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articoli

Train teachers in digital citizenship to facilitate a sustainable education system

Formare gli insegnanti alla cittadinanza digitale per facilitare un sistema educativo sostenibile

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Abstract

The technological development of the last twenty years, starting in Europe from the increased availability of Internet resources to the concept of the digital citizen, has involved our society at all levels, affecting politics, businesses, families and all forms of education and teaching at each and every level. The COVID pandemic that began in 2020 has led to further acceleration, so much so that both the Digital Agenda for information technology in public administration 2020-2022 (AGID) and the Action Plan for Digital Education 2021-2027 focus on a strong digital component in everyday life. A psychoeducational protocol for digital skills in teachers is hereby provided, tested on a sample over the course of 8 weeks. In order to be able to assess initial and final competences, a questionnaire on digital competences has been developed and validated, based on DigComp 2.1.

Keywords: digital citizenship; teacher; digital skills; self-efficacy; change.

Sintesi

Lo sviluppo tecnologico degli ultimi vent'anni, a partire in Europa dalla maggiore disponibilità di risorse Internet fino al concetto di cittadino digitale, ha coinvolto la nostra società a tutti i livelli, interessando la politica, le imprese, le famiglie e tutte le forme di istruzione e didattica ad ogni livello. La pandemia di COVID iniziata nel 2020 ha portato a un'ulteriore accelerazione, tanto che sia l'Agenda Digitale per le tecnologie dell'informazione nella pubblica amministrazione 2020-2022 (AGID) sia il Piano d'Azione per l'Educazione Digitale 2021-2027 si concentrano su una forte componente digitale nella vita di tutti i giorni. Viene fornito un protocollo psicoeducativo per le competenze digitali degli insegnanti, testato su un campione nel corso di 8 settimane. Per valutare le competenze iniziali e finali è stato sviluppato e validato un questionario sulle competenze digitali, basato su DigComp 2.1.

Parole chiave: cittadinanza digitale; insegnanti; competenze digitali; autoefficacia; cambiamento.

[1] The manuscript is the result of a collective work of the authors, whose specific contribution is to be referred to as follows: Luigi Piceci paragraphs: 1, 2, 6; Anna Maria Mariani paragraphs: 3, 4, 5.

1. Introduction

Technology is increasingly present in daily life and represents an indispensable gateway. Surely – and it goes without saying – its use has become progressively more prevalent and accelerated in all areas over the last 20 years. The European Union Institutions began to focus on digital competences in 2006 with the document entitled Key Competences for Lifelong Learning, where they appeared for the first time within the key competences for development (Papetti, 2008).

The MIUR (in Italy it is the Ministry of Education, University and Research) in 2008, with the "Digital Plan", had focused its attention on three main objectives (Ministry of Education, Strategy for Digital Growth 2014-2020):

1. incorporating interactive whiteboards in schools;
2. setting up technologically advanced classrooms;
3. creating an advanced didactic model that can be used in disadvantaged areas.

In 2010, the so called "Europe 2020 Strategy" was born (Chamber of Deputies, The Europe 2020 Strategy), it was proposed to encourage smart, sustainable and inclusive growth; this ten-year project includes the Digital Agenda for Europe as one of the seven pillars of growth for the European Union. The Digital Agenda 2014-2020 set out a series of objectives including the deployment of digital technologies in schools. Now there is talk of the Digital Agenda 2022 as part of the 2030 digital goals.

