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Artificial Intelligence In Preschool Teachers' Practice: Awareness, Attitudes And Training Needs In Public Greek Kindergartens

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ABSTRACT

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Artificial intelligence (AI) entered our lives a few years ago. Governments, organizations and educational systems are adjusting to the technological advancements - some would argue not fast enough.

A sizable international research volume is progressively targeting the new technology and its applications, mainly focusing on secondary education and/or zooming in on aspects other than the ones surveyed here. The current study researched the self reported awareness, attitudes and training needs of Greek preschool teachers who are currently working in public kindergartens in Greece. The teachers, who were recruited through online groups in social media, answered an online questionnaire and the collected data was analyzed using quantitative descriptive analysis.

Greek kindergarten teachers reported high awareness of AI, but this awareness does not necessarily translate into functional AI literacy. Participants showed partial uncertainty about AI's capabilities, accuracy, practical applications, and regulatory and ethical implications, while knowledge of specific AI tools for everyday kindergarten practice appeared moderate. The findings are situated within broader structural inequalities in the Greek education system. Nonetheless, reported training needs may reflect not only gaps in teachers' knowledge but also the absence of clear institutional guidance on AI use, particularly within a rapidly changing technological and regulatory context. The findings can be understood as describing a point where teachers are left to make individual judgements about issues that have not yet been sufficiently addressed by the institutions or the wider regulatory environment, highlighting the ambiguity between individual readiness and organisational responsibility.

When we understand access to education as meaningful participation in knowledge production, we recognize diverse forms of knowledge and give teachers and children an active role in testing, questioning, unlearning, and collaboratively rebuilding knowledge through interaction with emerging technologies. Legislation, regulation and a framework should be the prerequisites to any innovation.

Key words: Artificial Intelligence, Preschool, Kindergarten, Attitudes, Training, TAM

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1. INTRODUCTION AND BACKGROUND

1.1 The Greek educational system

Education in Greece is organised within a predominantly centralised national system. Any discussion of educational change is obliged to begin from the constitutional ground on which the system rests, since the provision of free education at every level of the public system constitutes a constitutional principle of the Greek State, rather than a revisable policy choice (European Commission, 2025a). National laws, presidential decrees and ministerial acts set the overall strategy. The Ministry of Education, Religious Affairs and Sports retains responsibility for decisions concerning curriculum content, staff recruitment and funding. The Institute of Educational Policy (IEP) supports the Ministry as its scientific and technical advisory body (European Commission, 2025b). At regional and local levels, education directorates are responsible for implementing national educational policy and supervising schools. Individual schools have comparatively limited autonomy over areas such as staffing, budgeting and curriculum adaptation (Organisation for Economic Co-operation and Development [OECD], 2026).

The formal educational system has three successive levels: primary, secondary and higher (European Commission, 2025a). Compulsory education spans eleven years, comprising two years of pre-primary attendance, six of primary school and three of lower secondary school, and it begins, interestingly, not with primary school but with the kindergarten, which forms part of (pre-)primary education and is obligatory for four- and five-year-olds (European Commission, 2025a, 2025c). From this perspective, public kindergartens emerge as the child's first compulsory encounter with formal schooling, and consequently as a setting in which questions of teacher preparedness acquire particular weight.

In 2020 the Greek government published its first ‘’Digital Transformation Bible’’, which was updated in June 2024, outlining the coming years. The Digital Transformation Bible (Ministry of Digital Governance, 2020) constitutes a strategic roadmap of 271 pages, structured into dedicated sections covering critical areas of society, the economy, and public administration. It further outlines in detail the vision, guiding principles, and objectives underpinning the national digital transformation strategy. In 2024 Greece introduced a range of measures to strengthen digital education, career guidance, and support for learners in remote areas. Law

5128/2024 enacted significant reforms to modernise vocational education and training (VET), with a strong emphasis on digital transformation (Hellenic Republic, 2024).

1.2 The public Greek kindergarten and the kindergarten teachers

Two-year compulsory attendance in the kindergarten was introduced in 2018 and became effective nationwide from 2020–21, a reform the OECD (2026) identifies as among the most significant recent developments in Greek early childhood education. What distinguishes the Greek kindergarten is less its legal position than its pedagogical logic. Although part of the school system, the kindergarten retains its own principles and operating framework, which together constitute its distinct identity, centred on children's holistic (physical, social, emotional and cognitive) development, their well-being, the gradual formation of a democratic citizen identity, and the fulfilment of a compensatory function in addressing educational and social inequalities (Ministry of Education and Religious Affairs, 2023). The curriculum states that didactic framing here is not identical to teaching as narrowly applied at other educational levels, denoting instead the systematic design of developmentally appropriate activities grounded in inquiry and play, with the teacher acting as facilitator and assessment remaining descriptive and formative through observation and the Individual Progress Portfolio. The curriculum is organised around four areas: 1) Child and Communication, 2) Child, Self and Society, 3) Child and Science and 4) Child, Body, Creation and Expression. The inclusion of Information and Communication Technology (ICT) within *Child and Communication*, together with English-language learning and "Skills Labs", reflects a growing emphasis on digital literacy and contemporary competencies from the earliest stages of education (OECD, 2026).

Kindergarten teachers in Greece are university-trained professionals whose education reflects the pedagogical role of kindergarten within the formal school system. Prospective teachers complete their studies in university Departments of Preschool or Pre-primary Education, where academic coursework is combined with pedagogy, teaching methodology and supervised classroom practice (European Commission, 2025d). From now on, every mention of preschool teachers in Greece will be confined to kindergarten teachers.

Teachers in public Greek schools are public servants, while both permanent and substitute appointments are governed by national recruitment procedures. Academic qualifications and previous teaching experience are among the criteria used in recruitment (European Commission, 2025a). Once in school, kindergarten teachers take on responsibilities that extend well beyond direct teaching. Pedagogically, they are expected to interpret curriculum goals,

observe children's development, recognise differences in learning and participation, and plan, implement, and evaluate educational activities that respond to children's cognitive, social, and emotional needs. This involves selecting and preparing appropriate materials and adapting learning experiences to the characteristics of individual children and the wider classroom group. Alongside these pedagogical responsibilities, kindergarten teachers also carry out administrative and communicative duties, including participation in school projects, completion of administrative tasks, and regular communication and collaboration with parents and guardians (European Commission, 2025a). When new policies, curricula or technologies enter schools, teachers must decide how these changes can be interpreted within the practical conditions of their own classrooms.

Initial teacher education provides an essential foundation, but it cannot anticipate every change that teachers will encounter during their professional lives. In Greece, the Institute of Educational Policy contributes to the planning, coordination and support of teacher training, which may focus on curriculum reform, teaching approaches and other emerging educational priorities (European Commission, 2025b). Greek teacher-training initiatives have included programmes on ICT, from introductory courses to more advanced training designed to support the use of digital tools for educational purposes (European Commission, 2025b). A digital tool may be available in a school, but its educational value depends on the choices teachers make about when to use it, for what purpose and with which children.

1.3 Artificial intelligence in the public educational system in Greece

The OECD (2024) defines an artificial intelligence (AI) system as a machine-based system that uses the input it receives to infer how to generate outputs, including predictions, content, recommendations, or decisions, while operating with different degrees of autonomy and adaptability.

The rapid development of AI is beginning to influence many areas of contemporary life, including education. In Greece this shift is increasingly visible in recent policy initiatives that explore how AI might be introduced into the public education system. In 2025, the Greek Ministry of Education, Religious Affairs and Sports introduced the "*AI in Schools*" pilot programme, aimed at exploring the responsible integration of artificial intelligence into secondary education through tools such as ChatGPT Edu. The initiative initially involves twenty schools across the country, including fourteen model and experimental schools and six Onassis public schools, which will function as testing environments for the educational use of

AI before any broader implementation (Koutroumpis, 2025). Teacher preparation is a central part of the initiative; participating teachers will receive training in the use of AI for lesson planning, classroom activities and administrative work, while students will use AI-supported tools for research, language learning and personalised learning activities. International coverage has also drawn attention to the programme, presenting Greece as one of the first countries to attempt a more systematic introduction of generative AI into public schooling as part of a wider effort to modernise education (Smith, 2025).

1.4 Artificial intelligence in the public kindergarten in Greece

The beforementioned developments suggest that AI is beginning to move from policy discussion into practical experimentation within the Greek education system. Yet its introduction raises questions that extend beyond access to technology or the ability to operate new tools. National reports identify possible applications such as lesson planning, automated feedback, and personalised learning, while also emphasising teacher preparation and ethical safeguards (Hellenic National Bioethics Commission, 2025).

Within preschool education, however, the questions raised by AI as a professional tool acquire a particular character. The "AI in Schools" pilot is directed towards secondary education, and it could therefore be argued that kindergarten teachers are approaching AI in the absence of the guidance, training and institutional experience gradually becoming available to colleagues at later educational levels. The distinctive conditions of Greek preschool practice, such as the malleable, adaptable nature of the pedagogical content (Ministry of Education, Religious Affairs and Sports, 2026) and the matter of the developmental appropriateness of AI tools for children of kindergarten age become increasingly significant. The central question is not simply whether AI tools can be used by teachers in public kindergartens, but what place teachers themselves consider appropriate for them within preschool practice, and how prepared they feel to evaluate and use them within pedagogically meaningful and ethically responsible boundaries.

1.5 Problematisation of the study

Although legal and ethical frameworks increasingly address the use of AI across education, less attention has been given to how their expectations are understood and negotiated by preschool teachers, especially in Greece. Therefore, there is a need to understand how the growing presence of AI in education translates into professional practice in early childhood

settings. Examining teachers' awareness, attitudes and training needs is not simply a response to technological change, but a way of understanding the professional responsibilities and support required to engage with AI critically and responsibly. Furthermore, frameworks developed largely within Anglophone contexts cannot be transferred directly to the Greek educational setting, where the curriculum emphasises children's holistic development. By exploring Greek teachers' perspectives, this small-scale exploratory study seeks to contribute context-specific insights.

