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TEACHER READINESS, EXPERIENCE, AND RESERVATIONS ABOUT AI: THE ROLE OF EDUCATIONAL LEADERSHIP AND SCHOOL CULTURE

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Abstract:
This research investigated the factors associated with the reservations and ethical dilemmas of primary and secondary school teachers in Greece towards the use of Artificial Intelligence (AI) in school. In particular, the role of teachers' readiness, experience and training needs was examined, as well as the perceived role of educational leadership and school culture. approach and was based on data from 506 primary and secondary education teachers from all over Greece, which were collected through a structured questionnaire. The analysis included descriptive statistics, group comparisons, and linear regression. The results show that, while teachers recognise the potential of AI, they show a moderate level of readiness and a high level of reservations, mainly related to pedagogical issues, the reliability of results, the protection of personal data and the lack of a clear institutional framework. Linear regression showed that only the readiness, experience and training needs of teachers are a statistically significant predictor of reservations and ethical dilemmas, with a negative relationship. In contrast, educational leadership and school culture did not emerge as direct predictors. In conclusion, the findings highlight that teachers' attitudes towards Artificial Intelligence are mainly shaped by individual and professional factors, while educational leadership functions more as a support framework than as a direct mechanism for forming

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reservations. Enhancing teacher training and readiness emerges as a key prerequisite for a pedagogically responsible use of AI in schools.

Keywords: Artificial Intelligence in Education, teachers, preparedness and training, ethical dilemmas, educational leadership, school culture

1. Introduction

Artificial intelligence (AI) is now a dynamically growing reality, with a growing presence in everyday life and education. Its entry into schools creates new possibilities, but also significant challenges for teachers (Poulimenou & Panitsidou, 2025). Its utilization is linked to Education 4.0 and the innovations of the 4th Industrial Revolution, which requires a readjustment of roles, skills and pedagogical practices (Panagiotopoulos, 2021).

In primary and secondary education, the presence of underage students intensifies concerns about the use of AI (Panagopoulou, 2025). Educators recognize its potential in personalized learning, skill support, and process automation (Zogopoulos *et al.*, 2025). At the same time, however, they express reservations and ask for clear pedagogical boundaries and guidance (Panagopoulou, 2025). The international literature records this dual attitude. Research shows that most teachers view AI with ambivalence or concern, even when acknowledging positive effects (Grass, 2024; Lin, 2024).

A critical issue concerns the level of knowledge and training of teachers. Many report a limited understanding of AI and the technologies of the 4th Industrial Revolution, as well as low familiarity with modern digital applications (Zogopoulos & Gioti, 2022; Karanikola *et al.*, 2022). Even when they declare themselves ready to use it, they express strong concern about its impact on their learning and role (Poulimenou & Panitsidou, 2025; Zogopoulos & Karatzas, 2025). This deficit affects not only their teaching practice, but also their professional identity, which is called upon to redefine itself in an ever-changing environment (Luckin *et al.*, 2022).

At the same time, the integration of AI raises serious ethical and institutional issues. Issues of transparency, algorithmic bias and personal data protection intensify the dilemmas of school practice and strengthen teachers' reservations (Karakoulas & Theologou, 2025; Taheri *et al.*, 2025). In this context, principals are called upon to manage complex changes, with their decisions influenced by the school climate and available political directions (Ho, 2025).

Educational leadership and school culture are emerging as decisive factors for the pedagogical use of AI. School leaders can act as agents of change, shaping vision and supporting teaching staff (Gioti & Zogopoulos, 2022; Karakose & Tulubas, 2025). At the same time, school environments that favor collaboration and open communication facilitate experimentation and the adoption of innovations (Poulimenou & Panitsidou, 2025; Schmitz *et al.*, 2025).

Steps have been taken in the Greek school for digital upgrading. However, teacher training often remains fragmented, and resistance to change persists, particularly among older age groups (Zogopoulos & Panagiotopoulos, 2025). While managers recognise these difficulties and seek to support their staff, the effective and sustainable integration of AI requires a holistic approach. An approach that combines training, strong educational leadership, and a collaborative school culture (Karakose & Tulubas, 2025; Taheri *et al.*, 2025).

2. Literature Review

2.1 Needs, readiness, and experience of teachers regarding Artificial Intelligence

The effective use of Artificial Intelligence (AI) in education requires a substantial understanding of its nature and its pedagogical applications. The level of knowledge and familiarity of teachers shows significant differences. In Greece, low levels of information on the technologies of the 4th Industrial Revolution, including AI, are recorded (Zogopoulos & Gioti, 2022). Similarly, international surveys show that less than half of teachers say they are highly familiar with AI (Iddrisu & Iddrisu, 2025). Nevertheless, most people seem to understand its basic principles and educational possibilities (Poulimenou & Panitsidou, 2025).

Cognitive readiness is not always accompanied by functional readiness. Internationally, there is an increasing, but not universal, use of AI applications in educational practice. About a quarter of teachers in the U.S. leverage AI tools to design or support instruction (Diliberti *et al.*, 2025), while the majority have at least tested related applications (Wagner, 2025). In Greek education, use remains at an early stage and is mainly limited to fragmented experimentation (Gousiou & Grammenos, 2023; Samara & Kotsis, 2025; Zormanová & Vavříková, 2025).

Teachers' attitudes towards AI are characterized by a complex coexistence of expectations and reservations. Many recognize its contribution to diversifying teaching, enhancing accessibility, and reducing workload (Chapman *et al.*, 2025; Iddrisu & Iddrisu, 2025; Wagner, 2025). The perceived utility of tools is directly linked to the intention to adopt them (Granström & Oppi, 2025). At the same time, concerns are expressed about the undermining of critical thinking, student autonomy, and the ambiguity of the pedagogical role of the teacher (Chapman *et al.*, 2025; Wagner, 2025). Anxiety towards AI and a lack of clear institutional guidance often act as a deterrent (Granström & Oppi, 2025).

The integration of AI requires, at the same time, the development of new skills and the adaptation of pedagogical practice. It is not limited to technical knowledge but includes issues of ethics, data protection, and critical digital literacy (Luckin *et al.*, 2022). Teachers themselves recognise this need, which makes it necessary to redesign training programmes, with an emphasis on practical training and pedagogical guidance (European Commission, 2022; Zogopoulos & Karatzas, 2025; Luckin *et al.*, 2022). However, existing professional development structures are often not adequately

responsive, while the level of use of modern digital applications remains modest (Karanikola *et al.*, 2022).