The Digital Agenda 2022 focuses on the increased use of digital technology in PA (public administration). "The objectives of the Plan are based on the indications emerging from the new European programming 2021-2027, on the principles of the eGovernment Action Plan 2016-2020 and on the actions foreseen by the Tallinn eGovernment Declaration (2017-2021), whose indicators measure the level of digitisation throughout the EU and detect the actual presence and use of digital services by citizens and businesses" (AGID). The specificity of the actions that require implementing from an educational point of view is too a part of this movement towards digitalisation. The Digital Education Action Plan 2021-2027 (European Commission DEAC 2021-2027) shows that there is a clear vision on the part of the European Commission to bring about a strong change in the field of education on the quality of digital education and on having equal knowledge and technological infrastructure in order to respect the principle of inclusiveness and accessibility in Europe. The crisis that has emerged in relation to COVID-19, which has led to an unprecedented use of technology in education and training, has made it clear that it is not only necessary to equip educational structures with technology, but it is also crucial to provide training in order to prevent situations that could be a brake on teaching or, worse still, stressful for teaching staff (Piceci, Sgorlon, & Peluso Cassese, 2020). One of the objectives of the Digital Education Action Plan 2021-2027 is the following: "teachers and staff involved in education and training should be familiar with digital technologies and be competent in the field". Furthermore, the document says that the development of the digital competences and skills should be accelerated in order to move from Digital Migrants (Prensky, 2001) to Digital Citizens, as soon as possible.

2. The digital competence framework

Digital competences comprehend the set of skills and knowledge required for a responsible, critical and therefore effective use of technology (Ferrari, 2013).

Historically, there have been different definitions of digital competencies (DC) depending on the approach used. In 2018 Spante, Hashemi, Lundin, and Algers highlighted what the relationship between DCs and the Digital Divide is. Still in that same year, Petterson showed how the meaning of digital competencies were strictly linked to political and organisational infrastructure and to pedagogical strategies and leadership. In higher education, Sánchez-Caballé, Gisbert-Cervera, and Esteve-Mon (2020) pointed out the terms that are most often related to DCs in relation to the very profile of students. Zhao, Pinto-Llorente and Sánchez-Gómez (2021) in their systematic review investigated the potential dimensions of DC in order to deduce the main trends, obtaining an overview of the status and development of students' and teachers' e-skills in higher education.

2.1. DigiComp

This is a document created within the European Union to deal with digital competences for citizenship (Ferrari, 2013) following the European Qualifications Framework (EQF) for European learning, which was created to make qualifications comparable, translatable and transferable across the European Union, and above all to link key competences for lifelong learning. This document identifies Cbs as one of the 8 competences and for the first time in the history of the European Union it identifies and defines "the key competences that citizens must possess for their personal fulfilment, social inclusion, active citizenship and employability in our knowledge-based society" (Key Competences for Lifelong Learning 2006). The framework outlines eight key competences are:

1. communication in the mother tongue;
2. communication in foreign languages;
3. mathematical competence and basic competences in science and technology;
4. digital competence;
5. learning to learn;
6. social and civic competences;
7. sense of initiative and entrepreneurship;
8. cultural awareness and expression.

The DigComp model is a common European reference framework for e-skills that aims to provide a tool-independent definition of e-skills and focuses on the needs of a society in which technology is becoming increasingly important. Said needs range from being informed to being able to manage any complex situation that is related to the use of technology.

The areas of competence under investigation are 5, which have evolved over the course of the various versions also in order to be in line with technological evolution.

The DigCom2.1 areas are:

- skills area 1: Information and data literacy;
- skills area 2: Communication and collaboration;
- competence area 3: Digital content creation;
- competence area 4: Security;
- competency area 5: Problem solving.

The first version (DigComp 1.0) had three levels of mastery in Dimension 3 (basic, intermediate and advanced). In DigComp 2.1 the levels have been increased to eight. A

wider and more detailed range of relevance levels supports the development of learning and training materials.

3. Digital citizenship and teaching methodologies

Schools are one of the main agencies for socialising and educating children, second only to the family. Its main role is to provide the tools and skills needed to grow up in a balanced way, to acquire responsibility and autonomy and to exert in citizenship and democratic life. In particular, in recent years, with the on-going digital transformation, schools have been asked to take charge of training digitally aware citizens. In Italy, Law 92/2019, with art. 5, introduces the teaching of Digital Citizenship within the subject Civic Education, reporting as main objectives those already identified by DigComp 2.1 and DigCompEdu and discussed in paragraph 1.1. Educational institutions are not fully aligned to this new challenge while young people need to learn a conscious and responsible way to express their digital citizenship. In this context, the role of teachers is of crucial importance. They are called upon not only to be digitally aware citizens, but also to teach this competence to their students, with leadership that helps their students learn a responsible and active way of living the digital transformation. For this purpose, it is necessary, first of all, to fill any existing gaps in the digital skills needed to fully play their role as Digital Citizens and, subsequently, to teach this to their students with innovative and effective teaching methodologies in the digital transition.