1.6 Structure of the thesis

Following up from the previous short introduction of the Greek context, the aim and the research questions of the study will be presented, succeeded by a critical exposition of the regulatory context, mainly focusing on European regulations. Moving on, the fourth chapter of this thesis is dedicated to previous research on education and digital literacy, developmental appropriateness of AI systems and educators' awareness, attitudes and training needs. The framework is introduced in chapter number five (TAM plus an adaption that led to the conceptual relationship for this research). After introducing the reader to the research gap, the methodology chapter of the thesis explains what type of research was conducted and the limitations that it entailed. The results of the exploratory study are presented thematically in the seventh chapter, starting with a presentation of the background of the participants. Pie charts, line charts and a table are used to visualise the results, while the accompanying text is corresponding to the research questions, reporting percentages and frequencies. Moving on to chapter number eight, this chapter interprets the findings in relation to the research questions, the TAM, and relevant literature on AI in education. Taking a critical stance, the chapter reflects on the framing of the study itself and proposes a new framework based on the principles of sustainability and equity. The study concludes with a brief summary of the findings and their interpretation underpinning the need for teacher professional development, institutional support and further research.

2. AIM AND RESEARCH QUESTIONS

This study investigates Greek public-kindergarten teachers' awareness of AI, their attitudes towards its use as a professional tool and the training needs they identify. Whether Greek preschool teachers perceive themselves as equipped to occupy the mediating role that the existing frameworks suggest, is central to the development and ethical use of AI tools in/for/at the Greek kindergartens.

The framework used in this study is the Technology Acceptance Model (TAM).

The following research questions concern AI as a professional tool for teachers - that is, teachers' own use of AI in their pedagogical and administrative work - rather than children's direct use of AI in the classroom. All questions refer to teachers in public Greek kindergartens.

1. How aware are Greek preschool teachers of artificial intelligence, and what do they report knowing about its applications in their professional work?
2. What attitudes do Greek preschool teachers hold towards the use of AI in their professional work, including the benefits and concerns they associate with it?
3. How prepared do Greek preschool teachers feel to use AI responsibly in their professional work, and what training needs do they identify in relation to this role?

3. THE REGULATORY CONTEXT

3.1 From the 2024 architecture to the July 2026 amendment

Artificial intelligence is becoming increasingly present in educational practice, creating new possibilities for lesson planning, resource development, documentation, and professional support. In preschool education, however, its introduction raises particular legal and ethical questions, because teachers work with young children whose vulnerability requires a high level of protection. At the European level there is still no regulation written specifically for preschool teachers' use of AI; their professional practice is instead situated within a broader framework composed of the Artificial Intelligence Act, the General Data Protection Regulation (GDPR), the requirements concerning AI literacy, and European ethical guidance for educators. It would be misleading, nevertheless, to present this framework as a stable backdrop against which teachers simply act. During the period in which this thesis was written, the framework itself was amended and revised.

The Artificial Intelligence Act, adopted as Regulation (EU) 2024/1689, established a risk-based architecture in which regulatory obligations depend on the potential impact of a given system rather than on its technical sophistication (European Union, 2024). Within this architecture, several educational applications were classified as high-risk, particularly those used to determine access to education, to evaluate learning outcomes, to assess the appropriate level of education for an individual, or to monitor prohibited behaviour during examinations. Certain practices were prohibited outright, including AI systems that exploit vulnerabilities associated with age and, in the specific context of workplaces and educational institutions, systems that infer emotions. Alongside these provisions, Article 4 introduced an obligation concerning AI literacy. From 2 February 2025 onwards, providers and deployers were required to take measures to ensure, to their best extent, a sufficient level of AI literacy among their staff and among those operating systems on their behalf, taking account of technical knowledge, experience, education and context of use (European Union, 2024, Art. 113).

Regulation (EU) 2026/1744, commonly described as the Digital Omnibus on AI, was published in the Official Journal on 24 July 2026 and entered into force on 27 July 2026, becoming the first amendment to the Artificial Intelligence Act since its adoption (European Union, 2026).

3.2 AI literacy as a legal obligation

Under the new regulation, providers and deployers "shall take measures to support the development of AI literacy of their staff", and the legislator adds that the provision "does not require providers or deployers to guarantee any specific level of AI literacy of any individual" (European Union, 2026, Art. 4(1)).

The legal floor under teachers' AI competence was lowered at precisely the moment generative AI became ubiquitous in schools. That strengthens the argument for studying self-reported preparedness of the Greek kindergarten teachers: if the binding obligation is now one of effort rather than result, the question of what teachers actually know becomes an empirical question rather than a compliance assumption. Where the 2024 text imposed an obligation of result, requiring a sufficient level of literacy to be ensured, the 2026 text imposes an obligation of effort, requiring only that its development is supported. The 2026 amendment does not diminish the significance of teachers' AI competence; it relocates it. What was briefly framed as a guaranteed institutional outcome has become a matter of institutional effort and individual professional judgement.

3.3 Ethical guidance for educators

A similar pattern of partial adjustment appears in the ethical guidance addressed to educators. The Commission first published ethical guidelines on the use of AI and data in teaching and learning in 2022, before generative AI had entered mainstream educational use (European Commission, 2022).

A revised version appeared in 2026, prepared through the Working Group on the Ethical Use of AI and Data in Education covered through the European Digital Education Hub, and the Commission itself explains the revision as a response to the rapid growth of AI use following public access to generative systems (European Commission, 2026). The revised guidelines invite educators to consider AI use in relation to pedagogical purpose, human agency, transparency, fairness and privacy. However, one important point remains unchanged: the guidelines are still mainly aimed at teachers working in primary and secondary education.

3.4 Data protection and the position of the child

At the same time as the ethical guidelines are being updated, the General Data Protection Regulation (GDPR,) which establishes rules for the protection and processing of personal data within the European Union, has remained unchanged since its adoption in 2016 (European Union, 2016).

It is noticeable that the GDPR was written in general terms rather than for any particular technology, which means it already applies to artificial intelligence even though it never mentions it. A kindergarten, like those in Greece, that keeps developmental notes, photographs, or attendance lists is responsible for that information under the GDPR's regulation. In practice this means that the school must have a proper reason for collecting each piece of information, must use it only for the purpose it was gathered for, must not gather more than it actually needs, and must be able to prove that the beforementioned criteria are met. Information about health or a child's body is treated as especially sensitive and protected more strictly. The AI Act adds a second layer: it treats some educational uses of AI as high risk, forbids systems that claim to read emotions in schools, and suggestively expects staff working with such systems to understand them - while leaving the data protection rules fully in place (European Union, 2024).

Children are given a special position in the Regulation. GDPS's Recital 38 explains that they deserve extra protection because they are less likely to understand what happens to information about them, and it points in particular to advertising, profiling and in cases when the data are collected through services that are addressed directly to them. Parental consent, however, is not required when the service offered to the child is preventive in nature or provides counselling (European Union, 2016). Moreover, Recital 116 explains that, when personal data are transferred beyond the borders of the Union, individuals may find it harder to exercise their data protection rights, and in particular to shield themselves from unlawful use or disclosure of their information, while also leaving supervisory authorities without the means to pursue complaints or investigate. Being open to get lowered by individual countries (European Union 2016, Art. 8(1)), Greece has lowered the age limit for the offer of information society services from the Unions' default of sixteen to fifteen years (Hellenic Republic, 2019). At the same time, it is required that anything written in a consent form must be written in language that the

data subject (that being the holder of parental responsibility in the case of children) can follow (European Union, 2016). Finally, Article 7 states that:

> When assessing whether consent is freely given, utmost account shall be taken of whether, *inter alia*, the performance of a contract, including the provision of a service, is conditional on consent to the processing of personal data that is not necessary for the performance of that contract (European Union 2016, Art. 7(4)).

There is no relevant research in Greece but international cases involving kindergartens show where this goes wrong, with general photograph permissions signed once at the start of the year and more health information than was ever needed requested at admission (Milkaitė & Mačėnaitė, 2026). Protection at this age therefore depends almost entirely on how the kindergarten behaves.

3.4.1 Data protection in the public kindergarten in Greece

In May 2026 a joint ministerial decision set binding rules for the use of artificial intelligence systems in secondary schools in Greece (Ministry of Education, Religious Affairs and Sports & Ministry of Digital Governance, 2026). The decision attempts to address some of the risks associated with the use of AI in education by incorporating the key principles of the AI Act. However, the decision applies solely to secondary education.

One could argue that in the Greek kindergarten, the responsibility of data protection sits with the school rather than with the individual teacher. As the public kindergarten is carrying out a task set by European guidelines (Council of Europe, 2020), while teachers process the data on the school's behalf (European Union 2016, Art. 29), the protections that make a real difference are ones that the kindergarten puts in place itself, not the individual teacher. In the case of research on children and young people, findings suggest that, although the consent practices adopted by institutions are often disapproved by researchers, the practices are rarely challenged, which undermines the rights of the participants (Heath et al., 2007).

What emerges in overall is an asymmetry in which the data-protection layer of the framework is stable but generic, the AI layer is specific but volatile, and the pedagogical guidance layer is thoughtful but scoped to age groups other than the one examined here.

3.5 Who is the deployer?

The Artificial Intelligence Act places different responsibilities on different actors but identifying these roles in a preschool setting is not always simple. A *deployer* is generally understood as a person or organisation that uses an AI system under its authority as part of a professional activity (European Union, 2026, Art. 1(5)). Therefore, regulations apply not only to the organisation itself but also to staff and others who use AI systems on its behalf. In some situations, this role is easy to identify. For example, if a school purchases an AI platform and allows teachers to use it, the institution can be seen as the deployer. The situation becomes more nebulous when teachers use AI independently. A kindergarten teacher might, for instance, use an AI tool on a personal device at home to generate content for work. In such a case, it is less certain whether the school or municipality can still be considered the deployer, since the teacher is not using the system through an officially provided or authorised institutional platform. This observation may indicate an inverse relationship between regulation and practice: the more institutionalized and visible the use of AI, the more clearly the obligations apply, whereas the more informal, individual and improvised the use, the thinner the regulatory coverage becomes. Everyday and often informal uses of AI may take place precisely in areas where institutional guidance and regulatory responsibility are least clearly defined.