The lack of formal training often leads to self-education and the exchange of practices through informal networks. Internationally, the majority of teachers have not received systematic training in AI and are developing relevant skills in a self-reliant way (Wagner, 2025; Poulimenou & Panitsidou, 2025). At the same time, the entry of AI into school affects the professional identity. It raises concerns about the automation of roles and the loss of pedagogical autonomy, but also expectations for a redefinition of the role of the teacher as a guide and designer of learning experiences (Wagner, 2025).

Overall, teacher readiness is constituted as a delicate balance between technological proficiency, critical attitude, and the need to maintain the human-centered character of education (Chapman *et al.*, 2025). In this context, institutional support and clear political directions emerge as crucial conditions. The European Commission and the OECD underline that teacher empowerment is a key enabler for a reliable and pedagogically beneficial integration of AI in schools (European Commission, 2022; Vincent-Lancrin & van der Vlies, 2020).

2.2. Reservations and ethical dilemmas about AI in Education

Teachers' reservations about Artificial Intelligence (AI) initially focus on issues that directly concern the learning process. A central concern is the over-reliance of students on AI tools and the potential impact on critical thinking and creativity (McGehee, 2024). Automating learning activities is considered to favor "easy answers" and limit reflection. For this reason, many educators are reluctant to encourage the systematic use of chatbots, as they associate them with copying and reproducing information without meaningful processing (Strauss, 2023; Trust *et al.*, 2023).

Particular distrust is also expressed regarding the reliability and validity of AI results. Systems may produce inaccurate or biased responses, which is considered particularly critical in high-stakes assessment processes (ASEF, 2020). Characteristic incidents, such as the massive downgrading of writings in Texas, reinforce these reservations and highlight the need to maintain human control (McGee, 2023). At the same time, risks related to data quality and algorithmic biases are considered decisive for the validity of educational decisions (Holmes *et al.*, 2021).

The concerns also extend to the human dimension of learning. Many educators fear that AI mediation may limit communication, emotional connection, and collaboration in the classroom (Grassi, 2024). A Greek survey records a high degree of agreement that the use of AI makes it difficult to develop interpersonal relationships (Poulimenou & Panitsidou, 2025). This concern is linked to the fear of weakening the pedagogical role and the teacher-student relationship.

At the same time, there is intense concern about educational and social inequalities. Unequal access to technological tools and the cost of advanced AI applications may widen the digital divide (OECD, 2021). AI is considered to be able to benefit already strong students, exacerbating inequalities within the classroom. Greek

studies link uncontrolled technological progress with social injustice and widening of the social gap (Panagiotopoulos & Karanikola, 2020). For this reason, teachers are calling for guarantees for a fair and equitable integration of AI in education.

Beyond pedagogical issues, serious institutional and ethical dilemmas emerge. Pedagogical responsibility and accountability are a central issue, as it is unclear who bears responsibility when AI systems propose activities or are involved in evaluation. Teachers express concern that their professional judgment is being replaced by algorithms and call for a clear demarcation, with the teacher in the central role (Panagopoulou, 2025).

Particular importance is also attached to the protection of personal data and privacy. AI is based on the collection and processing of sensitive student data, which intensifies teachers' concerns. Nationwide, a very high degree of concern is recorded about this issue (Poulimenou & Panitsidou, 2025). International studies point to risks of bias, lack of transparency, and invasion of privacy, reinforcing generalized distrust of AI systems (ASEF, 2020; Holmes *et al.*, 2021). The absence of a clear institutional framework and formal guidelines intensify uncertainty. Teachers state that they would adopt AI more easily if there were clear instructions from the state (Poulimenou & Panitsidou, 2025; Panagiotopoulos & Karanikola, 2020). Similarly, international organizations emphasize the need to develop ethical frameworks and practical rules for the use of AI in education (Holmes *et al.*, 2021).

Finally, job insecurity and fear of substitution are recorded, as some functions of teaching can be automated (Grassi, 2024; Panagiotopoulos & Karanikola, 2020; Trust *et al.*, 2023). While AI is not expected to replace the teacher, role transformation requires systematic support and training (Miao & Holmes, 2023). In this context, the need for open dialogue, a culture of trust and constant reflection is highlighted, with cooperation between the state and teachers for a pedagogically responsible integration of AI in school (Zogopoulos *et al.*, 2025).

2.3. The role of educational leadership and school culture in the utilization of Artificial Intelligence

Educational leadership is not limited to managing day-to-day operations. It is associated with vision, influence, and meaningful support for teaching (Bush, 2019; Hallinger, 2018). In the context of digital transformation, the director is called upon to act as a leader, encouraging innovation and the use of Artificial Intelligence (AI) with a clear pedagogical orientation (Karakose & Tulubas, 2025).

Transformational leadership emphasizes clear vision, professional development, and the active involvement of educators in initiative-making (Schmitz *et al.*, 2025). When leadership adopts a clear and positive attitude towards AI, a conducive climate for change is formed. Providing resources, clear guidance, and a positive school climate increase teachers' willingness to leverage AI in the classroom (Zeng *et al.*, 2025). In Greek reality, there is often a gap in perception, with management thinking strategically and teachers focusing on practical obstacles. This gap is narrowed when the vision is clearly

communicated and linked to the school's mission and the learning process (Karatzas & Zogopoulos, 2025).

Vision, however, is not enough without support in practice. Teachers need guidance and substantial training for the pedagogical use of AI (Gioti & Zogopoulos, 2022). In-school training, enhancing digital literacy, and providing time and resources increase self-confidence and reduce resistance to change (Taheri *et al.*, 2025). At the same time, leadership must listen to teachers' concerns, particularly on role and ethics issues, and encourage open dialogue about the benefits and risks of AI (Taheri *et al.*, 2025).

School culture also plays a decisive role. The values, beliefs and ways of working together of the school community directly influence the acceptance of innovation. A positive and collaborative culture fosters trust and open communication. Teachers feel part of a team with a common purpose. In this context, AI is seen as a collective affair rather than an individual initiative. When leadership fosters collaboration, formal and informal forms of collective practice increase (Schmitz *et al.*, 2025).

