out by the EU Science Hub, that has sought to identify the needs of educators regarding digital competences, through surveys, analyses and reports to support work to be carried out in this area, and of the self-assessment survey designed by the service and chosen for this study, not only because it is an excellent framework that enables strengths and weaknesses to be identified in distinct and fundamental areas of digital competence, but also provides users with improvement and, subsequently, development strategies for each of the areas, to help them achieve digital fluency.

2. Materials and Methodology

2.1. The *DigCompEdu CheckIn* Framework

By leveraging what digital technologies have to offer to enhance the educational process, one can create innovative digital environments and sustainable

learning scenarios, where digital can truly be a window to the world of knowledge. However, for this to happen, teachers (and students) must be able to recognise the value of these resources and, above all, identify how they can enhance, develop and add value to their educational processes.

As mentioned in the previous section, the EU Science Hub is one of many institutions that have been working on this issue in recent years. According to the website, research in this area started in 2005 and focuses on how to make better use of DICT for "rethinking learning, for innovating education and training and for addressing new skills requirements (e.g. digital competence) to generate growth, employment and social inclusion" (EU Science Hub, 2018, online).

Among the different products this service has been developing, of particular interest is *DigCompEdu*, a report that presents a common European framework for the digital competences of educators, launched in 2017, as a result of an awareness that teachers "need a set of digital competencies specific to their profession in order to be able to seek the potential of digital technologies for improving and innovating education" (Redecker, 2017, p. 8).

The working group also designed an online survey, in collaboration with several European countries, which can be answered by teachers in order to identify their level of digital competence and, rather than just listing a set of skills, provides users with a report with suggestions for improving their digital practices, based on their answers.

We believe that these two documents (the report and the survey) are excellent starting points for designing a teacher digital competences self-assessment tool, in order to identify their weaknesses and, from there, to offer suggestions to help them overcome those difficulties.

One of the most important aspects of this survey is that it is not limited to gauging how much digital technologies are used *per se*, but rather incorporates it into a broader strategy of interaction between learning, assessment and the development of the students themselves.

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There is a connection with the concepts of digital fluency mentioned in the previous section, namely an understanding that the teacher's own professional motivation must include an awareness of their needs regarding the use of digital technologies in their profession to enable personal growth and that of their students, through seamless collaboration between teachers and students and continuous learning development for all. And this is exactly what one needs to achieve "true" digital fluency: the ability to recognise that knowledge is never truly complete. Moreover, given that this type of knowledge has been changing rapidly, we believe that 'fluent' users should be those who acknowledge that they are not yet fully proficient and that their knowledge must be continuously built upon.

The educators' digital competences self-assessment rating scale, defined by the EU Science Hub, was validated for the Portuguese population (Dias-Trindade, Moreira, & Nunes, 2019) to assess the digital competences of teachers in Portugal.

The defined and validated rating scale, with 21 items, identifies six areas of competences, namely:

- **Professional engagement**, which identifies a teacher's competence with regard to the use of digital technologies for communication, collaboration and professional development;

- **Digital technologies and resources**, related with the use of digital technologies and resources, specifically the ability to use, share and protect them;

- **Teaching and learning**, regarding a teacher's capacity to identify his or her ability to manage and orchestrate the use of digital technologies in teaching and learning;

- **Assessment**, namely assessment competences, specifically how digital technologies are used to assess students;

- **Empowering learners**, regarding the ability to use digital technologies to enhance the inclusion, personalisation and active engagement of students;

- **Facilitating learners' digital competence**, regarding a teacher's competence to enable students to use digital technologies creatively and responsibly. (Dias-Trindade, Moreira, & Nunes, 2019).

The survey assigns teachers an overall result that places them in one of the six proficiency levels (Table 1), but also gives them a partial result for each of the six areas presented (Table 2), and the corresponding feedback on how to advance their knowledge in each of the 21 competencies.

Digital competence profi-ciency levels	Score
A1 - Newcomer	below 19 points
A2 - Explorer	between 19 and 32 points
B1 - Integrator	between 33 and 47 points
B2 - Expert	between 48 and 62 points
C1 - Leader	between 63 and 77 points
C2 - Pioneer	more than 77 points

Table 1: *Digital Competence levels in the* DigCompEdu CheckIn *Survey.*
Source: Dias-Trindade, Moreira, & Nunes, 2019, p. 158.

Area 1		Area 2		Area 3		Area 4		Area 5		Area 6	
Level	Score	Level	Score	Level	Score	Level	Score	Level	Score	Level	Score
A1	1 to 4	A1	1 to 2	A1	1 to 6	A1	1 to 3	A1	1 to 2	A1	1 to 6
A2	5 to 7	A2	3	A2	7 to 8	A2	4 to 5	A2	3	A2	7 to 8
B1	8 to 10	B1	4 to 5	B1	9 to 12	B1	6 to 7	B1	4 to 5	B1	9 to 12
B2	11 to 13	B2	6	B2	13 to 16	B2	8 to 9	B2	6	B2	13 to 16
C1	14 to 15	C1	7	C1	17 to 19	C1	10 to 11	C1	7	C1	17 to 19
C2	16	C2	8	C2	20	C2	12	C2	8	C2	20

Table 2: *Digital Competency levels and their score by area from the*
DigCompEdu CheckIn Survey. Source: from the authorss.

