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From Digital to AI-Supported Assessment: Exploring Teachers' Perceived Competences and Practices

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Abstract: The integration of digital technologies and artificial intelligence (AI) in educational contexts creates new demands for teachers' skills, especially in learning assessment. This study explores pre-service teachers' perceived competence in using digital and AI-based assessment tools and examines its relationship with selected socio-professional characteristics. A mixed-methods approach was adopted, involving the administration of a questionnaire to 175 teachers enrolled in secondary school teacher qualification programmes at the Telematic University of Pegaso. The questionnaire, which was developed by combining items from validated scales, investigated the use of digital assessment tools and the perceived competence in using digital and AI-based tools. The results show that, while participants attributed high importance to the appropriate selection of assessment tools, they reported more limited use of digital assessment tools. Perceived digital competencies were predominantly intermediate, whereas AI-related competencies were higher for general knowledge and use of AI, and lower for integration into assessment processes. Age showed a weak but significant negative correlation with perceived competence; no significant differences emerged for the other considered variables. These findings emphasise the importance of teacher training programmes that combine technological, pedagogical and assessment-related competencies, in order to encourage the informed use of AI in educational processes.

Keywords: AI-supported assessment; teachers; competences; mixed-method.

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1. Introduction

The advent of digital technologies, particularly Artificial Intelligence, has profoundly transformed everyday life by changing the ways in which people access information, communicate and interact socially (Harry, 2023).

However, educational systems and teaching methods have not yet fully adapted to these changes, particularly with regard to new scientific evidence and the needs of generations who are growing up in an increasingly digitalised world (Vinci et al., 2026).

While the health emergency caused by the SARS-CoV-2 virus accelerated the development and introduction of digital technologies in school contexts and online learning pathways, the level of competence of teachers in using these tools, particularly artificial intelligence, has only been partially explored (Kang et al., 2024).

It is only recently that the scientific literature has begun to define and empirically investigate specific frameworks and standards concerning teachers' digital competencies in technologically advanced educational contexts (Bustamante-Barreto & Yoo, 2023).

From this perspective, the role of teachers is of central importance. The conscious and effective use of educational technologies is essential for developing students' digital skills and enabling them to participate fully in contemporary society (Ching & Jamaludin, 2025; Ranieri, 2022).

However, the growing diffusion of AI-based tools raises questions and concerns about teachers' preparedness and willingness to integrate them into teaching practice. This highlights the need to investigate these issues from teachers' perspectives.

Within this framework, educational assessment plays a pivotal role. Understood as a 'complex and dynamic' practice (Williams, 2023) mediated by digital technologies, it is not limited to the measurement of learning, but can support processes of reflection, self-regulation and active student participation, moving beyond an exclusively summative conception of assessment (Grosseck et al., 2023).

The spread of online learning environments and digital technologies has further strengthened the role of digital assessment, calling for tools and strategies capable of providing timely feedback, supporting the monitoring of learning processes and fostering assessment oriented towards improvement (Provenzani, 2024).

2. Materials and Methods

In light of these considerations and the gaps identified in the literature, the present study aims to explore trainee teachers' perceptions of, and experience with, digital and AI-assisted assessment tools.

The research questions guiding the study are as follows:

1. What is the perceived competence level of teachers when using digital and AI-based tools for learning assessment?
2. Are there differences in perceived competence relating to the socio-professional characteristics of the participants?

The exploratory study, which involved the simultaneous collection of qualitative and quantitative data through an ad hoc questionnaire (Table 1), was conducted in April 2025 using an integrated mixed-methods design (Creswell, 2013; Teddlie & Tashakkori, 2009).

Table 1. Questionnaire Sections.

Questionnaire Section	Questions	Type of data
Socio-professional data	Gender, age, Degree, job position, years of teaching, teaching level	quantitative
Use and selection of digital assessment tools	two items on a 5-point Likert scale	quantitative
Skills in using digital assessment tools	five items on a 5-point Likert scale	quantitative
Skills in using Artificial Intelligence tools	eight items on a 5-point Likert scale	quantitative

The instrument was developed by integrating items from validated instruments found in existing literature, such as the Teachers' AI Competency Self-Efficacy Scale (TAICS; Chiu et al., 2025) and the Scale of Competency of Digital Age Teaching (SCoDAT; Kang et al., 2024). The sample consisted of 175 teachers enrolled in secondary school teacher qualification programmes at Pegaso Online University (Table 2).

Table 2. Sample characteristics.