Learning communities and sharing experiences foster experimentation with AI applications and joint problem-solving. Management can support this process by offering time and pedagogical guidance so that knowledge is disseminated and innovation is consolidated. Equally important is open dialogue and a climate of trust. When there are safe channels for discussion, teachers express concerns and feel supported (OECD, 2022; UNESCO, 2023). Accepting concerns reduces resistance and enhances participation in experimentation. It is in such environments that psychological safety develops, where mistakes are seen as learning opportunities (Karakose & Tulubas, 2025). The integration of AI requires a collective approach and a shared vision. When innovation is integrated into the school's action plan, change becomes more stable and sustainable (Panagiotopoulos, Karanikola & Zogopoulos, 2023). Through in-school training and learning communities, the school leverages teachers' knowledge and supports the gradual and responsible use of AI (Gioti & Zogopoulos, 2022; Taheri *et al.*, 2025).

The international literature indicates that the effect of educational leadership on teachers' attitudes and reservations towards digital innovations is not necessarily direct, but often operates indirectly, through intermediate psycho-pedagogical mechanisms. Studies in the field of educational technology show that leadership primarily influences teachers' learning conditions, access to training, sense of psychological security, and professional self-efficacy, despite their own attitudes or ethical concerns (Hallinger, 2018; Leithwood *et al.*, 2020). In this perspective, school leadership creates the framework in which teachers shape experiences and skills, without directly determining how they interpret the risks and ethical dilemmas of Artificial Intelligence (AI).

Central to this process is teacher readiness, which acts as a mediator between organizational conditions and individual attitudes. According to the model of first- and second-class obstacles, organizational and institutional factors (such as leadership and culture) indirectly influence the attitude of teachers, while direct resistance and reservations are mainly related to individual beliefs, knowledge and perceived adequacy (Ertmer, 1999; Ertmer & Ottenbreit-Leftwich, 2010). In the same context, professional self-

efficacy and experience of using technologies are critical factors that reduce uncertainty and enhance teachers' ability to critically – rather than fearfully – assess the ethical dimensions of AI (Bandura, 1997; Tondeur *et al.*, 2017).

In addition, international research shows that ethical dilemmas related to AI are constituted as multifactorial and socially integrated phenomena, which are not limited to organizational variables. Personal values, professional identity, past experiences, public discourse around AI and broader socio-technological contexts influence how teachers perceive the risks of algorithmic bias, privacy and pedagogical responsibility (Williamson & Eynon, 2020; Selwyn, 2022). In this sense, it is expected that the contribution of individual organizational actors to the anticipation of reservations will be limited, while the readiness and experience of teachers will emerge as more direct and powerful interpretative mechanisms.

2.4 Purpose of the survey

The purpose of this research is to investigate the relationship between teachers' readiness, experience and training needs and their reservations and ethical dilemmas towards the use of Artificial Intelligence in school, as well as the role of educational leadership and school culture in shaping these attitudes.

2.5 Research questions

1) What are the needs, level of readiness and experience of teachers regarding the use of Artificial Intelligence in teaching practice?
2) What pedagogical, social and professional reservations do teachers express about the possible use of Artificial Intelligence in school?
3) How do teachers perceive the role of educational leadership and school culture in supporting the utilization of Artificial Intelligence?
4) Do teachers' perceptions of their needs, readiness and experience, reservations and ethical dilemmas, as well as the perceived role of educational leadership and school culture in the use of AI differ, depending on their demographic and professional characteristics (level of education, role in school, qualification, ICT knowledge and training in AI)?
5) To what extent do the needs, readiness and experience of teachers in terms of Artificial Intelligence, as well as educational leadership and school culture, anticipate their reservations and ethical dilemmas?

3.Methodology of the survey

3.1 Research tool structure

The present research study followed a quantitative research approach and is part of the empirical field research. It took place in the period mid-January to mid-February 2026. The research was based on non-probabilistic convenience sampling, with voluntary participation of teachers through an open electronic call, according to the typologies of

the research methodology (Bryman, 2016; Cohen *et al.*, 2018; Creswell, 2014). A structured questionnaire was used as a research tool based on the review of the literature and the needs of the research. In addition to demographic characteristics (Gender, Years of service, Role in school, Level of education, Level of study, School area, ICT knowledge, AI training), it includes three thematic sections with 10 statements each: a) "Needs, readiness and experience of teachers regarding AI", "Reservations and ethical dilemmas about Artificial Intelligence in Education" and "Role of educational leadership and school culture in the use of Artificial Intelligence", with a total of 30 declarations. Participants were asked to respond on a five-point Likert scale (1=Strongly disagree, 2=Slightly disagree, 3=Neither disagree nor agree, 4=Slightly agree, 5=Strongly agree. The questionnaire was created electronically (Google Form) and sent to the addresses of school units via email, with a request to forward it to teachers. Participation was voluntary and anonymous.

3.2 Sample research

The population of the survey concerns primary and secondary school teachers in Greece. The sample consists of 506 teachers from all over Greece, which allows to capture a broad picture of the Greek educational context.

3.3 Data analysis

The statistical analysis of the data was carried out with the SPSS software (version 29). Initially, a normal distribution of the data (Kolmogorov-Smirnov test) was carried out, according to which there was a normal distribution of the variables (>.05). Descriptive statistical and parametric Pearson correlation tests and group comparisons using independent sample t-tests, variance analysis (ANOVA) and Linear Regression were then applied. The level of statistical significance was set at $p<.05$.

Regarding the internal coherence indicators (Cronbach's α and McDonald's ω) for the three subscales of the research tool (Table 1), the scale "Needs, readiness and experience of teachers regarding Artificial Intelligence" showed good reliability (α=.811, ω=.818). The scale "Reservations and ethical dilemmas for Artificial Intelligence in Education" showed very good internal coherence (α=.873, ω=.873). Similarly, the scale "Role of educational leadership and school culture" showed excellent reliability (α=.906, ω=.904). For all 30 questions, Cronbach's α was .845, while McDonald's ω was lower (.777), a finding that confirms the multidimensional nature of the tool and justifies the use of subscales as discrete variables in subsequent analyses.