In order to define the concept of Digital Citizenship, we referred to the MIUR guidelines (Ministerial Decree n. 35 - 22 June 2020), which identifies it as the ability to consciously and responsibly use digital tools. Drawing on international literature (Kim & Choi, 2018; Choi, Glassman & Cristol, 2017; Choi, 2016), we have identified some important building blocks to focus on for an effective Digital Citizenship model:

- digital Ethics, based on the respect towards others (Jones & Mitchell, 2016), taking responsibility and awareness (Hollandsworth, Dowdy, & Donovan, 2011; Ohler, 2012) and safety (Afshar, 2013);
- digital Knowledge, relating to the ability to access and use technologies in a critical way and to be able to evaluate information sent and received (Marcinek, 2013; Moeller, Joseph, Lau, & Carbo, 2011; Simsek & Simsek, 2013);
- digital activism, as active participation in aspects of political, social, economic life in the digital sphere from a civic duty perspective (Jones & Mitchell, 2016; Raoof, Zaman, Ahmad & Al-Qaraghuli, 2013; Kahne, Lee & Feezell, 2013; Lenhart et al., 2011; Tatarchevskiy; 2011);
- critical perspective, due to the need for critical thinking to guide the reading of interactions and choices within the digital world (Choi, Glassman & Cristol, 2017).

The competences needed for teachers to fully perform their task, according to Digicomp EDU (2017) cover six specific areas:

- professional engagement: using digital technologies to communicate, to collaborate with colleagues and for personal development;
- digital resources: identifying, creating and sharing digital resources;
- teaching and learning: managing the use of digital technologies for teaching and learning;
- assessment: reinforcing assessments through digital technologies;

- empowering learners: using digital technologies for inclusion and active involvement of learners;
- facilitating learners' digital competence: facilitating learners' creative and responsible use of digital technologies for sharing, communication, content-creation and problem-solving activities.

In order to stimulate and develop in students a model of Digital Citizenship that encompasses these aspects, it is necessary for teachers to use a circular learning process (Ribble, 2008) aimed at providing not only knowledge but also skills for everyday life. In such a process the main steps are:

- awareness: developing awareness about the need to be digitally literate, understanding needs and distinguishing between appropriate and inappropriate behaviours;
- guided practice: experimenting with digital technologies under adult guidance in protected environments, where there is the possibility of taking risks and making mistakes;
- modelling & demonstration: observing appropriate digital citizenship behaviours from adults;
- feedback & analysis: discussing and sharing reflections and experiences with peers and adults, receiving constructive feedback on the effective use of technologies in school and society.

The educational programme developed and delivered by our research team aims to develop the DigicompEDU skills in teachers and to provide a teaching model for them to follow with their pupils in order to enhance learning, experimenting it directly during the proposed training course.