Sample characteristics	Answer	n. (175)	% (100)
Gender	Female	123	70.3
	Male	50	28.6
	No answer	2	1.1
Age	23-33	122	69.7
	34-43	31	17.7
	44-53	15	8.6
	Over 54	7	4
Degree	Master's degree	157	89.7
	Postgraduate specialisation	4	2.3
	PhD	4	2.3
	Other	10	5.7
Job position	Not teacher	42	24
	Permanent teacher	119	68
	Fixed-term teacher	6	3.4
	Other	8	4.6
Years of teaching	0-5	112	64
	6-10	27	15.4
	11-15	5	2.9
	Over 16	2	1.1
School level	Primary school	16	9.1
	First level of Secondary school	52	29.7
	Second Level of Secondary school	63	36
	Missing	44	25.1

Of the participants (n. 178), 70.3% are women, with a mean age of 32 years. The majority (n. 157; 89.7%) hold a master's degree, and the majority (n. 119; 68%) are fixed-term teachers. The mean reported teaching experience is four years.

2.1. Data Analysis

To address the research questions, two types of analysis were conducted: a descriptive analysis and an inferential statistical analysis. All 175 participants completed the questionnaire, and no missing data were identified. The descriptive statistical analysis focused on the 15 questions included in Sections b, c and d (see Table 3).

Table 3. Descriptive statistical analysis.

Question	μ
In relation to the stages of the assessment process, how much weight do you attach to the appropriate choice of assessment tools?	4.17
How often do you use, or would you use, digital assessment tools?	2.70
I am able to use digital tools to assess students' understanding	3.06
I am able to use digital assessment tools (e.g. online quiz apps) that are consistent with the learning objectives and the nature of the classroom activities	3.05
I am able to use digital tools to provide immediate and effective feedback to students	3.01
I am able to use digital tools to conduct self-assessment or peer assessment during or after the lesson	2.74
I am able to use digital tools to monitor students' levels of engagement and promote engagement	2.86
I am able to distinguish whether a tool is AI-based or not	3.18
I am able to create content using AI	3.37
I am able to explain what AI is	3.67
I know how to choose the appropriate AI tools to carry out a task effectively	3.01
I am able to use AI tools to promote assessment for learning	2.61
I am able to design an assessment approach to enhance student learning in an AI-based environment (e.g. learning with ChatGPT)	2.39
I am able to assess students' learning in an AI-based environment	2.33
I am able to select an AI tool to support students' self-assessment	2.31

Overall, the highest mean value relates to the importance of choosing the right assessment tools at different stages of the process (μ = 4.17). On the other hand, the mean value for the frequency of use or potential use of digital tools for assessment is 2.70.

Regarding digital assessment competencies, the mean values range from 2.74 to 3.06. More specifically, the values are 3.06 for using digital tools to assess students' understanding; 3.05 for choosing tools that are consistent with learning objectives and teaching activities; 3.01 for providing immediate and effective feedback; 2.86 for monitoring and promoting student engagement; and 2.74 for using digital tools for self-assessment or peer assessment.

AI-related competences have mean values ranging from 2.31 to 3.67. The highest mean value is for the ability to explain what AI is (μ = 3.67), followed by the ability to create content using AI (μ = 3.37), and the ability to distinguish whether a tool is AI-based (μ = 3.18). The ability to choose appropriate AI tools to perform a task effectively has a mean value of 3.01.

Mean values relating specifically to the use of AI in assessment processes range from 2.31 to 2.61. Notably, the ability to use AI tools to promote assessment for learning has a mean value of 2.61. This is followed by the ability to design assessment methods that support learning in AI-based environments (μ = 2.39), the ability to assess students' learning in an AI-based environment (μ = 2.33) and the ability to select an AI tool that supports students' self-assessment (μ = 2.31).

An inferential statistical analysis was subsequently conducted using SPSS software (version 19) to examine the relationships between socio-professional charac-

teristics (gender, age, contract type, school level and years of teaching experience) and the scale measuring perceived competence in using digital and AI-based tools for learning assessment. This scale consisted of 13 items (Sections C and D) and demonstrated high internal consistency (Cronbach's $\alpha = .911$).

All corrected item-total correlations were above .30, with values ranging from .463 to .796, while the removal of individual items did not result in a substantial increase in the reliability coefficient. The items were therefore retained and, based on the 13 responses, an overall mean scale score was calculated and used in the subsequent analyses (Table 4).

Table 4. Inferential analysis.

Analysis	Variable[1]	Test / Coefficient	Statistic	p
Internal consistency	13-item scale	Cronbach's α	.911	-
Correlation	Age	Spearman's ρ	-.154	.042
Correlation	Years of Teaching	Spearman's ρ	-.099	.236
Group comparison	Gender	Mann-Whitney *U*	2872.50	.497
Group comparison	School level	Kruskal-Wallis *H*(2)	1.216	.545
Group comparison	Job position	Kruskal-Wallis *H*(3)	1.713	.634
Group comparison	Educational qualification	Kruskal-Wallis *H*(3)	0.957	.812

[1] The scale comprised 13 items measuring perceived competence in the use of digital and AI-based tools for learning assessment.

Spearman's correlation was used to examine the relationship between the quantitative socio-professional variables and the overall scale score. A weak, negative and statistically significant correlation was found between age and perceived competence in using digital and AI-based tools for learning assessment ($\rho = -0.154$, $p = 0.042$). No statistically significant correlation was found between years of teaching experience and the scale score ($\rho = -0.099$, $p = 0.236$).