Table 1: Reliability check

	N of Items	Cronbach's Alpha	McDonald's Omega
Needs, readiness, and experience of educators regarding Artificial Intelligence	10	.811	.818
Reservations and Ethical Dilemmas for Artificial Intelligence in Education	10	.873	.873
Role of Educational Leadership and School Culture in the Utilization of Artificial Intelligence	10	.906	.904
Total	**30**	**.845**	**.777**

4. Results of the survey

4.1 Quantitative research

Regarding the demographic and professional characteristics of the 506 teachers in the sample, in terms of gender, it consists mainly of women (67.6%), while men represent 32.4%. The largest group concerns teachers with 21–30 years of service (33.6%), while the rest of the categories are relatively evenly distributed. The representation of primary (49.8%) and secondary education (50.2%) is almost equal. 65.6% of the sample are classroom teachers, while 34.4% hold administrative positions (principals). In terms of educational level, the majority have a master's degree (69.2%), 23.3% a basic degree and 7.5% a doctorate. More than half have a B-Level ICT certification (58.9%), while 13.0% do not have any certification. Most teachers serve in urban areas (63.2%), followed by semi-urban (26.5%) and rural (10.3%). Finally, training in artificial intelligence appears to be almost evenly distributed, with 49.4% having attended relevant training and 50.6% having not.

Regarding leadership and professional development in the AI era, with the needs, reservations and expectations of teachers, the presentation of the results is organized in three subscales (Needs, readiness and experience of teachers regarding Artificial Intelligence, Reservations and ethical dilemmas about Artificial Intelligence in Education, Role of educational leadership and school culture in the utilization of Artificial Intelligence).

a. Needs, readiness and experience of teachers regarding Artificial Intelligence

The majority of teachers state that they understand what Artificial Intelligence (AI) is and how it works, with a Mean Value (AP)=4.15 and a Standard Deviation (SD)=.044, with cumulative agreement rates (I agree a little/completely) of 84.2%. Similarly, several state that they can distinguish educational from non-educational AI applications (AP=3.87, SD=.045), with 73.2% positive responses (Table 2). However, the percentage of neutral responses remains remarkable (15.8%), indicating uncertainty. The use of AI tools for course preparation appears relatively widespread (AP=3.60, SD=.064). More than half of teachers (68.0%) state that they have used them. In contrast, the use of AI to support student assessment is limited (AP=2.74, TA=.064). Almost half (45.8%) disagree, while

only 34.4% agree, which shows a clear reservation. Readiness to integrate AI into teaching practice appears to be moderate (AP=3.21, SD=.055). The answers are distributed, with 44.3% stating agreement and 27.3% disagreeing. A wait-and-see attitude prevails. Also, teachers recognize the potential of AI to support the differentiation of teaching (AP=3.87, SD =.044), with 69.6% positive responses.

Also, the vast majority (81.8%) believe that the use of AI requires new pedagogical skills (AP = 4.18, SD =.041). At the same time, there is strong dissatisfaction with the adequacy of the existing training (AP = 3.83, SD =.048). 65.2% agree that they do not meet their needs. Self-education emerges as a key mechanism for AI skill development (AP = 3.82, SD =.047), with 69.6% of teachers stating that they rely on it. In relation to professional identity, the responses show a modest but real effect from the entry of AI into school (AP=3.31, SD =.054). About half (49.0%) state that it is affected, while a significant percentage (29.2%) remains neutral.

Overall, the resulting picture is moderately positive but transitory. The overall index of the scale is formed at moderate to high levels (AP = 3.66, SD =.031). Teachers have basic knowledge and recognize the pedagogical potential of AI. At the same time, they appear cautious about critical practices, such as evaluation. The main difficulty is not found in attitude, but in the lack of systematic training. Self-education temporarily fills the gap, but not sufficiently. The overall picture shows teachers who want to move forward, but ask for clear frameworks, pedagogical guidance and institutional support.

Table 2: Percentage distribution, M.T., T.A., Needs, readiness and experience of teachers regarding AI

	I strongly disagree	**I disagree a bit**	**I neither disagree nor agree**	**I agree a little**	**I totally agree**	**A.P.**	**S.D.**
1. I have a basic understanding of what Artificial Intelligence is and how it works.	4.0	3.6	8.3	42.3	41.9	4.15	.044
2. I can distinguish educational from non-educational AI applications.	3.6	7.5	15.8	45.1	28.1	3.87	.045
3. I have used AI tools for lesson preparation.	16.6	7.9	7.5	34.8	33.2	3.60	.064
4. I have used AI tools to support student assessment.	29.6	16.2	19.8	19.8	14.6	2.74	.064
5. I feel ready to integrate AI into my teaching practice.	12.3	15.0	28.5	28.1	16.2	3.21	.055
6. AI can support the diversification of teaching.	3.2	5.5	21.7	40.7	28.9	3.87	.044
7. The use of AI requires new pedagogical skills from the teacher.	1.6	4.3	12.3	37.9	43.9	4.18	.041

8. Existing trainings do not adequately meet my AI needs.	3.2	8.7	22.9	32.8	32.4	3.83	.048
9. Self-education is a key way to develop AI skills.	5.1	5.5	19.8	41.1	28.5	3.82	.047
10. My professional identity is affected by the entry of AI into school.	12.3	9.5	29.2	33.2	15.8	3.31	.054
Teachers' needs, readiness and experience on AI						**3.66**	**.031**

b. Reservations and ethical dilemmas about Artificial Intelligence in Education

Concern about students' over-reliance on AI is recorded at the highest level (AP=4.24, SD=.041), with 82.2% agreement. Teachers fear the loss of active thinking. Similarly, concern about limiting creativity is equally strong (AP=4.20 SD=.045, 81.4% agreement). AI is perceived as a tool that can favor ready-made solutions. The reliability of AI results is a critical point of concern (AP=4.15, SD=.040), with 82.2% positive responses. Teachers do not trust the results produced uncritically. The risk of unequal access is also recorded as high (AP=4.09, SD=.043, 79.8% agreement). AI is not considered neutral. It can intensify inequalities. The teacher-student ratio shows a lower, but clear concern (AP=3.61, SD=.050). The answers are more divided. This shows concern, not rejection. Teachers are mainly concerned about how and how much AI is used, not about its existence.