4. Methodology and Methods

4.1. The psychoeducational program

Teachers, in most cases, fall into the category identified by Prensky (2001) of digital immigrants, where technologies are not fully integrated into personal and professional life and there exists some resistance to change. Legrottaglie and Ligorio (2014) point out that the actual use and integration of digital in teaching does not reflect the real potential of these tools and new possible learning models. Some of the causes of delays in integration are to be found in the internal factors that characterize the category of teachers, mainly related to the readiness to change, perceived self-efficacy and limiting beliefs with respect to technologies (Benigno, Chifari, & Chiorri, 2014). According to several scholars, the necessary pre-requisite for technology integration in teaching is TPACK (Technological, Pedagogical and Content Knowledge) (Scherer, Siddiq, & Teo, 2015; Scherer & Siddiq, 2015; Siddiq, Scherer, & Tondeur, 2016; Hew, Lan, Tang, Jia, & Lo, 2019), as it enables teachers to design specific teaching strategies (Moreira-Fontán, García-Señorán, Conde-Rodríguez & González, 2019; Petko, 2020; Scherer, Tondeur, & Siddiq, 2017; Scherer, Tondeur, Siddiq, & Baran, 2018). Choi (2016) adds that the emotions experienced by teachers when faced with the digital are also crucial in this integration process, even because they influence pupils' emotional states (Becker, Goetz, Morger, & Ranellucci, 2014; Sutton & Wheatley, 2003). The psycho-educational pathway designed took into account not only content-related aspects on new technologies but also psychological

aspects linked to resistance to change and self-efficacy. Specifically, it focuses on three areas: knowledge, skills, and psychological reactions (Kirschner, 2015; Sweller, 2020). For what concerns knowledge and skills, acted competence (Willermark, 2018) was considered within the TPACK framework (Koehler & Mishra, 2009). With regard to psychological aspects, the focus was on psychological reactions (Scherer and Teo, 2019) and, in particular, on the teacher's pedagogical belief system (Ertmer & Ottenbreit-Leftwich 2010; Hermans, Tondeur, Van Braak, &Valcke, 2008). The course consisted of eight 90-minute meetings, held on a zoom platform, on a weekly basis. The method used was based on experiential learning (Reggio, 2009), where the direct experience of teachers approaching new technologies is the cornerstone of the didactics, followed by a process of metacognition. Thanks to direct experience and experimentation with new possibilities for teaching, teachers can achieve a different view of digital technology, overcoming certain mental barriers with regard to effectiveness and self-efficacy.

The design of each meeting was based on three fundamental moments

- argumentation of specific digital competences, according to the model defined by DigiComp2 (Information and data literacy; Communication and collaboration; Digital content creation; Security; Problem solving);
- experiential activities, based on the competence addressed during the meeting with post-activity debriefing to activate metacognitive processes and learning;
- mindfulness elements and practice, for increasing self-efficacy and reducing attentional biases (Flook, Goldberg, Pinger, Bonus, & Davidson, 2013; Kilpatrick et al., 2011; Lutz, Slatger, Dunne, & Davidson, 2008).

In between meetings, stimuli were provided for reflection on the topics discussed, with the aim of maintaining focus on the specific topic and developing creative thinking about the experience and its transfer into professional practice, through a social platform. Furthermore, in the interaction with the teachers and among themselves, the teachers were encouraged to use some digital collaboration and social sharing tools with the aim of introducing and experimenting with new ways of interaction and communication.

4.2. The sample

The teachers who voluntarily participated in the study who completed both measurements (pre- and post-test) were 37 (with a heterogeneous distribution with respect to order and grade), 81% female, 37.8% in a relationship, with an average age M = 36.35 and DS = 9, with a distribution of the degree of education asymmetrical negative (diploma 5.4%, Bachelor's degree 13.5%, Master's degree 81.1%). Among these, about 30% are teaching (24.3% non-tenured, 5.4% tenured), while the remaining 70% are waiting for assignment or qualification or competition. All the participants were asked for a self-assessment of their technological skills (with a scale from none to specialised answers distributed normally) and whether they had taken courses to learn notions, methods or IT tools (46% yes, 54% no). Recruitment took place via email and participants decided to participate voluntarily, signing an informed consent and giving authorisation to process data in aggregate form.

4.3. Questionnaires

Before the beginning of the training (T0) and at the end of the training (T1), psychometric questionnaires were administered to evaluate the effectiveness of the training provided. The questionnaires were administered through Google Forms.

- The Questionnaire on the Evaluation of Digital Citizenship Competences (QCCD) of Teachers (Piceci, Mariani & Melchiori, 2021), built by the research team and validated, is composed of 21 questions that are divided into the 5 areas of DigiComp2.1, considering the specificity of the same areas:
  1. information and data literacy: 3 questions;
  2. communication and collaboration: 6 questions;
  3. digital content creation: 4 questions;
  4. security: 4 questions;
  5. problem solving: 4 questions.