To assess possible differences in the scale score according to the categorical variables, non-parametric tests were used. Gender was compared using the Mann–Whitney test and no statistically significant differences were found between the two groups ($U = 2872.50$, $Z = -0.679$, $\rho = .497$).

The Kruskal–Wallis test revealed no statistically significant differences in the scale score according to school level when considering primary, lower secondary and upper secondary teachers ($H(2) = 1.216$, $\rho = .545$). Similarly, no statistically significant differences emerged according to professional position ($H(3) = 1.713$, $\rho = .634$) or educational qualification ($H(3) = 0.957$, $\rho = .812$).

3. Results

3.1 What is the perceived competence level of teachers when using digital and AI-based tools for learning assessment?

The descriptive results show mean values ranging from 2.74 to 3.06 for digital assessment competencies. The highest values relate to the ability to use digital tools to assess students' understanding ($\mu = 3.06$), select tools that are consistent with learning

objectives and teaching activities (μ = 3.05) and provide effective and immediate feedback (μ = 3.01).

For AI-related competences, the mean values range from 2.31 to 3.67. The highest values are for the ability to explain what AI is, to create content using AI, and to distinguish between AI-based and non-AI-based tools. Items specifically referring to assessment in AI-based environments have values ranging from 2.31 to 2.61.

The 13-item scale, which was used to calculate the overall mean score employed in the inferential analyses, showed high internal consistency (α = .911).

3.2. Are there differences in perceived competence relating to the socio-professional characteristics of the participants?

Spearman's analysis revealed a weak, negative, and statistically significant correlation between age and perceived competence ($\rho = -.154$, $p = .042$). No statistically significant correlation emerged between years of teaching experience and perceived competence ($\rho = -.099$, $p = .236$).

The Mann–Whitney and Kruskal–Wallis tests revealed no statistically significant differences in relation to gender ($U = 2872.50$, $p = .497$), school level ($H(2) = 1.216$, $p = .545$), professional position ($H(3) = 1.713$, $p = .634$), or educational qualification ($H(3) = 0.957$, $p = .812$), respectively.

Overall, among the socio-professional characteristics considered, only age showed a statistically significant correlation with the overall scale score. No statistically significant differences or associations emerged in relation to years of teaching experience, gender, school level, professional position, or educational qualification.

4. Discussion

Overall, the results highlight a discrepancy between the importance that teachers attribute to the choice of assessment tools, and their actual use of, and perceived competence in using, digital tools based on artificial intelligence. This initial finding is particularly relevant given the increasing importance of digital technologies in education and the need to develop specific skills for using them in learning and teaching contexts, as emphasised in previous studies (Kang et al., 2024; Bustamante-Barreto & Yoo, 2023).

While trainee teachers recognise the importance of digital assessment, its use in school contexts and in learning and teaching processes remains limited.

Perceived competence in using digital tools for assessment is predominantly intermediate, with greater familiarity with assessing learning and providing feedback and greater difficulty with self-assessment, peer assessment and monitoring student engagement. These results can be interpreted in light of the conception of assessment as a 'complex and dynamic' practice (Williams, 2023), which encompasses functions such as providing feedback, encouraging self-regulation, and facilitating student participation (Grosseck et al., 2023; Provenzani, 2024).

With regard to artificial intelligence, more consolidated competences emerge in general knowledge of and familiarity with the tools, whereas the ability to integrate AI into assessment processes appears less developed. The lower values relating to assessment design, learning assessment, and support for self-assessment suggest that general familiarity with AI does not necessarily correspond to the ability to use it for

pedagogical and assessment purposes. This confirms the need to develop specific competences for its use in educational contexts (Kang et al., 2024).

Analyses of socio-professional characteristics show that the variables considered play a limited role: only age presents a significant, albeit weak, relationship with perceived competence. No significant associations were found for years of teaching experience, gender, school level, professional position or educational qualification.

Overall, the results emphasise the importance of designing teacher training programmes that integrate technological, pedagogical and assessment competencies, and promote the informed use of artificial intelligence to support teaching, learning and assessment processes.

5. Conclusions

This study examined trainee teachers' perceived competence in using digital and AI-based tools for learning assessment, considering the possible relationship with selected socio-professional characteristics.

The results suggest that trainee teachers have an intermediate level of perceived competence in using digital tools, and are more familiar with general aspects of AI than with its integration into assessment processes. Specifically, more difficulties were encountered when using AI for assessment design, learning assessment and self-assessment support. Of the characteristics considered, only age showed a statistically significant, albeit weak, relationship with perceived competence.

Overall, the results highlight the need for training programmes that integrate technological, pedagogical, and assessment dimensions to support the informed use of AI in teaching, learning, and assessment processes, rather than focusing solely on the development of technical competences.

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