The finding regarding the lack of a clear institutional framework (AP=4.27, SD=.039) is strong, with 82.6% agreement. The absence of rules breeds insecurity. Confusion about the limits of pedagogical responsibility is also strong (AP=3.83 SD=.045). Teachers want to maintain control over decisions. Concern about privacy remains high (AP=4.10, SD=.047), with nearly 80% positive responses. Privacy is considered non-negotiable. Occupational insecurity appears lower (AP=3.37, SD=.053). The fear of substitution does not prevail. But there is uncertainty about the future role. Of particular importance is the finding that reservations are not openly discussed in the school environment (AP=3.44 TA=.049). 30.8% remain neutral. This shows a lack of dialogue. Teachers seem to operate individually, without collective institutional support.

The overall index of reservations and ethical dilemmas is high (AP=3.93, SD=.031). The attitude of the teachers is mature and thoughtful. They don't reject AI. The reservations focus more on pedagogical consequences and institutional gaps and less on fears of technological replacement. In general, teachers seem ready to use AI, under certain conditions. They want clear frameworks, human control, and pedagogical guidance. This is not resistance to innovation, but professional responsibility.

Table 3: Percentage Distribution, A.P., S.D., Reservations and Ethics Dilemmas for Artificial Intelligence in Education

	I strongly disagree	I disagree a bit	I neither disagree nor agree	I agree a little	I totally agree	A.P.	S.D.
11. I am concerned about the over-reliance of students on AI tools.	1.2	4.3	12.3	34.0	48.2	4.24	.041
12. I am concerned that AI may limit students' creativity.	3.2	4.7	10.7	32.0	49.4	4.20	.045
13. I am concerned about the reliability of AI results.	1.2	5.1	11.5	41.5	40.7	4.15	.040
14. There is a risk of unequal access of students to AI tools.	2.8	4.7	12.6	40.7	39.1	4.09	.043
15. AI may alter the teacher-student relationship.	5.1	11.9	23.7	35.6	23.7	3.61	.050
16. The use of AI creates confusion as to the limits of pedagogical responsibility.	2.8	6.3	24.9	37.5	28.5	3.83	.045
17. I am concerned about privacy issues.	3.6	6.3	10.3	36.4	43.5	4.10	.047
18. The lack of a clear institutional framework reinforces my reservations.	1.2	2.8	13.4	33.2	49.4	4.27	.039
19. AI reinforces the feeling of job insecurity.	7.1	17.0	28.1	27.7	20.2	3.37	.053
20. Concerns and reservations around AI are openly discussed in the school environment.	4.3	15.4	30.8	30.4	19.0	3.44	.049
Reservations and ethics Dilemmas for Artificial Intelligence in Education						3.93	.031

c. Role of educational leadership and school culture in the utilization of Artificial Intelligence

The attitude of the participants towards AI is evaluated marginally positively (AP=3.20, SD=.051), with a high neutrality (39.1%), which indicates a lack of clear orientation. Pedagogical guidance is the weakest point (AP=2.64, SD=.054), as almost half of them disagree that it exists. Any concerns are moderate (AP=3.06, SD=.054). The encouragement to experiment appears more positive (AP=3.67, SD=.053), showing a willingness to experiment but without a strategic framework. The integration of AI into the school vision remains unclear (AP=3.00 SD=.051), while the role of leadership as a mediator of change has not been consolidated (AP=3.28 SD=.052). Overall, the leadership shows good intentions but lacks systematic guidance and strategic coherence.

In-school training opportunities and collaboration on AI issues are rated moderately (AP=3.11 SD=.056 and AP=3.11 SD=.050, respectively), showing fragmented practices. The strongest element is the climate of dialogue (AP=3.72 SD=.051), with 63.6% agreement, which indicates psychological safety and the ability to discuss. However, the treatment of digital innovation as a collective assumption remains modest (AP=3.28,

SD=.054). Overall, the climate is conducive to dialogue, but it does not always translate into collective action and stable practices.

Overall, the role of educational leadership and school culture in the utilization of Artificial Intelligence is modest (AP=3.21, SD=.039). School culture works more positively than educational leadership, especially in terms of dialogue and experimentation. However, the absence of a clear vision, systematic guidance, and linking AI to school goals limits the dynamics. The use of AI seems to be evolving from the bottom up, through individual or informal teacher initiatives, rather than as a coordinated strategy. This highlights both possibilities and risks of fragmentation.

Table 4: Percentage distribution, A.P., S.D., Role of educational leadership and school culture in the utilization of Artificial Intelligence

	I strongly disagree	**I disagree a bit**	**I neither disagree nor agree**	**I agree a little**	**I totally agree**	**A.P.**	**S.D.**
21. The leadership of the school unit has a clear attitude towards the use of AI.	11.1	11.1	39.1	24.1	14.6	3.20	.051
22. There is guidance on how AI can be used pedagogically.	21.3	26.1	27.7	16.6	8.3	2.64	.054
23. Managers take into account teachers' concerns about AI.	14.6	15.0	34.0	22.9	13.4	3.06	.054
24. Management shall encourage experimentation with digital innovations.	7.1	8.7	23.3	32.0	28.9	3.67	.053
25. The use of AI is part of the school's vision and goals.	7.1	8.7	23.3	32.0	28.9	3.00	.051
26. Leadership acts as a mediator of change and not just as a manager.	9.5	14.2	31.2	28.9	16.2	3.28	.052
27. There are in-school training opportunities for AI.	15.4	15.0	26.1	30.4	13.0	3.11	.056
28. Collaboration between teachers shall be supported in the field of AI.	11.1	15.8	33.6	30.0	9.5	3.11	.050
29. The school climate allows for dialogue around AI.	4.7	11.1	20.6	34.4	29.2	3.72	.051
30. Digital innovation is treated as a collective rather than an individual matter.	9.5	17.4	26.1	29.2	17.8	3.28	.054
The role of educational leadership and school culture in the utilization of Artificial Intelligence						**3.21**	**.039**

d. Differentiation of needs, readiness and experience, reservations and ethical dilemmas and their perceptions of the role of leadership and school culture in the use of Artificial Intelligence with demographic-professional characteristics.