For each competence 4 levels of mastery are defined: Basic, Intermediate, Advanced and Highly Specialised, through a declaration of behaviours that includes both the knowledge aspect and the skills and attitude aspect.

- Intrapersonal Technology Integration Scale (ITIS) (Benigno et al., 2013). The questionnaire contains 21 items measuring the constructs of Self-Efficacy (SE), Outcome Expectations (OE) which is divided into Performance, Social and Self-Evaluative OE and the construct of Interest (INT) (previously theorised within the Social Cognitive Career Theory by Lent et al., 1994) in the use of technologies. Participants answered on a 5-level Likert scale with their level of agreement/disagreement.
- Utrecht Work Engagement Scale (UWES) (Pisanti, Paplomatas & Bertini, 2008). The scale measures the level of involvement with work and consists of 17 items identifying the three elements of vigour, dedication and involvement. The respondent can express the frequency with which they experience certain work-related feelings through a 7-point Likert scale (from "never" to "always").
- Teachers' self-efficacy scale (SAED) (Biasi, Domenici, Capobianco & Patrizi, 2014). The scale measures teachers' perceptions of self-efficacy with regard to their ability to transfer skills and maximise their students' learning (Biasi et al., 2014, p. 491). The Italian version of the scale includes 24 statements with respect to which respondents must declare their level of agreement with a scale from 1 to 9, where 1 i stands for "not at all" and 9 for "very much".
- The Multidimensional Work Motivation Scale (WTMTS) (Gagnè et al., 2014). The questionnaire measures the teacher's level of motivation with respect to carrying out his or her work, on a scale ranging from "intrinsic motivation" to "demotivation" (Deci & Ryan, 2000). It consists of 15 statements that can be answered with a 7-point likert scale from 1 ("does not correspond at all") to 7 ("corresponds completely").

4.4. Research Hypothesis

On the basis of the theoretical indications derived by the main reference literature, the following hypotheses were developed and subsequently tested through a quasi-experimental one group longitudinal design:

- H1: a training intervention based on a mixed approach (knowledge development according to the Digicomp2 model, experiential learning and mindfulness) will produce an improvement in the participants' skills (from a statistical point of view, a statistically significant difference ($p < .05$) will be detected by placing the post-test averages higher than the pre-test, a one-way positive dependent sample test).

Complementarily, constructs or sub-dimensions not directly affected by the intervention will not show significant changes.

- H2: The nomological relationship between the constructs considered relevant on the basis of the literature will be confirmed by the correlation model between the empirical variables found (from a statistical point of view, the correlation matrix will identify positive and statistically significant Pearson's r coefficient values for ($p < .05$).

5. Findings and results

With regard to the first hypothesis, the detailed results of the Paired Samples T-Test are shown in Figure 1. All comparisons, except for the AREA1 sub-dimension, are statistically significant ($p < .001$) and confirm the increase in mean values in the post-test. Furthermore, the corresponding effect sizes are very large (0.2 Small, 0.5 Medium, 0.8 Large) (Cohen, 1969). Similarly, the pre-test ($M = 24.21$, $SD = 5.46$) and post-test ($M = 25.81$, $SD = 4.21$) results on self-efficacy in teaching strategies indicate that the training intervention led to an increase in self-assessment on this task, $t(36) = -2.257$, $p = .015$. On another of these scales, the pre-test ($M = 24.8$, $SD = 4.72$) and post-test ($M = 26$, $SD = 4.16$) results of self-efficacy in student engagement indicate that the training intervention led to an increase in self-assessment on this task, $t(36) = -1.836$, $p = .037$. In both of these two cases, the effect sizes were less strong (approximately $d = .30$).

