# *Fostering Digital Citizenship and Effective Approach to Change in Teachers*

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**Abstract**
The study presents the results of a research project aimed to foster digital skills and approach to change in teachers. In Italy, the educational system needs an urgent acknowledgment of the digital revolution underway and the training of teachers and students cannot be postponed to increase general awareness of the risks and the countless opportunities that the digital world offers. Teachers need to become digitally aware citizens and, at the same time, they are responsible for teaching this competence to their pupils; educational institutions need to ensure a physical and virtual environment conducive to learning. A radical change in teaching methods is needed, accompanied by the acquisition and integration of new languages, the pacification between tradition and innovation, and a rebalancing of change approach. Our research focused on improving digital skills in teachers, as a vehicle to spread digital citizenship and literacy to the young population. The psycho-educational protocol has been proposed to a sample of 40 teachers over 8 weeks. It works both on digital skills and on approach to change, self-efficacy and acceptance. Initial (T0) and final (T1) competencies have been assessed. The results showed a significant positive change in Digital Citizenship skills, in all areas of competence, and in teachers' perceived level of self-efficacy in teaching and their perceived ability to engage students.

Keywords: Digital Citizenship, Teacher, Digital Skills, Self-Efficacy, Change

## Introduction

The COVID pandemic that began in 2020 led to an acceleration of Digital Transformation Processes in Italy, so much so that both the Digital Agenda in the three-year plan 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.

Among the objectives of the Digital Education Action Plan 2021-2027, one of the most important says "teachers and staff involved in education and training should be familiar with digital technologies and be competent in the field". So digital competencies and skills should be developed, both basic and advanced, and therefore there should be a strong acceleration in digital knowledge to pass from Digital Migrants to Digital Natives (Prensky, 2001).

Schools are called to educate and provide to children the life skills needed to grow up in a balanced way, to acquire responsibility and critical thinking and to train in citizenship and democratic life. In recent years, the digital transformation is demanding for digitally aware citizens and the Italian Government is responding by introducing the subject "Digital Citizenship" within the school programs, reporting as main objectives those already identified by DigCompEdu.

In this context, the role of teachers is crucial. They have to be digitally aware citizens and teach this competence to their students. First of all, it is important to fill any teachers' existing gaps in the digital skills to make them able to play their role as Digital Citizens and to transfer their competence to students with innovative and effective teaching methodologies in the digital transition.

The paper presents the results of a psycho-educational program aimed at developing the digital skills as per DigicompEDU in teachers and to provide a teaching model to enhance learning and effectiveness of the training in terms of digital skills and self-efficacy but also motivation and interest in the use of technologies.

## 1. Teaching Digital Citizenship

- Drawing on international literature (Kim & Choi, 2018; Choi, Glassman & Cristol, 2017; Choi, 2016), we have identified some important building areas to focus on for an effective Digital Citizenship model:
- Digital Ethics, consisting in respect towards others (Jones & Mitchell, 2016), responsibility, awareness, and safety (Ohler, 2012; Hollandsworth, Dowdy, Donovan, 2011; Afshar, 2013);
- Digital Knowledge, regarding a responsible approach in accessing and using technologies and evaluating information sent and received (Moeller et al., 2011; Marcinek, 2013; Simsek & Simsek, 2013);
- Digital activism, concerning the possibility to be active in political, social, and economic aspects 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, as critical thinking in interactions and choices within the digital world (Choi, Glassman, and Cristol, 2017).

As teachers are called to teach their students Digital Citizenship, they need to develop some more competencies, to fully perform their tasks, according to DigicompEDU (2017). They can be identified in the following six areas:

- Facilitation of learners' digital competence: responsible use of digital technologies for sharing, communication, content creation, and problem-solving activities;
- Empowering learners: using digital technologies for inclusion and active involvement of learners;
- Professional engagement: incorporate digital tools into communication and use them to collaborate with colleagues and for personal development;
- Digital resources: to be able to identify, create and share digital resources;
- Teaching and learning: digital technologies integrated into teaching and learning process;
- Assessment: reinforcing assessments through digital technologies.

According to Ribble (2008), the learning process suitable for stimulating and developing a Digital Citizenship model in students is the circular one. It focuses on providing knowledge but also skills for everyday life and consists of 4 main steps:

- Awareness: stimulating the awareness about the importance to be digitally literate, understanding needs, and distinguishing between appropriate and inappropriate behaviors;
- Guided Practice: stimulation of digital technologies experiences under adult guidance and in protected environments, with the opportunity to take risks and make mistakes;
- Modeling & Demonstration: to be a model and give a demonstration about appropriate digital citizenship behaviors;
- Feedback & Analysis: encouraging the exchange of feedback and reflections among peers and adults, to have a comparison with other experiences and feelings.