Comparisons were made of the three sub-scales with the demographic and occupational characteristics (level of education, role in school, qualification, ICT knowledge and training in AI) of the participants.

di. With regard to the *Needs, Readiness and Experience of Teachers Regarding AI*, comparisons were made between the Test and Anova

The *level of education* (Primary-Secondary) and the role in the school (Headmaster-Classroom Teacher) do not show a statistically significant difference in the perceptions of the respondents (p>.05) (Table 5). Statistically significant difference is shown by:

a) The qualification [F(2)=17.132, p<.001]. Post hoc comparisons have shown that those with a Master's degree agree to a greater extent on teachers' needs, readiness and experience regarding AI by .423 points more than those with only the basic degree. Also, those with a PhD agree by .352 points more than those with only the basic degree.
b) *ICT knowledge* [F(2)=12.622, p<.001]. Post hoc comparisons have shown that those with Level B (B1/B2) agree to a greater extent on the needs, readiness and experience of teachers regarding AI by .327 points more than those with ICT A knowledge and by .271 points more than those without ICT knowledge.
c) *AI* Training [t(504)=11.184, p<.001]. Those who have been trained in AI agree to a greater extent (Mean=3.97) on the needs, readiness and experience of teachers regarding AI than those who have not been trained (Mean=3.35).

Table 5: Comparisons with Demographic-Occupational Characteristics

Teachers' needs, readiness and experience on AI	Education Level	t(504)=.743, p=.458 >.05
	Role in the school	t(504)=-1.825, p=.069 >.05
	Degree	F(2)=17.132, p<.001
	ICT Knowledge	F(2)=12.622, p<.001
	AI training	t(504)=11.184, p<.001

dii. Regarding the *Reservations and Ethical Dilemmas for Artificial Intelligence in Education*, comparisons were made with t Test and ANOVA

The *level of education* (Primary-Secondary) does not show a statistically significant difference in the perceptions of the participants (p>.05) (Table 6). Statistically significant difference is shown by:

a) *The role in the school* [t(504)=3.389, p<.001]. Teachers show a higher average of reservations (AP=4.01, SD=.659) compared to principals (AP=3.78, TA=.740). The magnitude of the effect is small to moderate (Cohen's d=0.33), which shows a substantial variation in attitudes depending on the role of the participants in the school.

b) The *qualification* [F(2)=15,270, p<.001]. Post hoc comparisons (Tukey) show that teachers with a PhD show a significantly lower level of reservations than those with a basic degree (DMT=0.69, p<.001) and a master's degree (PMT=0.56, p<.001). The finding shows that the higher the level of academic training, the higher the level of academic training, the more reservations and ethical dilemmas towards AI are reduced. In contrast, teachers with a basic degree or master's degree show a similar level of reservations. This shows that differentiation does not simply result from more years of study, but from deeper research experience and familiarity with knowledge assessment.
c) *ICT knowledge* [F(2)=5,564, p=.004<.05]. Post hoc comparisons (Tukey) show that teachers with Level A of ICT show higher reservations than those with Level B (B1/B2). The finding shows that advanced knowledge of ICT is associated with a lower level of reservations about AI. Teachers with Level B seem to have greater technological confidence and a better understanding of the limits and potential of AI.
d) AI *training* [t(504)=-4.528, p<.001]. Trainees show a lower level of reservations (AP=3.79, SD=.736) compared to non-trained students (AP=4.06, SD=.625). The magnitude of the effect is small to moderate (Cohen's d=0.40), which shows a substantial effect of training on attitudes.

Table 6: Comparisons with Demographic-Occupational Characteristics

Reservations and Ethical Dilemmas for Artificial Intelligence in Education	Education Level	t(504)= .195, p=.845 >.05
	Role in the school	t(504)=3.389, p<.001
	Degree	F(2)=15.270, p<.001
	ICT Knowledge	F(2)=5.564, p=.004<.05
	AI training	t(504)=-4.528, p<.001

diii. Regarding the *Role of Educational Leadership and School Culture in the Utilization of Artificial Intelligence*, comparisons were made using t-test and ANOVA. Statistically significant difference is shown by all demographic and professional characteristics investigated:

a) The *level of education* (Primary-Secondary) [t(504)=2.904, p=.004<.05]. Primary school teachers have a higher mean value (AP=3.32, SD=.897) compared to secondary school teachers (AP=3.10, SD=.836). The difference is real (BMI=0.22) and is accompanied by a small to moderate effect (Cohen's d=0.26). Primary teachers perceive the role of leadership and school culture in use of AI in relation to secondary school teachers.
b) The *role in the school* (Headmaster-Classroom Teacher) [t(504)=-8.275, p<.001]. Principals have a significantly higher rating (AP=3.62, SD=.787) than classroom teachers (AP=2.99, SD=.837). The difference is large (BMI=0.64). The magnitude of the effect is high (Cohen's d≈0.77), indicating a substantial difference in attitudes.
c) The *degree* (Basic Degree-Master's-PhD) [F(2)=6.170, p=.002<.05]. Post hoc comparisons (Tukey) show that there is a statistically significant difference

between the group with a basic degree and the group with a Master's degree (ΔMT=0.313, p=.002), with the holders of a Master's degree showing a more positive assessment of the role of leadership and school culture. There are no statistically significant differences in the comparisons involving the group with PhD (p>.05).

d) ICT *knowledge* [F(2)=4.229, p=.015<.05]. Post hoc comparisons (Tukey) show that teachers with Level B (B1/B2) evaluate the role of leadership and school culture more positively than those who do not have ICT certification (DMT=0.33, p=.016). There are no statistically significant differences between Level A and B, nor between Level A and the absence of certification (p>.05).

e) AI *training* [t(504)=-3.325, p<.001]. Teachers trained in AI evaluate the role of leadership and culture (AP=3.34, AP =.942) more positively than non-trained teachers (AP =3.08, SD=.781). The difference is clear (BMI=0.26). The effect size is small to moderate (Cohen's d≈0.30), an indication of substantial differentiation.

Table 7: Comparisons with Demographic-Occupational Characteristics

Role of Educational Leadership and School Culture in the Utilization of Artificial Intelligence	Education Level	t(504)= 2.904, p=.004 <.05
	Role in the school	t(504)=-8,275, p<.001
	Degree	F(2)=6.170, p=.002<.05
	ICT Knowledge	F(2)=4.229, p=.015<.05
	AI training	t(504)=-3.325, p<.001

e. Predictive factors for reservations and ethical dilemmas about Artificial Intelligence in Education

To investigate the extent to which teachers' needs, readiness and experience towards Artificial Intelligence, as well as the role of educational leadership and school culture, predict their reservations and ethical dilemmas, a linear regression was performed with the dependent variable Reservations and ethical dilemmas for AI.