The children rights organisation 5Rights Foundation (2025) criticised the 2024 AI Act on the grounds that children were primarily viewed as direct users of AI systems, while insufficient attention was given to the ways in which AI-supported decisions taken by adults in schools and other institutions affect them indirectly.

4. PREVIOUS RESEARCH

4.1 Digital technology in Greek preschool education

Early childhood education in Greece has traditionally emphasised play, interaction, creativity, and children's social and emotional development. Although previous research has examined how teachers' beliefs, training, and access to technology influence the use of digital tools in preschool settings (Nikolopoulou, 2014; Papadakis, 2016), considerably less is known about how Greek preschool teachers understand artificial intelligence and how they position it in relation to their own professional work.

According to the OECD (2026), despite investment in digital infrastructure, platforms and teacher development, digital technologies are still not consistently integrated into teaching and learning across Greek schools. Teacher competence and professional learning therefore remain closely connected to the wider process of digital change in education.

4.2 Defining AI literacy for teachers: gaps between policy and practice

The legal framework treats the meaning of literacy as though it were already agreed upon, yet the literature suggests otherwise. Reviews of this emerging field have put forward ways of organising the concept around separate dimensions, such as knowing and understanding, using and applying, evaluating and creating, and dealing with ethical questions, while at the same time pointing out that public understanding of AI, and even the definition of AI literacy itself, remain little explored (Ng et al., 2021).

International guidance written for teachers asks for considerably more than any legal minimum, since it reaches into the pedagogical, ethical and professional sides of their work (Miao & Cukurova, 2024). The AI Act (European Union, 2024, Art. 3(56)) by contrast, describes AI literacy in practical terms, as the skills, knowledge and understanding that allow deployers and affected persons to use these systems in an informed way and to stay aware of the opportunities, obligations, risks and possible harms involved.

These are not simply differences of emphasis; they point towards different answers to the question of when a teacher may be considered adequately prepared. Selwyn (2022) argues that

working with AI in educational contexts requires more than an understanding of how particular technologies function. It also involves a willingness to examine the values, assumptions, and ideological positions that shape the ways in which AI is discussed, promoted, and evaluated. Such reflection includes self reflection and acknowledgement of one's own positionality, while also questioning claims that AI systems can be treated as neutral or detached from wider political, social, and educational interests.

Presenting the issue as one of teacher literacy places the weight on individuals. In doing so it turns a political question about the problematic of the use of AI in education into a technical question about the provision of training as a problem to be solved.

4.3 Developmental appropriateness of AI systems

Discussions of artificial intelligence in early childhood education evolve around the question of developmental appropriateness. Nikolopoulou (2025) situates generative AI at the intersection of developmental psychology and sociocultural theory, arguing that appropriateness cannot be established through content filtering alone. According to her, appropriateness requires the simultaneous operation of developmental alignment, ethical safeguards, and sociocultural mediation. Kurian (2025) proposes the science of child development to be translated directly into system architecture and thereby shifting the burden of demonstrating safety away from practitioners and towards developers. Tao (2025) argues aligning the level of children's engagement with AI with their cognitive and socio-emotional development. Within this progression, the youngest learners are introduced to AI only through carefully guided, teacher-led demonstrations. Summarised, these contributions suggest that appropriateness in the early years is achieved through adult mediation rather than through the properties of any given AI tool.

Acknowledging the lack of agreed standards for an AI curriculum for early childhood education, Su & Zhong (2022) created a framework for the development of AI literacy in kindergarten children, aiming to the development of AI knowledge, skill and attitude. They discovered that problem-based learning was the best teaching method and suggested AI training for teachers.

On the other hand, Cai et. al., (2025) examine the frameworks through which AI is conceptualised in early childhood research. Their findings suggest that current approaches to AI in early learning are largely shaped by cognitive and situated framings, placing emphasis

on how individual children engage with AI and how these interactions unfold within particular educational contexts. The authors argue that, while such perspectives offer valuable insight into learning processes and practical applications, they leave broader questions around social consequences, inequality, and equity less explored. In response to this gap, the authors introduce a posthumanism perspective that positions AI as a new ontological category worthy of examining closely and argue for the inclusion of an ethic of care when designing learning experiences with and about AI. Bush's empirical research (2025) sharpens this argument: when teachers evaluated four large language models against pedagogical criteria for four-year-olds, the models differed substantially in their capacity to generate accurate and developmentally suitable explanations.

Ultimately, what AI systems could be used for at other educational levels, corresponds only partially to preschool education. It could be argued that the appropriateness of use of AI in kindergarten is a question of synthesis of various parameters rather than of AI as a tool in general.

4.4 Educators' awareness of AI

Research on how educators perceive artificial intelligence has expanded rapidly, though it remains unevenly distributed across educational levels. Studies have examined the extent to which teachers are informed about AI, including its capabilities, its potential educational applications, its limitations, and its possible implications for teaching and learning (Bulut, 2026; Wang et al., 2025). What emerges across this work is that awareness is rarely a binary condition. Teachers may recognise a term while remaining uncertain about what these systems do, and familiarity with a tool does not necessarily accompany an understanding of how it operates.

Furthermore, the available evidence suggest that awareness is not a homogenous concept. Bulut (2026), working with 260 primary and secondary teachers, found overall awareness to be at a moderate level, yet the sub-dimensions diverged: practical knowledge emerged as high while theoretical knowledge, the capacity to associate AI with varied contexts, and belief-attitude were marked as moderate. Interestingly, the qualitative material indicated that a number of participants were capable of describing the effects of AI without being able to define the concept itself. Awareness was significantly higher among teachers who had used AI tools, received training, or followed technology-related publications, whereas gender, seniority, and

school level showed no significant association - a pattern which the author of the study acknowledged as contested, since other studies report awareness declining with age and seniority. Wang et al. (2025), surveying 230 K-12 mathematics teachers in China, found that AI awareness significantly predicted perceived usefulness, perceived ease of use, and attitude, although it is worth noting that almost half of their sample described themselves as unfamiliar with generative AI and a similar proportion reported no experience of using it in teaching.

4.5 Educators' attitudes on AI

In educational AI contexts, attitudes appear to be shaped by perceptions of usefulness and ease of use and may subsequently influence teachers' willingness to engage with these technologies and their actual engagement (Almogren et al., 2024; Demir, 2026; Wang et al., 2025).

The findings themselves are less consistent than this framing suggests. Almogren et al. (2024) surveyed 458 university students. Perceived ease of use predicted perceived usefulness and usefulness predicted attitude. However, usefulness and behavioural intention were not strongly correlated. Demir's (2026) research with mathematics teachers in the Marmara Region reported a similar result on the effect of ease of use on usefulness, a considerably stronger effect of usefulness on attitude, and a significant direct effect on actual use, alongside a larger indirect effect through attitude.

Interestingly, Wang et al. (2025) reported something different: Among 230 in-service K–12 mathematics teachers in China, neither usefulness nor ease of use predicted usage behaviour; attitude, subjective norms (*referring to an individual's perception of whether the people who matter to them believe that s/he should or should not engage in a behaviour*) and perceived behavioural control were more important factors. This inverts the pattern in Almogren et al. (2024), where subject norms had no significant effect on attitude. The latter authors explained their results through curricular constraint and through teachers' sense of diminished professional authority, whereas Wang et al. (2025) concluded that teachers' decisions about adopting AI emerge from a highly complex process, which policymakers and researchers should recognise. Differences of this kind might be explainable under socio-cultural lenses. One correlation survives all three studies: attitude predicts intention or use, whereas the perceptual antecedents are less stable.

All beforementioned studies rest on self-report but none of them concerns purely early childhood. Their findings therefore transfer to the preschool setting only partially and with caution.

4.6 Educators' AI training needs

While the studies above examine educator's awareness and attitudes towards AI, another body of work looks into their perceived training needs.

To assess the grade of the association between factors such as teaching grade and teaching experience with teacher attitudes towards AI chatbots, Chen et al. (2025) used a mixed methods approach to analyse the responses from 1,454 teachers. According to their analysis, teachers in secondary school settings were more reluctant to the use of an AI chatbot and prioritised training on guiding students how to use AI and detecting AI-generated work, whereas teachers at elementary school settings prioritised basic AI literacy.

In 2025, Granström & Oppi (2025) surveyed 133 public Estonian schools and 3848 teachers. Data were collected via the Qualtrics platform. Applying the TAM framework, the authors concluded that teachers' readiness and perceived usefulness are the strongest predictors of the adoption of AI, while also underlining the importance of human-centred *and* ethical principles, the importance of teacher empowerment and the role of school leadership to the fostering of a culture of innovation. The study argues that the demographic background of teachers is less relevant for the successful integration of AI in teaching than personal competencies, experiences, and the environments in which teachers work.

Kölemen et al. (2026) highlight professional development that addresses not only how AI can be used but how teachers can evaluate its use responsibly and recognise situations in which its application may be inappropriate or potentially harmful.

Two further contributions complicate any reading of needs as a fixed deficit. Research by Wulansari et al. (2025) indicate that AI training needs in early childhood education are multidimensional and cannot be reduced to technical knowledge. Instead, needs emerge through the interaction between teachers' existing competencies, their attitudes towards technology, the demands of practice, and the resources available within their setting. Additionally, Lademann et al. (2026) suggest that such needs recur rather than resolve, as the technologies and the policies surrounding them continue to change.

One can conclude that, existing empirical research evidence sit almost entirely outside preschool education. Moreover, reported needs for training are based on self assessment, as teachers articulate the needs that they identify, which presupposes that teachers can recognise what they do not know yet.