## 2. The Study

The field of investigation of our research project concerns the evaluation of the effectiveness of training, considering three fundamental areas (Kirschner, 2015; Sweller, 2020):

- knowledge
- skills acted competence (Willermark, 2018) within TPACK Framework (Koehler & Mishra, 2009);
- psychological reactions (Scherer and Teo, 2019), in particular, on the teacher's pedagogical belief system (Ertmer and Ottenbreit-Leftwich 2010; Hermans et al., 2008).

The research team developed the following hypothesis, based on the theoretical indications derived by the main reference literature:

- 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.
- H2: The nomological relationship between the constructs considered relevant based on the literature will be confirmed by the correlation model between the empirical variables found. The research team developed the following hypothesis, based on the theoretical indications derived by the main reference literature:

## 2.1 Materials and Methods

### 2.1.1 Participants

The sample was recruited via email and teachers decided to participate voluntarily. They signed and informed consent, giving authorization to privacy aspects.

37 teachers completed all the processes. They filled out psychometric questionnaires, administrated through Google Forms before the beginning of the training (T0) and at the end of the training (T1).

Teachers have a heterogeneous distribution concerning order and grade and were 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 an assignment or qualification or competition. 46% of the sample stated to have taken courses to learn notions, methods, or IT tools.

### 2.1.2 Experimental Conditions

The program was constituted of 8 meetings (90 mins each), held on a zoom platform, weekly.

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 some mental barriers regarding effectiveness and self-efficacy.

Each meeting was based on three fundamental moments:

- argumentation of specific digital competencies, 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).

Between one meeting and another, researchers provided stimuli to make teachers reflect and experience the topics discussed, to maintain focus on the specific topic and develop creative thinking. Teachers had the opportunity to discuss and share opinions and experiences in 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 to introduce and experiment with new ways of interaction and communication.

### 2.1.3 Measurements

The questionnaires administrated were the following:

- Questionnaire on the Evaluation of Digital Citizenship Competences (QCCD) of Teachers
- (Piceci et al., 2021): it measures the level of digital citizenship competencies according to DigiComp2.1.
- Intrapersonal Technology Integration Scale (ITIS) (Benigno et al., 2013): it measures the;
- Self-Efficacy (SE) and Outcome Expectations (OE) in the use of technologies.
- Utrecht Work Engagement Scale (UWES) (Pisantiet al., 2008): it is a scale measuring the level of involvement with work.
- Teachers' Self-Efficacy Scale (SAED) (Biasi et al., 2014): it measures the perceived level of teachers' self-efficacy in transferring skills and maximizing students' learning.
- The Multidimensional Work Motivation Scale (WTMTS) (Gagnè et al., 2014): it measures the motivation of teachers, concerning Deci & Ryan (2000) Self-Determination Theory.

## 3. Results

The hypothesis has been tested through a quasi-experimental one-group longitudinal design.

In Figure 1, the detailed results of the Paired Samples T-Test are shown. It is evident that all comparisons, except for the AREA1 sub-dimension, are statistically significant ($p < .001$) and confirm the increase in mean values in the post-test (Figure 1).

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

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, $t(36) = -2.257$, $p = .015$. As regards the self-efficacy in student engagement, there an improvement between the pre-test ($M = 24.8$, $SD = 4.72$) and post-test ($M = 26$, $SD = 4.16$) results. It indicates that the training intervention led to an increase in self-assessment on this task, $t(36) = -1.836$, $p = .037$. In both, the effect sizes were less strong (approximately $d = .30$).

On the contrary, in the area of Motivation, 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 ($M = 46.30$, $SD = 6.54$), $t(36) = 1.219$, $p = .885$, and 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. In the same way, also total mean WRMST Amotivation had no increase 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.