The results showed that only the variable "Teachers' needs, readiness and experience regarding AI" is a statistically significant predictor of reservations. In particular, the relationship was negative and statistically significant (β=-.124, p=.005<.05), showing that higher levels of AI readiness and experience are associated with lower levels of reservations and ethical dilemmas. The model was statistically significant overall, F(1,504)=7,829, p=.005<.05, explaining 1.5% of the variation in the dependent variable (R^2=.015, Adjusted R^2=.013), with acceptable residual behavior (Durbin-Watson=1,728). In contrast, the variable "Role of educational leadership and school culture in the utilization of AI" did not show statistically significant predictive power and was not introduced into the final model. This finding suggests that, in this sample, teachers' reservations about AI seem to be shaped mainly by individual and professional factors, while the organizational and leadership dimensions do not have a direct effect. Overall, the results highlight that the readiness, experience and training needs of teachers are the main axis of understanding the reservations and ethical dilemmas towards

Artificial Intelligence, while the role of educational leadership and school culture seems to function more as a support framework than as a direct predictive factor.

5. Discussion

The purpose of this study is to investigate how teachers' readiness, experience, and professional development needs are related to their reservations and ethical dilemmas regarding the use of Artificial Intelligence in school settings, as well as to examine the role of educational leadership and school culture in shaping these attitudes. Based on the research questions posed, it is demonstrated that:

a. What are the needs, level of readiness and experience of teachers regarding the use of Artificial Intelligence in teaching practice?

The findings show teachers with a relatively high basic understanding of AI (AP=4.15) and the ability to distinguish educational applications (AP=3.87). At the same time, the user experience mainly concerns lesson preparation (AP=3.60), while the use of AI in student assessment remains low (AP=2.74). Readiness for integration in practice appears to be moderate (AP=3.21), showing a cautious attitude. On the contrary, training needs are recorded particularly strongly, with high agreement that AI requires new pedagogical skills (AP=4.18). This picture is consistent with research showing that educators recognize the potential of AI but do not feel adequately prepared for pedagogically critical uses (Chapman *et al.*, 2025; Luckin *et al.*, 2022). Similarly, Greek studies record basic familiarity, but a lack of systematic training, which limits the practical use of AI (Poulimenou & Panitsidou, 2025). Therefore, the findings do not differ from the literature and confirm the transitory nature of preparedness.

b. What pedagogical, social and professional reservations do teachers express regarding the possible use of Artificial Intelligence in schools?

The findings show a high level of reservations, mainly on pedagogical and social issues. Concern about students' over-reliance on AI is recorded at very high levels (AP=4.24, SD=.041), as is concern about limiting creativity (AP=4.20, SD=.045). Similarly, the reliability of AI results is a critical point of concern (AP=4.15, SD=.040). These findings are in line with international studies highlighting risks of passive learning, information reproduction, and algorithmic errors (Trust *et al.*, 2023; Strauss, 2023; ASEF, 2020; Holmes *et al.*, 2021). At the same time, the risk of unequal access is also recorded as high (AP=4.09, SD=.043), confirming concerns about a widening digital divide (OECD, 2021; Panagiotopoulos & Karanikola, 2020). Overall, teachers exhibit a critical, but not dismissive, attitude, accepting AI only under clear pedagogical conditions (Panagopoulou, 2025; Poulimenou & Panitsidou, 2025).

c. How do teachers perceive the role of educational leadership and school culture in supporting the use of Artificial Intelligence?

The overall picture is modest (AP=3.21). Leadership appears vague and fragmented, particularly in terms of pedagogical guidance for AI (AP=2.64). There is greater acceptance in experimentation (AP=3.67), but no clear strategic framework. The school climate favours dialogue (AP=3.72), but not stable collaborative practices and training (AP=3.11). The finding agrees with the literature, which emphasizes that without a clear vision and support, technological innovation remains fragmented (Bush, 2019; Hallinger, 2018· Schmitz *et al*., 2025). Ethical concerns reinforce the need for institutional guidance (Ho, 2025; Karakoulas & Theologou, 2025; OECD, 2022; UNESCO, 2023). The modest assessment of the role of educational leadership does not indicate an absence of influence, but reflects a transitional stage, in which leadership functions more as a framework maker than as a direct pedagogical guide of the utilization of Artificial Intelligence. The international literature points out that in digital transformation environments the influence of leadership is manifested indirectly, through the enhancement of professional learning, psychological safety and self-efficacy of teachers (Hallinger, 2018; Leithwood *et al*., 2020). In this perspective, the absence of clear pedagogical guidance for AI explains why school leadership is recognized as an important support framework, without yet translating into an immediate change in attitudes or practices (Ertmer, 1999; Ertmer & Ottenbreit-Leftwich, 2010).

d. Do teachers' perceptions of their needs, readiness and experience, reservations and ethical dilemmas, as well as the perceived role of educational leadership and school culture in the use of Artificial Intelligence differ, depending on their demographic and professional characteristics (level of education, role in school, qualification, ICT knowledge and training in AI)?

The results in *terms of their needs, readiness and experience* show that the level of education, the role in the school and the area do not statistically significantly differentiate teachers' perceptions ($p>.05$). In contrast, there is a statistically significant difference in terms of qualification ($F=17.132$, $p<.001$), ICT knowledge ($F=12.622$, $p<.001$) and training in AI ($t=11.184$, $p<.001$). Indicatively, those trained in AI show a higher overall index ($M = 3.97$) than those who have not been trained ($M = 3.35$). The findings are in line with international studies showing that AI readiness is mainly linked to teachers' educational and digital capital (Granström & Oppi, 2025; Iddrisu & Iddrisu, 2025). Similarly, Greek research confirms that ICT training and knowledge are critical factors in differentiating attitudes towards educational innovations (Zogopoulos & Gioti, 2022; Karanikola *et al*., 2022). Therefore, the findings reinforce the view that AI does not differentiate socially or demographically, but educationally.

Regarding *reservations and ethical dilemmas,* they do not differentiate based on the level of education ($p>.05$), which shows that the concerns are horizontal in the educational body. On the contrary, statistically significant differences are recorded in terms of role in school, qualification, ICT knowledge and training in AI. Indicatively,

classroom teachers appear more cautious than headteachers (AP=4.01 - 3.78, p<.001). It is particularly important that teachers with a PhD show significantly lower reservations than those with a basic degree or a master's degree (p<.001). Similarly, advanced ICT knowledge and especially AI training are associated with lower reservations (MT=3.79 in the trained versus 4.06 in the untrained, p<.001). The findings suggest that uncertainty is reduced through knowledge and systematic training (Zogopoulos & Karatzas, 2025; Miao & Holmes, 2023).