4.7 The research gap

While the legal and ethical implications of AI increasingly extend across educational settings, comparatively little attention has been given to how these expectations are understood and negotiated within early childhood education. As AI becomes more accessible to teachers, this gap raises important questions about whether preschool educators feel sufficiently informed, prepared and supported to make responsible decisions about its use. In this sense, the need to examine preschool teachers' awareness, attitudes and training needs does not arise only from technological change itself, but from the growing professional responsibility to interpret that change critically and in ways that remain consistent with the educational and ethical demands of work with young children.

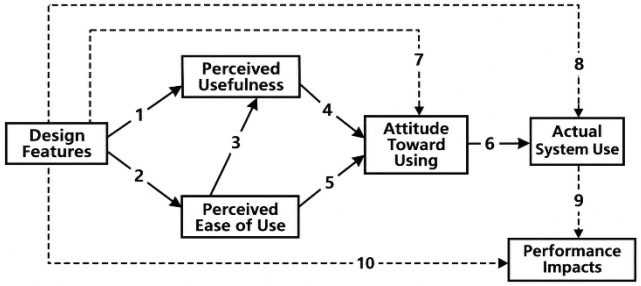
The frameworks that are explored internationally and proposed as solutions to the ambiguity of the use of AI tools by teachers in kindergarten, presuppose an educator who can recognise developmental misalignment in AI output and intervene, yet this presupposition remains empirically unexamined in the Greek setting. Moreover, international frameworks are largely Anglophone in origin, and cannot be accurately transferred into the Greek curriculum, which is organised differently and aim to the holistic development of the child. These are precisely the gaps this small exploratory study addresses.

5. THEORETICAL FRAMEWORK

5.1 Technology Acceptance Model

The Technology Acceptance Model (TAM) consists of five main constructs: perceived usefulness (PU), perceived ease of use (PEU), attitude (ATT), behavioural intention (BI), and actual use (AU). According to the model, actual technology use is determined by behavioural intention, which is shaped by users' attitudes, perceived usefulness, and perceived ease of use. Furthermore, both perceived usefulness and perceived ease of use influence attitudes towards technology, while perceived ease of use also contributes to perceived usefulness (Davis,1986). These relationships are presented in Figure 1 :

Fig. 1: Davis's Technology Acceptance Model



Reproduced from: *A technology acceptance model for empirically testing new end-user information systems: Theory and results* (p. 43), by F. D. Davis, 1986, MIT Open Scholarship (https://hdl.handle.net/1721.1/15192)

The Technology Acceptance Model (TAM) has been widely used to examine and predict the acceptance and use of different learning technologies. In 2019, Granić and Marangunić (2019) reviewed 71 studies. The reviewed studies indicated that perceived usefulness is one of the strongest predictors of technology adoption in educational contexts. Research suggests that perceived usefulness and perceived ease of use contribute to learners' satisfaction, while perceived usefulness and learning satisfaction can strengthen their intention to use technology. The authors argued that both constructs have been consistently identified as important factors influencing the acceptance of technology-supported learning.

A meta-analysis of 27 studies involving 12,124 participants conducted by Xue et al. (2026) examined the acceptance of artificial intelligence in education through the Technology Acceptance Model. The findings supported the relationships between the model's constructs,

with all examined associations being positive and statistically significant, although their strength varied. Among the three core relationships, perceived usefulness and behavioural intention showed the strongest association, followed by perceived ease of use and perceived usefulness, and perceived ease of use and behavioural intention. The analysis also found that these relationships were stronger than those reported in previous meta-analyses focusing on teachers' technology acceptance and mobile learning. The authors attribute this to the emphasis on personalised learning within AI in education. Overall, the findings reinforced the relevance of TAM in understanding AI acceptance in educational settings, particularly the role of perceived usefulness and perceived ease of use in shaping behavioural intention.

This research did not include any questions regarding a specific AI interface system, therefore the aspect of the perceived ease of use (PEOU in TAM) will be irrelevant and only the perceived usefulness (PU in TAM) and the attitude toward using the AI will be investigated.

Fig. 2: The conceptual relationship for this research

5.2 Teachers' awareness of and attitudes towards AI

AI awareness refers to the extent to which preschool teachers are informed about and understand artificial intelligence, including its existence, basic capabilities, potential educational applications, limitations, and possible implications for teaching and learning. Awareness therefore extends beyond simple familiarity with the term AI to include teachers' developing understanding of what AI technologies can do, how they may relate to educational practice, and what challenges their use may involve (Bulut, 2026; Wang et al., 2025). Although awareness is not an original construct of the Technology Acceptance Model (TAM), it can be understood as an external antecedent that contributes to the formation of teachers' perceptions of a technology, particularly its perceived usefulness and ease of use (Wang et al., 2025).

Within TAM, attitude represents an evaluative response toward using a technology and is conceptually distinct from both knowledge or awareness of the technology and the behavioural intention to use it (Shroff et al., 2011). In educational AI contexts, such attitudes may be shaped by perceptions of the usefulness and ease of use of AI and may subsequently influence teachers' willingness and actual engagement with these technologies (Almogren et al., 2024; Demir,

2026; Wang et al., 2025). From now on *attitudes towards AI* will be referring to preschool teachers' positive or negative evaluations of the use of artificial intelligence in educational and professional practice, including the extent to which they regard its use as desirable, beneficial, appropriate, enjoyable, concerning, or potentially problematic.

5.3 Teachers' training needs for AI

Training needs are understood here as preschool teachers' perceived need for further knowledge, skills, guidance, and professional support in relation to artificial intelligence and its possible role in educational practice. Such needs may emerge for several interconnected reasons.

First of all, teachers may seek further training when their foundational understanding does not allow them to engage with AI confidently or critically (Chen et al., 2025), or when they recognise its potential relevance to their work, but do not yet feel sufficiently prepared to use it effectively (Granström & Oppi, 2025). Additionally, knowing what AI is, or even having experience with particular AI tools, does not necessarily provide teachers with the pedagogical knowledge required to decide when their use is educationally appropriate, how they may support learning objectives, or how they can be adapted to the developmental characteristics of particular groups of learners. Studies have identified pedagogical integration as an important area of professional development, with teachers requesting practical guidance on how AI can be used in lesson planning, teaching, assessment, and other aspects of educational practice (Chen et al., 2025). Equally important is the ability to evaluate the ethical, privacy, safety, and age-appropriateness implications of AI use. Research with preschool educators has highlighted the importance of professional development that addresses not only how AI can be used, but also how teachers can evaluate its use responsibly and recognise situations in which its application may be inappropriate or potentially harmful (Kölemen et al., 2026). Furthermore, as students begin to interact with generative AI and other AI-supported technologies outside or within educational environments, teachers may require additional knowledge to provide guidance, establish appropriate boundaries, respond to AI-generated work, and help learners engage with these technologies critically and responsibly (Chen et al., 2025). The need for professional learning may re-emerge over time because AI technologies, their educational applications, and the policies surrounding them continue to develop rapidly. Therefore, training needs should not be regarded as a temporary knowledge deficit that can be addressed through a single professional development activity. Instead, teachers may require continuing

opportunities to update their knowledge, reconsider their practices, and respond to new technological and educational developments (Lademann et al., 2026).

6. METHODOLOGY

The present study seeks to explore the level of awareness Greek preschool teachers have regarding artificial intelligence, the ethical considerations they might have, the attitudes they develop toward its possible use in early childhood education, and the training needs that may arise from this emerging technological landscape. Examining these aspects may contribute to a more comprehensive understanding of how educational systems can respond to technological change while remaining attentive to the pedagogical values that characterize early childhood education.

6.1 Design of the study

This study employed a quantitative survey research design to investigate the use of artificial intelligence (AI) in kindergarten education. The instrument for the collection of the data was an online questionnaire. Questionnaires are widely used in quantitative educational research as they allow a systematic collection of standardized information and are particularly useful for examining participants' attitudes and perceptions (Reinders, 2015). A survey approach is therefore in this case suitable because the study aims to collect data from a considerable group of a defined population -that is Greek preschool teachers- in order to explore general trends in awareness, perceptions, and training needs related to AI. The chosen method allowed the researcher to systematically examine how teachers perceive AI and whether they feel prepared to integrate such technologies into their professional practice. The survey design directly addressed the research questions by gathering self-reported data of teachers.

6.2 Participants

The target population of the study consisted of 31 preschool teachers of various age groups and educational levels, as well as varied work experience, working in Greek kindergartens in rural and urban areas.

6.3 Data collection

Starting from the gatekeepers of day-to-day practice, data was collected to investigate current opinions and trends through an online questionnaire. The questionnaire included sections designed to address the research questions:

1. Demographic information (for example years of teaching experience, level of education).

2. Awareness and understanding of AI, including familiarity with AI tools and concepts.
3. Attitudes toward AI in education, measured through Likert-scale statements regarding the perceived usefulness and potential risks of AI in kindergarten teaching.
4. Perceived readiness and training needs, focusing on teachers' confidence in using AI tools and their interest in professional development related to AI.

Participants were recruited through two online groups in social media, specifically on Facebook, created for Greek kindergarten teachers working in public schools. Participation was voluntary and anonymous. Each participant answered the Google Forms questionnaire with his/her email but no emails were obtained by the author of the thesis. As the online link grew in popularity, it caused a snowball effect and gradually more and more teachers were participating in the survey. The questionnaire was in English. The reason for the language of choice was to avoid small differences in translated text, where the subtle nuances or distinctions of the language can alter the tone and emphasis of the expressed opinions. The data collection was completed in two months.