Thus, more than just listing a set of competences, this survey also provides users with a report with suggestions, based on their answers, to improve their digital practices. This appears to be an added value, as it offers teachers the ability not only to identify their level of digital competence, but to also receive specific information on the training they need (Trindade, Moreira, & Nunes, 2019).

For our study, we applied the tool at a Portuguese University in the first half of 2019, and received responses from 118 teachers from different areas of this institution.

A quantitative analysis was carried out by analysing the partial results of each of the survey's areas of competence, and of the overall results obtained by each teacher, to identify strengths and weaknesses, detailing the results obtained in each of the survey's 21 items of competence, in an effort to understand what training each teacher needs to advance their digital skills, irrespective of their competence level.

3. Findings from a study conducted at a Portuguese University

By analysing the results from the survey, we were able to identify the strengths and weaknesses of each teacher in each of the 21 competencies and, consequently, the areas in which more training is required in order to progress to the next level of digital proficiency.

As can be seen in Table 3 below, a general analysis of the responses provides an overall understanding of the results and allows us to identify the competence areas that need to be improved.

	Competence Areas	items	Average Score
Teachers' professional competencies	Professional engagement	Organisational communication	2,31
		Reflexive practice	1,78
		Digital competence	1,88
		Selecting	2,08

	Competence Areas	items	Average Score
Teachers' professional competencies	Digital technologies and resources	Professional collaboration	2,26
		Management, protecting, sharing	1,97
	Teaching and learning	Teaching	2,24
		Guidance	1,31
		Collaborative learning	2,09
		Differentiation and personalisation	2,12
		Content creation	1,90
	Assessment	Self-regulated learning	1,50
		Assessment strategies	1,45
		Feedback and planning	1,95
	Empowering learners	Analysing evidence	1,43
		Accessibility and inclusion	1,68
Learners' competences	Facilitating learners' digital competence	Actively engaging learners	1,81
		Information and media literacy	2,21
		Communication	1,66
		Responsible use	1,21
		Problem solving	1,82

Table 3: *Overall results. Source: from the authors.*

These results indicate that Area 5 – E*mpowering learners*, is the weakest area. Area 2 – *Digital Technologies and resources* – is the area with the highest average score.

The competence areas in which the group studied obtained the lowest scores, on average, can also be identified, namely:

- *Differentiation and personalisation* (Area 3) – 1.12 points;
- *Responsible use* (Area 6) – 1.21 points;
- *Guidance* (Area 3) – 1.31 points.

These results help explain why Area 3 is that in which these teachers will need to invest more.

An analysis of the competences with the highest average scores shows that these fall under the top 3 areas of the survey:

- *Teaching* (Area 3) – 2.24 points;
- *Organisational communication* (Area 1) – 2.31 points;
- *Professional collaboration* (Area 2) – 2.26 points.

4. Discussion

The above results indicate the areas of competence that, on average, the teachers need to improve and those in which they are most proficient. The results also show that it is important to analyse the scores obtained for each competence, in each of the areas, given that, considering the results for Area 6 in Table 3, for example, the first competences have a good average score, while the remaining three are those which need to be improved.

However, when analysing individual results, not all teachers have good levels of competence in the competences listed under Area 2, nor do they have low levels of competence in Areas 3, 4 or 5.

Such is the case, for example, of the results obtained by 15 of the teachers who took part in the study, shown in Table 4.

N	Área 1	Área 2	Área 3	Área 4	Área 5	Área 6	Total
27	B1	B1	A1	A1	A1	A1	A1
30	B1	B1	B1	A1	B1	B2	B1
34	A2	A1	A1	A1	A1	A1	A1
35	A2	B1	A1	A1	A1	A1	A1
38	B1	B1	A2	A2	A1	A2	B1
40	A2	B1	B1	A2	B2	B1	B1
57	B2	A2	B2	A2	B1	B2	B2
59	C2	C2	C1	C1	C1	C1	C2
74	C1	B2	B1	A2	B1	B1	B2
83	B2	B2	B2	B1	B1	B2	B2
85	B2	C1	C1	B1	B2	B2	C1
90	B2	B2	C1	C2	C2	C1	C1
103	A2	B2	A2	A1	A1	A1	A2
108	A2	A1	B1	A1	A2	A2	A2
110	A2	A2	A2	A1	A1	B1	A2

Table 4: *Example of the levels of competence per area of competence[1].*
Source: from the authors.

As can be seen in Table 4, not all teachers need training in Area 5 – *Empowering* learners (the area with the lowest overall results), with some teachers already falling within the upper C1 and C2 levels (such as participants 59 and 90).

On the other hand, although Area 2 – *Digital technologies and resources*, has the highest average score, participants number 34, 57, 108 and 110 have very low levels of digital proficiency and, therefore, need training specifically in this area.