Two correlation matrices between the variables measured on the pre-test and post-test were performed (Figure 2 and Figure 3). The H2 hypothesis has been confirmed. The patterns of the relationships are consistent with those expected. The low sample size has been taken into account. In particular, a strong statistically significant coefficient (r = .724 p < .001) between the total Digital Citizenship scale and the IT IS_SE in the pretest, which is duplicated in the post-test (r = .731 p < .001) has been shown. The variables related to self-efficacy in teaching facets also reported a statistically significant positive correlation with Digital Citizenship, 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

## Conclusion

Our study has some critical issues to be attributed primarily to the low sample size and the unequal numbers of males and females. In addition, the lack of a control group doesn't allow to isolate the interference of intervening variables. However, we can say that our two hypotheses have been confirmed by the analysis of the collected data. A significant positive change in Digital Citizenship skills has been demonstrated in all areas of competence. The combination of the three aspects (knowledge, skill, psychological approach) in training seems to be more effective, as stated by Zhao et al. (2021). The information seeking and content analysis areas seem not to be affected by the training, maybe due to a ceiling effect for the majority of the subjects and the already strong perception of knowledge of the teachers that are active in these areas in their professional and personal environments. The results support our hypothesis that a methodology involving knowledge, experience, and embodiment, in a blended way can improve teachers' self-efficacy in teaching and their level of perceived ability to motivate students. For the confirmation of the second hypothesis, the positive

correlation between Digital Citizenship and the ITIS Self-Efficacy and with the Teaching Self-Efficacy, we believe that the direct experience of tools and of a new way for digital teaching can have the primary role in the results, according to Bandura's (1996) theory (direct experience as reinforcement of Self-Efficacy). Furthermore, the mindfulness practice, with the enhancement of self-awareness and acceptance, can have facilitated the results.

We consider this study and its results a good starting point to build psychoeducational programs for teachers able to enhance Digital Citizenship, first and foremost among teachers and, consequently, among students. Furthermore, the experience of digital didactic with effective results can set a precedent for their working practice. The effective online delivery was a strength of the program because it made sustainable the teachers' participation who, in their day-to-day work, are sometimes unable to follow proposals for face-to-face interventions regularly.

**References**


Afshar, V. (2013, February 11). Digital citizenship: Businesses can learn from K–12 educators. *Huffington Post*. Retrieved from http://www.huffingtonpost.com/vala-afshar/digital-citizenship-busin_b_2654628.html

Benigno V., Chifari A., Chiorri C. (2013). Adottare le tecnologie a scuola: una scala per rilevare gli atteggiamenti e le credenze degli insegnanti. *TD Tecnologie Didattiche*, 22 (1), 59-62

Biasi, V., Domenici, G., Capobianco, R., Patrizi, N. (2014). Teacher Self-Efficacy Scale (Scala sull'Auto-Efficacia del Docente – SAED): adattamento e validazione in Italia, *ECPS Journal* – 10/2014, http://www.ledonline.it/ECPS-Journal/

Choi, M. (2016). A Concept Analysis of Digital Citizenship for Democratic Citizenship Education in the Internet Age, *Theory & Research in Social Education*, 44(4), 565-607, DOI: 10.1080/00933104.2016.1210549

Choi, M., Glassman, M., Cristol, D. (2017). What it means to be a citizen in the internet age: Development of a reliable and valid digital citizenship scale. *Computers & Education*, 107, 100-112.

Deci, E.L., Ryan, R.M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227–268. doi:10.1207/S15327965PLI1104_01

Decreto Ministeriale n.35 del 22 giugno 2020.

Ertmer, P. A., Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect, *Journal of Research on Technology in Education,* 42, 255–284.

Flook, L., Goldberg, S.B., Pinger, L., Bonus, K., Davidson, R.J. (2013). Mindfulness for teachers: A pilot study to assess effects on stress, burnout, and teaching efficacy. *Mind Brain Educ*. 7(3), doi:10.1111/mbe.12026.

Gagné, M., Forest, J., Vansteenkiste, M., Crevier-Braud, L., Van den Broeck, A., Aspeli, A.K., Bellerose, J., Benabou, C., Chemolli, E., Güntert, S.T., Halvari, H., Indiyastuti, D.L., Johnson, P.A., Molstad, M.H., Naudin, M., Ndao, A., Olafsen, A.H., Roussel, P., Wang, Z., Westbye, C. (2014). The Multidimensional Work Motivation Scale: Validation evidence in seven languages and nine countries, *European Journal of Work and Organizational Psychology*, http://dx.doi.org/10.1080/1359432X.2013.877892

Hermans, R., Tondeur, J., van Braak, J., Valcke, M. (2008). The impact of primary school teachers' educational beliefs on the classroom use of computers. *Computers & Education*, 51(4), 1499–1509.