6.4 Data analysis

The collected data was analysed using quantitative descriptive analysis. Descriptive statistics are commonly used in quantitative research to summarize and present the main characteristics of a dataset in a clear and systematic way. This method allows researchers to describe patterns in participants' responses through numerical indicators such as frequencies, percentages, means, and standard deviations (Mishra et al., 2019), and is also being used in educational research (Mohamed & Saleh, 2019). In the current study, descriptive statistics was used to analyse preschool teachers' responses regarding their awareness of artificial intelligence, attitudes toward its potential use in kindergarten education, and training needed to use AI tools in their professional practice. Responses to Likert-scale questions were summarized using percentages in order to identify overall trends in teachers' perceptions. The collected data were organized and analysed thematically, and the results are presented in text accompanied by pie and line charts.

Regarding the final question (Q15), which was an open- ended question exploring kindergarten teachers' opinions on AI, the researcher identified recurring words and ideas across the responses. Their frequent occurrence was understood as reflecting dominant perspectives and was therefore considered particularly noteworthy.

The analysis involved four steps:

1. Data preparation: Responses were exported from Google Forms into Excel and the data was checked for completeness and organized for analysis.
2. Descriptive statistical analysis: Frequencies and percentages were used to present an overview of participants' responses.
3. Comparative analysis: Responses were compared in relation to selected variables, to explore potential differences in attitudes toward AI.
4. Interpretation: The results were interpreted in relation to the research questions and existing literature on AI in education.

Questions Q1-Q5 regarded the awareness of the kindergarten teachers, their Perceived Use of AI in the kindergarten. Questions Q6-Q8 regarded a positive attitude towards AI, because of the phrasing of the questions, presenting positive possible uses of AI tools (*AI can help me*…). Questions Q9-Q11 regarded a negative attitude towards AI, because it presented with negative possible outcomes (*AI will*…). Questions Q12-Q14 regarded possible need for training on AI tools. The last question, Q15, was an open one: teachers could make a statement or give a short feedback/evaluation on the use of AI tools in the kindergarten.

6.5 Limitations

This study was primarily exploratory and involved a small sample, therefore, causal relationships concerning kindergarten teachers' awareness of and attitudes toward AI, as well as their training needs, could not be established. Nevertheless, the findings may offer useful insights and implications, opening pathways for further research in an area that has not yet received sufficient attention in Greece. The sample was limited to 31 participants, meaning that the findings cannot be generalized to the wider population of kindergarten teachers.

The data were collected through an online Google form and all participants were anonymous. The data were self-reported, which means that participants' responses may not always accurately reflect their actual knowledge, attitudes, or practices. Some kindergarten teachers may have provided answers they considered socially acceptable. Even though the participation was anonymous, the factor of social desirability may be especially significant regarding questions that refer to professional training on AI, which is seen as desirable characteristic. Research comparing teachers' questionnaire responses with classroom observations has identified inconsistencies between self- reported beliefs and their observed teaching practices (Zhang & He, 2024). Participants may also have interpreted the questionnaire items differently

and/or overestimated/underestimated their own knowledge of AI. Therefore, the findings should be understood as representations of teachers' perceived awareness, attitudes, and training needs and not as objective measurements of their knowledge or behaviour.

Another limitation was introduced through the online collection of data, as the questionnaire was distributed through social media groups for Greek kindergarten teachers, and participation was voluntary. This method was practical and relatively fast but may have introduced selection bias, as teachers with a greater interest in digital technologies and AI might have been more willing to participate. Consequently, the findings obtained from the 31 respondents cannot be generalized to the wider population of Greek public kindergarten teachers.

The participation of male teachers was limited but can be understood within context, as male kindergarten teachers in Greece are much less than female kindergarten teachers. It is uncommon to meet a male kindergarten teacher.

Last but not least the questionnaire was in English. That is nonetheless another limitation, leading to selection bias: the participants were capable users of the English language.

6.6 Ethical considerations

Data collection and research procedures were conducted with consideration for the principles of the General Data Protection Regulation (GDPR). The questionnaire focused on collecting data relevant strictly to the research objectives, while respecting participants' privacy and confidentiality. The participants' responses were used solely for the purposes of the study. The data were handled, stored, and analysed with care to safeguard participants' information and prevent unauthorised access. Only the author of this thesis had access to the collected data in Google Forms.

Before completing the anonymous online questionnaire, participants were informed about the study's purpose, the voluntary nature of their participation, and how the collected data would be used. No directly identifying information was requested, while demographic questions were limited to information relevant to the study. Participants were also informed that, anonymity made it impossible to identify and withdraw an individual questionnaire after its submission. The collected data were accessed and used exclusively for research purposes.

7. RESULTS

7.1 Demographics

The online questionnaire was answered by 31 participants in total, 29 of them being female and only 2 male. An impressive 80,6% owed a master's degree, whereas 19,4% had a bachelor's degree. There were no participants with a PhD. As illustrated by Figure 3, a pie chart, the age of the participants varied, with the group 30-39 being the most represented, with age groups 40-49 and 22-29 coming second and third respectively. The one participant (marked with green colour) of the age group 50-59 and the two participants of the 60+ can be explained with the survey being known not only through online posts but also through the word of mouth. Adding the three prominent age groups adheres to a total of 90,3%, which shows that the younger kindergarten teachers are easily reachable online and possibly most likely interested in AI, taking the time to reflect on its use as a professional tool.

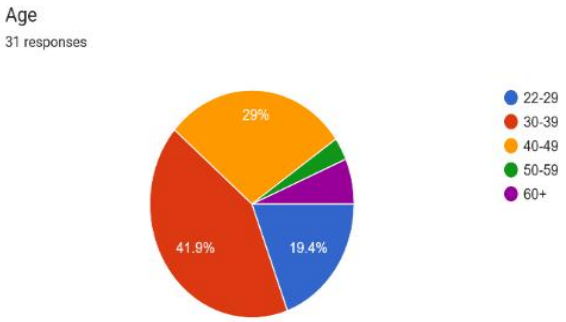


Figure 3

A total of 58% of the participants had up to 10 years of work experience, with an impressive percentage of 41,9% having up to 5 years of work experience. This indicates a less experienced population taking part in the survey. The teachers with more than 21 years of work experience had the lowest participation rate (9,7%). The following Figure 4 is presenting the data.

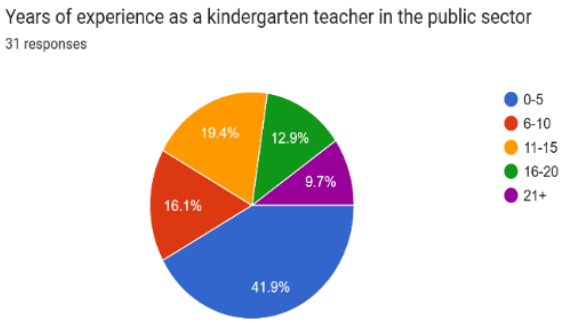


Figure 4

7.2 Awareness

Out of 31 participants, only one person was not sure what an AI is, all the rest claimed to know. Moreover, 83,9% claimed that AI tools may provide inaccurate information, whilst a considerable 16,1% (5 persons) was not sure about it. At the same time, 90,3% said that AI differs from other digital technologies, 6,5% were not sure if it differs and 3,2% said that AI does not differ. A big percentage claimed to know examples of AI tools that can be used in kindergarten (87,1%), whereas 12,9% did not know any applications or was not sure about it. Regarding risks involving the use of AI tools in kindergarten, illustrated in Figure 5, a considerable percentage was not sure if there are any (25,8%). A considerable percentage said that there are not any, and slightly more than half of the participants identified risks (58.1%).

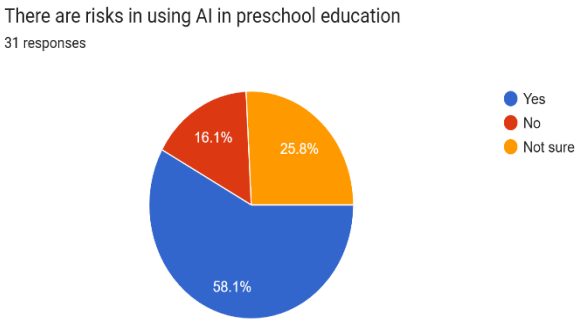


Figure 5

The findings indicate that the participants were, by their own account, generally familiar with artificial intelligence as a broader technological phenomenon. However, the level of awareness appears to become less consistent when the questions move towards a more critical consideration of AI use, as we will see in the next chapter. This suggests a distinction between being familiar with AI as a technology and having a more developed understanding of the implications of its use in early childhood education. In this small exploratory study AI awareness was understood as a starting point rather than as an attitude towards AI.

7.3 Attitudes

About four-fifths of the participants said that AI can have a supportive role in education, helping them save time on planning and preparation (80,6% agree and strongly agree). Approximately two-thirds of the participants rendered a similar role to AI tools in helping them create differentiated content, which is adapted to the individual needs of children (67,7% agree and strongly agree). In the second case, educators seemed to be more hesitant, as the combined percentage of neutral and disagreeing participants was almost twice as big as in the first case (32,3% vs 19,4%). When it came to the role of AI tools helping the teachers with administrative

workload and communication with families, presented in Figure 6, the opinions of the target group were more divided. Less than half of the questioned (45,2%) expressed a positive expectation, less than one-fifth (19,4%) expressed a negative expectation and an impressive 35.5% were neutral.