It is clear that participants who achieve low overall scores will certainly need more training. However, one can see, for example, that participant 35 does not need as much training in Area 2 – *Digital technologies and resources*, at least initially, as participant 34, for example.

With suitable training for each of the *DigCompEdu* areas, designed to include 6 different areas, each teacher can confirm their level of competence, in each of the areas, and attend training that best suits their needs.

Consequently, and based on the findings of this pilot study, we believe that six training courses should be designed, focusing on each of the areas, each with three levels – beginner, intermediate and advanced, to meet the needs of levels A, B or C (there may still be room for improvement at C1 level), an undertaking that is currently under way.

Though these training courses are designed *en bloc* and to meet all the digital competence needs of teachers, from the moment each teacher completes this survey and receives a specific response for each of the areas in the document, they will be able to determine which course they should attend, investing first in the areas for development and personalising their learning needs, thus progressing at their own pace towards achieving digital fluency.

5. Final considerations

"Now, more than ever, education has a responsibility to be in gear with 21st century challenges and aspirations, and foster the right types of values and skills that will lead to sustainable and inclusive growth, and peaceful living together." (UNESCO, 2017, p. 27). The challenges UNESCO refers to are linked to the new needs of labour markets: competences that go beyond basic literacy skills (related with the ability to apply acquired knowledge), and translate into the ability to deal with complex challenges and the environment (Trindade, & Moreira, 2017). These are the skills that the employers of this new millennium value most, besides being able to flourish in adaptive contexts where collaborative and cooperative work is also essential.

By harnessing the potential of technology, innovative environments with sustainable learning scenarios can be created, where digital can truly be a window to the world of knowledge. However, for this to happen, teachers (and students) must be able to recognise the value of these resources and, above all, identify how they can enhance, digitally "grow" and add value to their educational processes.

However, more than being able "to do" something, actually being "skilled at" something is not as easy as it sounds. Although it is perfectly normal for students in the new millennium to use a whole host of digital technologies and to feel the need to be in constant contact with and connected to the world, digital devices and apps are mostly used for social purposes and using them in school seems unfamiliar. And this is where the challenge lies: bridging the gap and fostering the use of digital technologies in education, acknowledging the differences to make specific use thereof and harnessing the potential of these resources.

There is, therefore, a very important correlation between what schools must offer - quality learning, and the needs arising from the digital age - an era in which the continuous flow of increasingly greater amounts of information requires competences to validate the information and, thus, use it correctly. These digital competences include, necessarily, the ability to work in digital environments and to mobilise knowledge and attitudes for effective use of digital technologies in a professional context, in this case an educational environment. However, as the findings of the study show, the digital competence level of the teachers indicated in the illustrative example above varies greatly, based on their strengths and weaknesses in the different areas of competence.

In fact, that is what separates digital literacy from digital fluency: "the essence of digital fluency is to make core critical thinking and information literacy skills relevant to the new challenges of the [digital] environments" (Miller, & Bartlett, 2012, p. 39).

That is why we believe that the resources created by the EU Science Hub are very valuable assessment tools for enhancing educational processes. Tools such as *DigCompEdu CheckIn*, created by the EU Science Hub and validated for the Portuguese population by Dias-Trindade, Moreira and Nunes (2019), are a great starting point for assessing the digital proficiency level of teachers, based on which initial and continuing training courses can be designed to help teachers overcome the digital "barriers" they still face today.

MONOGRAPH

By analysing the answers to this survey, one sees that each teacher has basic levels of digital literacy in each area, that is, they acknowledge that they have only basic knowledge, which limits their ability to work in digital educational environments. However, the results in other areas show that some teachers are close to being digitally fluent, that is, their answers show that they are at a stage where they feel confident and able to choose the best digital tools or strategies to use, as appropriate, and, above all, are able to make use thereof to better achieve their goals. Being able to identify their strengths and weaknesses helps teachers to determine what steps need to be taken to achieve full digital fluency.

Thus, the ongoing study discussed in this paper and its initial findings aim at demonstrating that this survey can be used to clearly identify the areas of digital competences that teachers need to improve and, from there, design personalised learning pathways to improve digital competences and a roadmap to digital fluency.

The examples given show that even the teachers with the lowest levels of digital competence may not need to attend beginner training courses in all areas.

Based on our findings, we recommend that different training courses be designed, focusing on each of the six areas of the survey, each with three levels of complexity – beginner, intermediate and advanced, for those at level A, B or C (there is always room for improvement at the highest level, and feedback from the survey itself also addresses this possibility).

This will enable each teacher to invest in the areas and competences in which they identified weaknesses and attend the training courses best suited to their needs, thereby improving their competences until they feel truly digitally fluent.

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Notas

[1]   *Key for Table 4: N= Identification number of the participating teacher. Area 1 – Professional engagement; Area 2 – Digital Technologies and resources; Area 3 – Teaching and learning; Area 4 – Assessment; Area 5 – Empowering learners; Area 6 – Facilitating learners' digital competence. A1 – Newcomer; A2 – Explorer; B1 – Integrator; B2 – Expert; C1 – Leader; C2 – Pioneer. (see Table 1).*