Just as expected, there was no significant increase in the total mean UWES after the end of the training course ($M = 45.054$, $SD = 8.1$) compared to the pretest ($M = 46.30$, $SD = 6.54$), $t(36) = 1.219$, $p = .885$. Similarly, there was no significant increase in total mean WTMST intrinsic motivation after the end of the training course ($M = 17.081$, $SD = 3.69$) compared to the pretest ($M = 17.73$, $SD = 3.46$), $t(36) = 1.\ 046$, $p = .849$; nor was there a significant increase in total mean WTMST Amotivation after the end of the training course ($M = 5.649$, $SD = 3.988$) compared to the pretest ($M = 5.75$, $SD = 4.33$), $t(36) = 0.166$, $p = .565$.

Paired Samples T-Test

							95% CI for Cohen's d	
Measure 1		Measure 2	t	df	p	Cohen's d	Lower	Upper
PRE_AREA1_AID_TOT	-	POST_AREA1_AID_TOT	−1.516	36	0.069	−0.249	-∞	0.027
PRE_AREA2_CC_TOT	-	POST_AREA2_CC_TOT	−5.401	36	< .001	−0.888	-∞	−0.563
PRE_AREA3_CCD_TOT	-	POST_AREA3_CCD_TOT	−6.140	36	< .001	−1.009	-∞	−0.670
PRE_AREA4_SIC_TOT	-	POST_AREA4_SIC_TOT	−4.534	36	< .001	−0.745	-∞	−0.434
PRE_AREA5_RP_TOT	-	POST_AREA5_RP_TOT	−7.322	36	< .001	−1.204	-∞	−0.841
PRE_DigitalCitizenship_TOT	-	POST_DigitalCitizenship_TOT	−7.181	36	< .001	−1.181	-∞	−0.821

Note. For all tests, the alternative hypothesis specifies that Measure 1 is less than Measure 2. For example, PRE_AREA1_AID_TOT is less than POST_AREA1_AID_TOT.
Note. Student's t-test.

Figure 1. Digital Citizenship and sub dimensions PRE-POST comparison.

Proceeding with the analysis for the second hypothesis, both correlation matrices between the variables measured on the pre-test and post-test are presented in the following figures (2 and 3). In this case, the low sample size has to be taken into account. The patterns of the relationships are consistent with those expected (H2). In particular, there is a strong statistically significant coefficient ($r = .724$ $p < .001$) between the total DigitalCitizenship scale and the IT IS_SE in the pretest, which is duplicated in the post-test ($r = .731$ $p < .001$). The variables related to self-efficacy in teaching facets also reported a statistically

significant positive correlation with DigiCitizenship, which was most evident in the post-test.

Just as expected, the absence of statistically significant or at least large correlation coefficients for indirectly correlated variables (such as UWES or WTMST) were further confirmatory evidence for H2 (in both the pre- and post-measures).

Pearson's Correlations

			n	Pearson's r
PRE_DigitalCitizenship_TOT	–	PRE_ITIS_SE	37	0.724***
PRE_DigitalCitizenship_TOT	–	PRE_ITIS_OE	37	0.137
PRE_DigitalCitizenship_TOT	–	PRE_ITIS_INT	37	0.372*
PRE_DigitalCitizenship_TOT	–	PRE_SAED_Auto-efficacia nel Coinvolgimento degli studenti	37	0.213
PRE_DigitalCitizenship_TOT	–	PRE_SAED_Auto-efficacia delle Strategie di insegnamento	37	0.366*
PRE_DigitalCitizenship_TOT	–	PRE_SAED_Auto-efficacia nelle Tecniche di Gestione della Classe	37	0.319
PRE_DigitalCitizenship_TOT	–	PRE_WTMST_INTRINSIC_MOTIVATION	37	0.124
PRE_DigitalCitizenship_TOT	–	PRE_WTMST_IDENTIFIED_MOTIVATION	37	−0.004
PRE_DigitalCitizenship_TOT	–	PRE_WTMST_INTROJECTED_MOTIVATION	37	0.043
PRE_DigitalCitizenship_TOT	–	PRE_WTMST_EXTERNAL_MOTIVATION	37	0.313
PRE_DigitalCitizenship_TOT	–	PRE_WTMST_AMOTIVATION	37	0.126
PRE_DigitalCitizenship_TOT	–	PRE_UWES_TOT	37	−0.058

Figure 2. Pre-intervention correlation matrix.