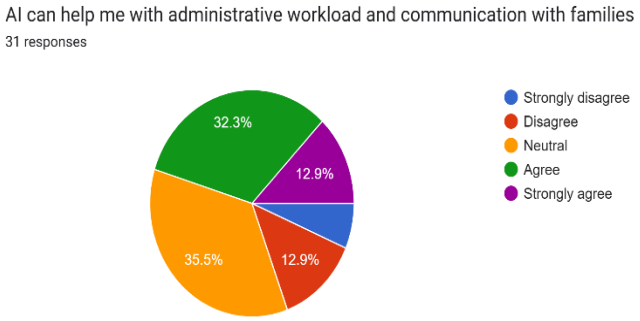
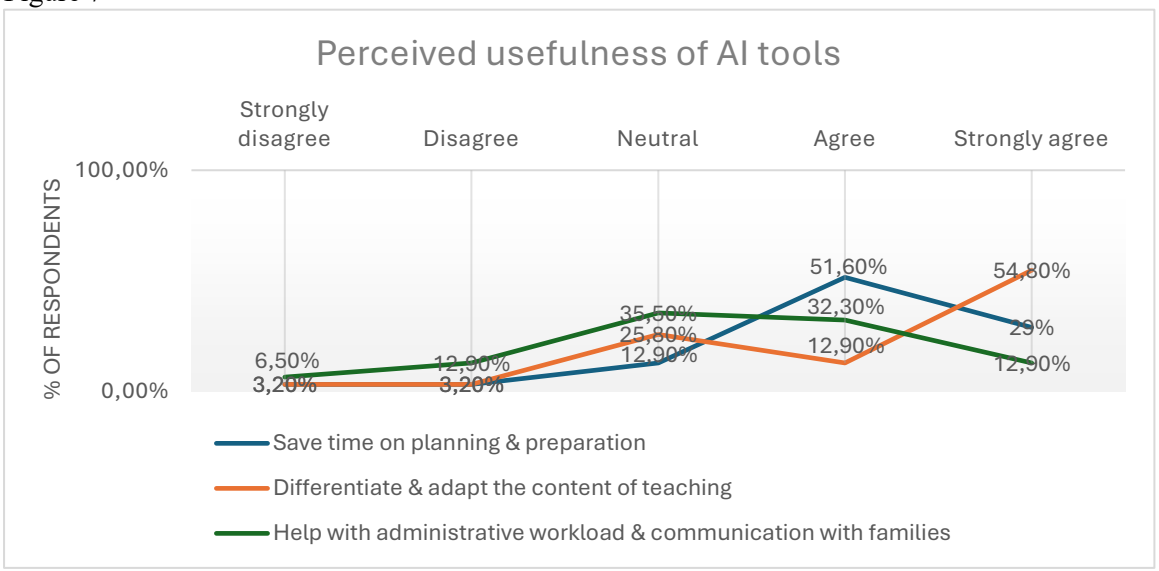


Figure 6

Summarising, one could argue that attitudes towards AI as a professional tool were generally positive, although this varied depending on the task. This pattern does not seem to reflect a simple difference between easier and more complex tasks. Instead, teachers appeared more positive towards uses where they could maintain direct control over how the AI-generated output was interpreted and used. Positive attitudes were less pronounced when the task involved communication with families. The following Figure 7 visualises these relationships in a line chart.

Figure 7



Moving on to the statements with a negative connotation, a substantial 16,1% of the focus group was concerned that AI tools will reduce human interaction and diminish the teacher's role in the classroom. More than half of the participants (54,8%) disagreed with the statement, while 29% remained neutral. Regarding the introduction of tools that are not developmentally appropriate for young learners, the percentage of the neutral participants was increased to 32,3%. Reduced was the percentage of the disagreeing participants (45,2%), in comparison to the previous question about human interaction and the role of the teacher. Kindergarten teachers appeared to be more concerned about the appropriateness of the AI tools with 22,6% agreeing with the statement *''AI will introduce tools that are not developmentally appropriate for young learners''*. As illustrated in Figure 8, the most prominent concern of the questioned teachers appeared to be whether AI will compromise children's right to privacy and expose them to risks. Nearly one-third of the respondents (32,3%) agreed with the latest statement, a furtherly reduced percentage remained neutral (25,8%) and approximately two-fifths of the participants (41,9%) disagreed.

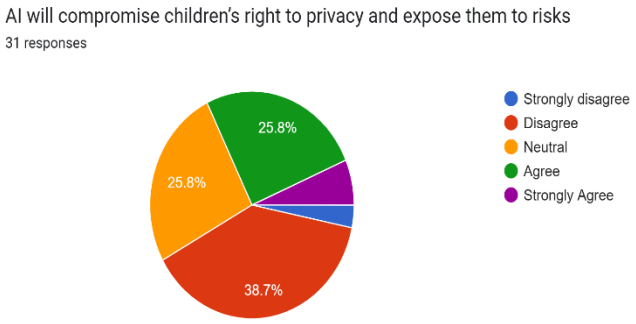


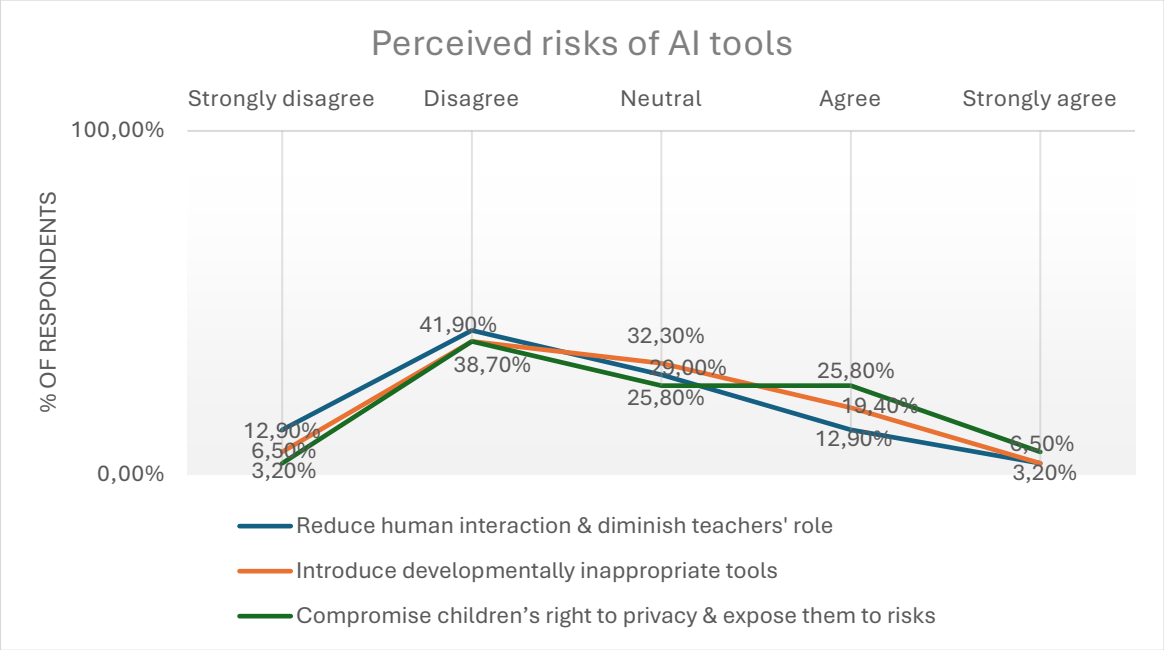
Figure 8

	Human interaction/ Teacher's role	Developmental appropriateness	Children's privacy and risks
Agree/Strongly agree	16,2%	22,6%	32,3%
Neutral	29%	32,3%	25,8%
Disagree/Strongly disagree	54,8%	45,1%	41,9%

Table 1: *Greek kindergarten teachers' concerns in relation to the use of AI tools in kindergarten*

In overall, participants' concerns were not primarily focused on AI replacing or weakening the teacher's pedagogical role. Greater concern was associated with how AI might be used in relation to young children, particularly when children's personal information and privacy are involved (perceived risks of AI tools depicted in Figure 9).

Figure 9



7.4 Training needs

When asked about their digital skills generally, 54,5% of the teachers appeared to be confident in them, 22,6% were neutral and 12,9% were not confident. A quite big percentage claimed to have received training on AI tools (45,2%), whereas 35,5% have not. Approximately one-fifth of the participants believe that training on AI tools is necessary, even though they have not received any yet (19,4%). Even though 45,2% of the target group received training, nearly two-thirds of the participants, 64,5%, stated that they can evaluate whether an AI tool is appropriate for young children (Figure 10). A smaller percentage was not sure about that aspect and an even smaller percentage self-assessed as not being able to evaluate the appropriateness of AI tools for young children.

This may suggest that teachers are drawing on their existing pedagogical and developmental knowledge when evaluating AI, applying professional judgement to a relatively new technology rather than relying on specific AI-related training. While this may indicate that teachers can transfer existing professional knowledge to a new context, it also highlights a possible gap between perceived preparedness and formal AI training. This is consistent with the discrepancy identified in the study, where training needs become more visible when teachers recognise a difference between what they currently know and what they consider

necessary for the responsible use of AI (Chen et al., 2025; Granström & Oppi, 2025; Kölemen et al., 2026).

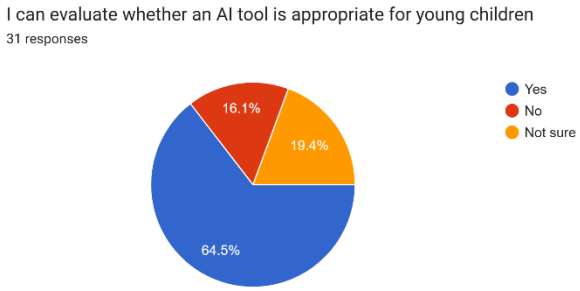


Figure 10

7.5 Opinion on AI

The last question of the online questionnaire was open ended and was asking the teachers *''what do you want to say about the use of AI in the Greek public kindergarten?''*. This question could be entirely skipped by the participants, who could opt to submit their questionnaire without answering it. The result was a collection of 15 answers.

When asked freely, only one out of fifteen persons said we ''*must try and teach about this''*, one person said that AI is already widely used in kindergartens with impressive results, and two persons said that it is non existent or rare. At the same time, one person admitted to not know how we could intergrade it. Four participants underlined the importance of restricted use and adherence to rules and regulations, two of which mentioned explicitly the General Data Protection Regulation and the protection of children. Informing the children of consequences of possible use was also added to the last comment. Eleven participants out of fifteen characterised AI as a helpful tool, supportive to the role of the teacher under conditions and three participants identified it as a tool that should only be used by educators, while one person of those said that AI should not be used with children (but teachers should use it as a professional tool privately).