Regarding *the perceived role of educational leadership and school culture in the use of Artificial Intelligence,* there are no statistically significant differences in critical factors. Regarding the level of education, primary education shows a more positive image than secondary (p=.004). Regarding the role in school, principals evaluate the role of leadership and culture much more positively than classroom teachers (p<.001); showing a perception gap between command and class. Regarding the level of education and knowledge of ICT (Level B) and especially training in AI, they are associated with more positive evaluations (p≤.016). The finding confirms that the acceptance of AI is enhanced through knowledge, digital competence and systematic training (Gioti & Zogopoulos, 2022; Taheri *et al.*, 2025; Zeng *et al.*, 2025; Poulimenou & Panitsidou, 2025).

e. To what extent do the needs, readiness and experience of teachers with regard to Artificial Intelligence as well as educational leadership and school culture anticipate their reservations and ethical dilemmas?

According to the findings of this research, it was found that teachers' reservations and ethical dilemmas towards Artificial Intelligence (AI) are predicted solely by their readiness, experience and training needs, while the role of educational leadership and school culture does not have immediate predictive power. In particular, the negative and statistically significant relationship between readiness/experience and reservations (β=-.124, p<.05) is consistent with findings showing that as teachers' knowledge, familiarity and positive attitude towards AI increase, anxiety, ethical concerns and resistance to its use decrease. Teachers' attitudes and perceived adequacy act as crucial mediating mechanisms between knowledge and practice, directly influencing how they make sense of the ethical risks of AI (Fteiha *et al.*, 2025). At the same time, regarding the psychological readiness of teachers, it seems that technological self-efficacy and positive attitudes reduce moral and emotional reservations, while stress and lack of experience reinforce them (Farooq, 2025). Similarly, interventional training studies show that even short-term AI training experiences can substantially improve teachers' attitudes and allow them to approach the ethical issues raised by AI in a more critical and balanced way (Jaksic & Ansaf, 2024). In contrast, the finding that the role of educational leadership and school culture did not show immediate predictive power differs from studies that attribute leadership to a central role in the adoption of AI. However, this differentiation can be interpreted based on the fact that several studies suggest that leadership acts indirectly, primarily through enhancing teacher readiness and training, rather than as a direct predictor of attitudes or ethical concerns (Zaman *et al.*, 2025). In addition, there is a

discontinuity between positive attitudes and intention to adopt AI, driven by broader cultural and institutional ambiguities rather than leadership practices per se (Omidi & Rostami Beyraq, 2024). Finally, the low rate of explained variance (R^2 =.015) is consistent with the international literature, which indicates that attitudes and ethical dilemmas towards AI are multifactorial phenomena, influenced by personal values, professional identity, user experiences, and broader socio-technological contexts (Bond *et al.*, 2024).

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6. Recommendations

The findings of this research highlight that the successful and pedagogically responsible use of Artificial Intelligence in schools cannot be based on fragmented initiatives or the individual effort of teachers. A combination of training, institutional guidance and a supportive school framework is required. Based on the results, the following are proposed.

First, it is necessary to redesign teacher training in Artificial Intelligence. Training needs to be systematic, continuous and practice-oriented. General information about the potential of AI is not enough. Teachers need guidance on how to use it pedagogically, safely and critically, within the real school context. Particular emphasis should be placed on issues of ethics, data protection and pedagogical responsibility.

Second, it is important to strengthen teachers' readiness and self-confidence through experiential forms of professional learning. Communities of practice, sharing experiences, and collaborative experimentation can be supportive. When teachers feel that they are not alone, reservations are reduced, and AI is treated with greater composure and criticism.

Third, educational leadership is called upon to take on a more pedagogical and less managerial role. Education managers and executives can act as framework makers. Encourage dialogue, listen to teachers' concerns and create conditions of psychological safety. The clear integration of Artificial Intelligence into the vision and goals of the school helps so that innovation does not remain fragmented.

Fourth, the state must form a clear institutional and ethical framework for the use of AI in education. The absence of instructions intensifies uncertainty and shifts the entire burden of responsibility to teachers. Clear guidelines can act protectively, both for themselves and for students, and strengthen confidence in the use of technology.

Finally, it is proposed to further investigate the role of educational leadership with more complex research models. Future studies could examine indirect relationships and mediating factors, such as professional self-efficacy and a culture of collaboration. At the same time, qualitative approaches could shed deeper light on the way in which teachers give meaning to the ethical dilemmas of Artificial Intelligence in everyday school practice. Integrating AI into school is not just a technological challenge; It is primarily a pedagogical and cultural process, which requires time, trust and coordinated support of all involved.

7. Conclusion

The present study highlighted that Artificial Intelligence is a reality for schools that can no longer be ignored. Teachers recognize its potential and show a willingness to explore it. At the same time, they express strong reservations and ethical concerns. This attitude is not a denial of innovation, but an expression of professional responsibility and pedagogical reflection. The results showed that teachers' reservations and ethical dilemmas are mainly related to their readiness, experience and training needs. The greater the knowledge and familiarity with Artificial Intelligence, the less stress and uncertainty. On the contrary, the lack of training intensifies concerns and limits confidence in its use.

Of particular interest is the finding that educational leadership and school culture did not function as direct predictors of reservations. This does not mean that their role is secondary. On the contrary, they seem to function more as a support framework, in which the experiences and readiness of teachers are shaped. The absence of clear pedagogical guidance and strategic vision limits leadership dynamics and leads to piecemeal practices. The overall picture that emerges is that of a school in transition. Teachers do not reject Artificial Intelligence, but ask for boundaries, guidance and institutional support. Their reservations focus mainly on the pedagogical implications, data protection and the preservation of the humane nature of education. The integration of Artificial Intelligence in school is a matter of pedagogical readiness, professional development and a culture of trust. The empowerment of teachers, the clear institutional direction and the supportive educational leadership are basic conditions for a responsible and pedagogically effective use of Artificial Intelligence in the school environment.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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