Pearson's Correlations

			n	Pearson's r
POST_DigitalCitizenship_TOT	–	POST_ITIS_SE	37	0.731***
POST_DigitalCitizenship_TOT	–	POST_ITIS_OE	37	0.013
POST_DigitalCitizenship_TOT	–	POST_ITIS_INT	37	0.270
POST_DigitalCitizenship_TOT	–	POST_SAED_Auto-efficacia nel Coinvolgimento degli studenti	37	0.329*
POST_DigitalCitizenship_TOT	–	POST_SAED_Auto-efficacia delle Strategie di insegnamento	37	0.385*
POST_DigitalCitizenship_TOT	–	POST_SAED_Auto-efficacia nelle Tecniche di Gestione della Classe	37	0.464**
POST_DigitalCitizenship_TOT	–	POST_WTMST_INTRINSIC_MOTIVATION	37	0.240
POST_DigitalCitizenship_TOT	–	POST_WTMST_IDENTIFIED_MOTIVATION	37	0.197
POST_DigitalCitizenship_TOT	–	POST_WTMST_INTROJECTED_MOTIVATION	37	0.121
POST_DigitalCitizenship_TOT	–	POST_WTMST_EXTERNAL_MOTIVATION	37	0.072
POST_DigitalCitizenship_TOT	–	POST_WTMST_AMOTIVATION	37	−0.059
POST_DigitalCitizenship_TOT	–	POST_UWES_TOT	37	0.254

Figure 3. Post-intervention correlation matrix.

6. Discussion and conclusion

The analysis of the collected data confirms the hypotheses formulated at the beginning of the project. The psycho-educational intervention administered to the sample of teachers showed a significant positive change in Digital Citizenship skills, in all areas of competence. Literature reports on the effectiveness of digital informal learning (DIL) or the delivery of training through digital systems confirmed the positive association between digital competence and DIL, although it is noted that having more digital competence seems to give better results (Zhao et al., 2021). The only area that appears to have had no change was the first one, that of information-seeking and content analysis. We believe that the lack of effect in this area is due to an already strong perception of knowledge on the part of teachers who are active in this aspect on a daily basis in their professional and personal lives. A possible ceiling effect should also be taken into account here, considering a level of difficulty that could be considered rather low for the majority of subjects. The course also appears to have had a positive effect on the teachers' perceived level of self-efficacy in teaching and their perceived ability to engage students. All this supports our hypothesis that a blended teaching methodology, involving knowledge, experience and embodiment, can be effective in learning Digital Citizenship, the concept of which is complex and concerns cognitive and psychological aspects. This statement is further strengthened by the confirmation of the second hypothesis, where Digital Citizenship turned out to be positively correlated with the construct of ITIS Self Efficacy and with the

variables of teaching self-efficacy as knowledge to be activated if necessary. The intervention administered, through the direct experience of tools and new ways of doing digital teaching, can be linked to the direct and observed experiences that Bandura (1996) defines as two of the elements that increase the sense of self-efficacy. Moreover, the practice of mindfulness, which aims at self-awareness and acceptance, may have contributed to this result. Our study has some limitations within which our findings have to be interpreted carefully. Some of them have to be mentioned. First, the restricted sample size and the unequal numbers of males and females, second the lack of a control group. Although aware of the above, we believe that this project is a good starting point for the widespread dissemination of Digital Citizenship, first and foremost among teachers and, consequently, among students. The effectiveness of online delivery seems to us to be an excellent opportunity to make participation sustainable on the part of teachers who, in their day-to-day work, are sometimes unable to follow proposals for face-to-face interventions on a regular basis. This experience can further strengthen teachers' awareness of the effectiveness of digital didactics structured according to an experiential model and set a precedent for their working practice.

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