The open-ended responses suggest that participants' views towards AI were expressed mainly in terms of their perceptions and expectations rather than their actual professional use. The lack of a direct measure of current and intended use should be understood as a limitation of the study rather than as evidence about the level of AI adoption among Greek kindergarten teachers.

8. ANALYSIS AND DISCUSSION

8.1 Greek public kindergarten teachers and AI awareness

The participants reported high awareness of AI, claiming an understanding of what AI is and how it differs from other digital technologies. Awareness is not an original construct of TAM but can be understood as an external factor that influences the formation of teachers' beliefs about AI. In particular, familiarity with AI and its potential applications may shape teachers' perceptions of its usefulness in their professional practice. Those who understand what AI can offer may be better able to recognise its potential to support tasks such as lesson planning, the preparation of educational materials, and the differentiation of learning activities. However, awareness should be distinguished from both perceived usefulness and practical AI literacy. From a TAM perspective, knowing about AI does not necessarily mean that teachers consider it useful in their professional practice. Instead, awareness may inform the development of perceived usefulness, whereas the latter more directly reflects teachers' beliefs about the extent to which AI can contribute to their work.

The research questions did not expand to the ideological positions or values that might affect the self reflection of the participants. The general opinions which were investigated through the open-ended question, suggest that kindergarten teachers in Greece are curious about AI, especially in its role as a professional tool. Nonetheless, the study revealed some uncertainty about what AI can actually offer and how accurate it is. Thematization of legal considerations was very limited, together with non existing examples of AI apps that can be used in everyday practise in the kindergarten, and explicit referral to risks involved. That might indicate a lack of knowledge of the regulatory context and/or a limited knowledge of AI and its capabilities. *How* it actually operates and *what* that means for the teacher or the kindergarten being the deployer(s) of the AI technology, remains partially unanswered. Nonetheless, high reported awareness coexisted with relatively positive perceptions of AI's usefulness in this small exploratory study. At the same time, one could argue that Greek kindergarten teachers have heard about AI but have not yet developed functional AI literacy. Teachers' self-reported awareness does not necessarily indicate that they can evaluate AI critically and independently. Within TAM, perceived usefulness represents a subjective belief about the potential value of a technology rather than an objective assessment of users' competence or its educational effectiveness. The findings therefore point to a possible gap between recognising AI's potential and having the knowledge required to assess its professional applications critically. This

distinction is particularly important in preschool education, where teachers need to consider not only whether AI can perform a task efficiently but also whether its outputs are developmentally appropriate and aligned with educational objectives. In this respect, AI literacy complements TAM by extending the analysis beyond teachers' beliefs about technology acceptance to include the knowledge and evaluative skills necessary for its responsible use.

Regarding infrastructure and equipment, despite the imperative of multifaceted digital transformation, many Greek schools, particularly in remote or rural areas, continue to face shortcomings in digital infrastructure, such as limited access to high-speed internet and up-to-date devices. These limitations can restrict the effective use of AI tools and reproduce inequalities. Within TAM, external factors also influence users' beliefs about technology and the possibilities for its adoption. A teacher, for instance, may consider AI highly useful for preparing differentiated learning activities but be unable to integrate it into their practice due to poor internet access, inadequate equipment, or a lack of institutional support. In this case, perceiving AI as useful does not necessarily translate into actual use. This distinction is significant because it shifts the discussion beyond individual willingness to adopt technology. Teachers' perceptions are shaped by the institutional and material conditions in which they work. Consequently, understanding how AI acceptance translates into professional practice requires consideration of the broader context in which teachers are expected to use it.

The Greek educational system is experiencing increasing socio-economic segregation, persistent teacher shortages, and significant disparities in the distribution of educational resources. These structural conditions contribute to unequal educational opportunities by affecting the quality, availability, and continuity of educational provision across schools and regions. At the same time, educational opportunities and outcomes become increasingly differentiated. This creates a tension between the welfare-state principle of education as a means of promoting equity and policy approaches that place greater emphasis on competition, performance, and measurable outcomes. Without parallel investment in connectivity and hardware, such disparities risk deepening rather than closing the digital divide.

On the other hand, although digital technologies can broaden participation and access, access to education should not be reduced to the ability to enter educational spaces or use digital technologies such as AI (Bagga-Gupta, 2023). Meaningful access has social aspects and is shaped by whose knowledge is recognized and valued, whose voices are represented, and how

learning is conceptualized and enacted across both physical and digital environments. From this standpoint, education should provide space for multiple ways of knowing rather than reproduce a single, universal model of knowledge.

Access to education includes the capacity to participate actively to the dynamic process of knowledge production. In the case of AI tools, kindergarten teachers and children should be viewed as active members of the production of knowledge as they are testing the technology, unlearning dominant assumptions, relearning and rebuilding knowledge collaboratively. Following the argument made by Bagga-Gupta and Weckström (2025), flexibility and self reflection are critical aspects of sustainable learning environments, especially when we talk about such fast-evolving technologies.

8.2 Greek public kindergarten teachers and attitudes toward AI

Greek kindergarten teachers generally perceive AI as useful but have significant concerns about its developmental appropriateness and children's privacy. Although perceived usefulness was relatively high, concerns may constrain teachers' willingness to incorporate AI into their professional practices. Within TAM, perceived usefulness describes the extent to which individuals believe that a technology can improve their performance. In the context of this study, it reflects teachers' perceptions of AI's potential to support their professional work. Their positive responses regarding planning and the preparation of differentiated materials indicate that they recognise its possible practical value. However, acknowledging these benefits does not necessarily mean that teachers consider all AI applications suitable for early childhood education. While TAM provides a useful lens through which to understand perceived benefits, it does not fully address the developmental and ethical considerations that shape the use of technology in preschool settings.

Regarding the developmental appropriateness of AI tools and following in the steps of Nikolopoulou's (2025) argument, a question to ask would be how aligned are these tools with the age of the children and with the Greek curriculum and its developmental goals. Participants of this study seemed to welcome AI's help and at the same time to agree with Tao's (2025) suggestion for children to be exposed to AI tools only under the careful curation of the teacher. Even though previous empirical research by Bush (2025) underlined the distinctive difficulties that are involved in the pedagogical evaluation of AI models specifically for preschool children, Greek participants seemed to welcome AI's ability to differentiate content according to individual needs of children but were hesitant regarding its capabilities when it came to the

social role of the teacher and, in particular, to the communication with the families of the children.

TAM offers insight into why teachers may be interested in adopting AI, but it does not establish whether they have the knowledge required to assess its outputs critically. Perceiving AI as useful does not necessarily mean understanding its limitations, just as a willingness to use it does not guarantee the ability to do so responsibly. The finding that teachers recognised the potential of AI for differentiation while expressing more reservations about its use in communication with families indicates that perceived usefulness may depend on the professional task at hand. Teachers may value AI as a tool for preparation and planning while remaining more cautious about its role in areas that require human interaction, professional judgement, and an understanding of individual circumstances. This perspective offers a more nuanced interpretation than categorising teachers as either supportive of or sceptical about AI. Rather, their evaluations appear to depend, at least partly, on the intended application and the extent to which it aligns with their understanding of their professional role and responsibilities. The connection between perceived usefulness and responsible acceptance is not necessarily direct. Teachers may recognise AI's potential to enhance their professional practice while deciding that certain applications are unsuitable because their associated risks outweigh the potential benefits. From this perspective, choosing not to use a particular tool should not automatically be interpreted as resistance to technology. Rather, it may represent a considered professional judgement about whether its use is appropriate in a given context.

Perceiving AI as a useful tool that could be used under conditions (as reported by 11/15 participants), the participants' responses are generally consistent with the theoretical expectation that perceived usefulness may contribute to positive attitudes and willingness to use the technology. The question to be asked here is if reporting teachers were aware of all the existing regulations and the obligations that stem from this use or if they were affected by socially desirable roles while answering the questionnaire's questions. As Wang et al. (2025) suggested, subjective norms such as likeness by peers (in this situation, other teachers) and perceived behavioural control are important factors that individuals take into consideration when making a decision. Positive evaluations of AI as something ''impressive'', while feeling confident to chose when and how to use it, might lead to a positive attitude towards it. As we can see at the following graph, Greek kindergarten teachers feel confident in their role in the classroom. The main point of concern is children's right to privacy and explosion to risks,

which is understandable and can acquire greater significance when viewed under the moving legal ground.

In the latest school years, an explicit reference to AI tools was often absent from the admission documents that parents sign. So, when a teacher opens an AI tool and types something like *"I have a five-year-old boy who hits other children when frustrated, how should I write this up for the parents?"*, several things happen at once that the school never accounted for: Personal information about an identifiable child has been sent to an AI company that is not on the school's list of processors. There is no agreement in place with that company about what it may do with the text. The data has probably left the EU and the information itself is of the more sensitive kind, since it touches on behaviour and possible developmental difficulty.

This looks more like a grey zone, rather than an illegal situation: The teacher is usually acting in good faith and out of professional care. What is missing is any institutional decision covering it. The school cannot show a legal basis for that particular use of AI, has not told parents it happens, and has not assessed the risk. If something went wrong, no one could account for it. Teachers often assume that leaving out the child's name solves this. It usually does not, because a small kindergarten is a small pool of children where age, gender and a described behaviour can be enough to identify a child within that setting. Teachers need to know these responsibilities exist, even though a teacher knowing is not the same as the kindergarten complying.

8.3 Preparedness and training needs

Greek kindergarten teachers appeared to have high interest and positive attitudes toward AI: they perceive it as something useful that they should incorporate in their practice. Simultaneously they are reporting insufficient knowledge and lack of training when slightly more than half of the teachers feel confident in their digital skills and two thirds of them can evaluate whether an AI tool is appropriate for children of kindergarten age.