Hollandsworth, R., Dowdy, L., Donovan, J. (2011). Digital citizenship in K–12: It takes a village. *TechTrends*, 55(4), 37–47. doi:10.1007/s11528-011-0510-z

Jones, L. M., Mitchell, K. J. (2016). Defining and measuring youth digital citizenship. *New media & society*, 18(9), 2063-2079.

Kahne, J., Lee, N. J., Feezell, J. T. (2013). The civic and political significance of online participatory cultures among youth transitioning to adulthood. *Journal of Information Technology & Politics*, 10, 1–20. doi:10.1080/19331681.2012.701109

Kilpatrick L.A., Suyenobu, B.Y., Smith, S.R., Bueller, J.A., Goodman, T., Creswell, J.D., et al. (2011). Impact of mindfulness-based stress reduction training on intrinsic brain connectivity. *Neuroimage*. 56 (1), 290–298.

Kim, M., Choi, D. (2018). Development of Youth Digital Citizenship Scale and Implication for Educational Setting. *Educational Technology & Society*, 21 (1), 155–171.

Kirschner, P. A. (2015). Do we need teachers as designers of technology-enhanced learning? *Instructional Science*, 43(2), 309–322. https://doi.org/10.1007/s11251-015-9346-9

Koehler, M. J., Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, 9(1), 60-70.

Lutz, A., Slagter, H.A., Dunne, J., Davidson, R.J. (2008). Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, 12 (4), 163–169.

Lenhart, A., Madden, M., Smith, A., Purcell, K., Zickuhr, K., Rainie, L. (2011). Teens, kindness, and cruelty on social network sites: How American teens navigate the new world of "digital citizenship", *Pew Internet & American Life Project*. Retrieved from http://www.pewinternet.org/2011/11/09/teens-kindness-and-cruelty-on-social-network-sites/

Marcinek, A. (2013). The path to digital citizenship. *Edutopia*. Retrieved from http://www.edutopia.org/blog/the-path-to-digital-citizenship-andrewmarcinek

Moeller, S., Joseph, A., Lau, J., Carbo, T. (2011). *Towards media and information literacy indicators*. Paris, France: United Nations Educational, Scientific and Cultural Organization.

Ohler, J. (2012). Digital citizenship means character education for the digital age. *Education Digest: Essential Readings Condensed for Quick Review*, 77(8), 14–17.

Pisanti, R., Paplomatas, A., Bertini, M. (2008). Misurare le dimensioni positive nel lavoro in sanità: un contributo all'adattamento italiano della UWES - Utrecht Work Engagement Scale, *Giornale Italiano di Medicina del Lavoro ed Ergonomia*, Supplemento A, Psicologia, 30, 1, A111-A119.

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon*, 9, 1e6

Raoof, J. K., Zaman, H. B., Ahmad, A., Al-Qaraghuli, A. (2013). Using social network systems as a tool for political change. *International Journal of Physical Sciences*, 8, 1143–1148.

Reggio, P., *Apprendimento esperienziale: fondamenti e didattiche*, ISU - Università Cattolica del Sacro Cuore, Milano 2009: 164 [http://hdl.handle.net/10807/33614]

Ribble, M. (2004). Digital citizenship: Addressing appropriate technology behavior. *Learning & Leading with Technology,* 32, 1, 6–11.

Scherer, R., Teo, T. (2019). Unpacking teachers' intentions to integrate technology: A meta-analysis. *Educational Research Review*, 27, 90–109. https://doi.org/10.1016/j.edurev.2019.03.001

Simsek, E., Simsek, A. (2013). New literacies for digital citizenship. *Contemporary Educational Technology*, 4, 126–137.

Sweller, J. (2020). Cognitive load theory and educational technology. *Educational Technology Research & Development,* 68(1), 1–16. https://doi.org/10.1007/s11423-019-09701-3

Tatarchevskiy, T. (2011). The 'popular culture of Internet activism. *New Media & Society*, 13, 297–313. doi:10.1177/1461444810372785

Willermark, S. (2018). Technological pedagogical and content knowledge: A review of empirical studies published from 2011 to 2016. *Journal of Educational Computing Research*, 56(3), 315–343. https://doi.org/10.1177/0735633117713114

Zhao, Y., Pinto-Llorente, A.M., Sánchez-Gómez M.C. (2021). Digital competence in higher education research: A systematic literature review, *Computers & Education*, 168, 5.

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