In overall, teachers' perceived training needs are influenced by the wider professional environment in which they work. Digital competence, openness towards technological innovation, access to appropriate infrastructure, and institutional support can all shape whether teachers feel capable of engaging with AI and what kinds of professional development they consider necessary. Evidence from early childhood education indicates that AI training needs

are multidimensional and cannot be reduced to technical knowledge alone; rather, they emerge through the interaction between teachers' existing competencies, their attitudes towards technology, the demands they encounter in practice, and the resources and support available within their educational context (Wulansari et al., 2025). Noting responses of the participants who do not how to intergrade it or limit the use of AI to *'' plays in end-of-the-year shows''* coexisting with responses that mention the limitless capabilities of AI and the need to *''try and teach about this'',* leads to the conclusion that awareness might lead to willingness to use AI, but there is a need for training that pre-exists the ability of the teachers to implement AI responsibly.

Starting from and building on basic AI literacy skills is undeniable. At the same time teachers should be empowered to intergrade pedagogically the AI tools by receiving practical, hands on guidance. Self reflection and evaluation of AI's use and establishing appropriate boundaries should not be secondary to its implementation. Learning, unlearning and re-learning over time is a process that views teachers and their knowledge as dynamic and dialectic rather than as a deficit to be addressed momentarily.

A teacher who uses AI professionally cannot be understood simply as an AI user. Professional engagement with AI involves a range of critical and pedagogical competencies that extend beyond the technical ability to operate an AI tool. Teachers need to determine whether AI is appropriate for a particular task, formulate effective prompts, critically evaluate and verify AI-generated outputs, and identify potential inaccuracies, biases, or limitations. They must also adapt AI-generated content to suit pedagogical objectives and learners' needs, while considering issues of data privacy and copyright. Ultimately, despite the assistance provided by AI, the teacher retains professional responsibility for evaluating, adapting, and approving the final product. Professional development is therefore crucial, equipping teachers with both technical skills and ethical awareness to guide students in responsible, reflective, and participatory digital practices. One must note that teachers' self perception is affected when they try to balance the moral responsibilities and the institutional or curriculum demands. When we combine the above with unequal opportunities for teachers' training and support, the result is hierarchized teacher identities, varying from tech-competent to traditional teachers Gu and Lai (2019).

Summarising, the beforementioned findings suggest that perceived AI training needs can be understood as the recognition of a discrepancy between what teachers currently know and feel

able to do and what they believe is required for them to understand, evaluate, and, where appropriate, use AI effectively and responsibly in their professional practice (Chen et al., 2025; Granström & Oppi, 2025; Kölemen et al., 2026).

8.4 Individual preparedness or institutional absence?

A further reflection concerns the framing of the study itself. The research asks teachers what they know, how they evaluate AI, and what training they feel they need. It therefore locates preparedness within the individual practitioner, which is precisely the framing Selwyn (2022) cautions against. A condition produced by policy comes to be examined as a matter of personal competence. Under this perspective, a study of individual readiness risks reproducing the displacement it set out to describe, offering training as the remedy for an absence that is organisational in origin.

It could be argued, nevertheless, that the findings admit a second reading. An expressed training need may be understood not only as a gap in a teacher's knowledge, but as a trace of something the institution has not decided. Participants who report uncertainty about whether particular uses of AI are permissible may be indicating less about their own understanding than about the absence of any institutional position they could have consulted. Taking into consideration the moving ground of the legislation and the continuous advancements of AI, this possibility is hard to ignore. Read in this way, the self-reported data acquire a different significance. They describe individuals, yet what they describe is a point of transfer. It is the point at which individuals are left to resolve, through their own judgement and in the course of everyday practice, questions that the surrounding institutional and regulatory environment has not yet addressed. This interpretive ambiguity is therefore acknowledged here rather than resolved.

8.5 A new framework

Recognising the complex processes that involve a decision about the inclusion or not of AI tools, the speed and the ambiguity on which AI is being legislated and re-evaluated, as well as the important mediating role that the teachers are called to play between policy and practice, one could suggest the creation of a framework for AI specific to kindergartens.

This framework would follow Kurian’s suggestion for the shifting of the burden of demonstrating safety from the kindergarten teachers to the developers. It would be based on what we know about the development of the child and would not understate the role of sociocultural mediation that the teachers are called to play. Despite continuous education and

training, AI is changing too fast for any professional. A framework that answers to broader questions about social consequences of AI use and is developed around an inclusion of an ethic of care is needed. To be reframed and updated not only the learning experiences in the micro level as Cai et. al. (2025) suggest, but mainly the pedagogical curriculum and its goals. What role does the developer want the AI tool to play and why? Let's discuss firstly with a wider futuristic horizon and focus secondly to the day-to-day practice. Equity, sustainability, ethical safeguards, developmental theories should form the base of such a discussion. Adopting Selwyn's (2022) stance, Ariadne's thread begins to unravel from τhe questioning of the values and the assumptions of the Greek society on preschool education. What ideologies frame these dispositions?

9. CONCLUSION

9.1 The study

The starting point of this study was the gap between the rapid emergence of AI in educational discourse and the limited attention given to how its use is understood and negotiated within early childhood education in Greece. Although legal and ethical discussions surrounding AI in education have expanded considerably, Greek preschool teachers, whose work is centred on the holistic development of young children, remain largely absent from this discussion. The problem addressed by the present study extended beyond the question of whether Greek preschool teachers are aware of AI and their attitudes toward it. It additionally concerned whether teachers perceive themselves as sufficiently prepared to undertake the mediating role that current frameworks implicitly assign to them, and whether they identify the knowledge and training required to do so responsibly within their own professional context.

The theoretical framework adopted was the Technology Acceptance Model (TAM). The study adopted a quantitative survey design using an anonymous online questionnaire, which was distributed through social media groups for Greek kindergarten teachers. In total, 31 teachers participated, representing mostly young kindergarten teachers working in public schools, a big percentage of them owning a master's degree, two thirds of them having up to fifteen years of professional experience.

9.2 The findings

Since the analysis is descriptive, the relationships between the variables can only be discussed as patterns in the responses rather than as statistically tested relationships. Three patterns are particularly relevant: First, high levels of general AI awareness coexist with considerable uncertainty about the risks associated with its use. This suggests that being familiar with AI does not necessarily mean that teachers feel equally confident in evaluating its possible risks. Second, positive attitudes towards AI and concerns about its use appear to coexist within the same group of participants. The sample therefore does not appear to be clearly divided between teachers who support AI and those who are sceptical of it. Instead, participants could recognise the potential usefulness of AI while also expressing concerns, particularly in relation to children's privacy. Third, reported AI training was lower than teachers' self-assessed ability to evaluate whether an AI tool is appropriate for young children. This difference suggests that teachers may be relying partly on their existing professional knowledge and judgement rather

than on formal AI-specific training. One could conclude that the participants represent a group with mixed but generally open attitudes towards AI, rather than a clearly polarised group of supporters and sceptics.

9.3 Overall interpretation of the findings

The findings suggest that the questioned teachers have a relatively good level of general awareness of AI, but are less prepared in terms of the knowledge and guidance needed for its responsible use in practice. Their responses also show uncertainty about the risks of AI and about how its use should be approached in an early childhood setting. This suggests that preparedness is not only a matter of technical or digital skills, but it also involves having the knowledge and guidance needed to decide when the use of AI is appropriate, what risks should be considered, and how children's interests and rights can be protected. The responses to the open-ended question support this interpretation.

In line with the regulatory context and its implications, participating teachers largely view themselves as mediators between AI and young children. In this role, they would be responsible for deciding how and when AI should be used and for protecting children from potential risks associated with the technology. This understanding is consistent with the focus of the study on AI as a professional tool for teachers. At the same time, it raises an important issue concerning preparedness: teachers appear willing to take on this mediating role, while the findings indicate that they may not yet have received sufficient AI-specific training or institutional guidance to fully support them in doing so.

The relationship between awareness, attitudes, preparedness and use of AI, does not appear to follow a simple sequence in which access leads to awareness, awareness leads to positive attitudes, and positive attitudes lead to actual use. Awareness and positive attitudes are already relatively high among the participants, while training opportunities and evidence of actual use appear to be more limited. This difference supports the argument raised earlier in the study that focusing mainly on individual teacher preparedness may overlook wider structural issues (Selwyn, 2022). In other words, the findings should not be interpreted as showing that Greek preschool teachers are simply unprepared for AI. Instead of that the findings suggest that teachers' awareness and willingness to engage with AI may have developed faster than the institutional support, training, and guidance needed to enable its responsible use.

9.4 Teacher professional development and institutional support

AI training should not focus only on how to use AI tools. Basic AI literacy is clearly necessary, but teachers also need to understand *when*, *why*, and *under which conditions* the use of AI is appropriate. The integration of AI in Greek kindergarten asks whether teachers have the knowledge, critical understanding, pedagogical capacity, institutional support, and training necessary to mediate these technologies responsibly.

One would suggest practical and hands-on training that connects AI with everyday pedagogical practice. Such training should include not only the use of AI tools, but also the evaluation and adaptation of AI-generated content, the identification of inaccurate or inappropriate outputs, the protection of children's privacy, and the establishment of appropriate boundaries for AI use. In this sense, professional development should be understood as an ongoing process of learning, unlearning, self-reflection, and re-evaluation rather than as a one-time intervention aimed at addressing a skills gap (Wulansari et al., 2025; Chen et al., 2025; Granström & Oppi, 2025; Kölemen et al., 2026).

Kindergartens also play a role in creating the conditions in which teachers can explore and use AI responsibly. This includes institutional support, opportunities for experimentation, and opportunities for teachers to share experiences and concerns with colleagues. Clear guidance is particularly important when teachers are expected to make decisions. Therefore, AI literacy should become a consistent part of professional development rather than being treated as an additional technical skill. The mediating role of the kindergarten teacher between the technology, the child, the curriculum, and the values of early childhood education should be recognised by legislators, policy makers and teacher trainers.

There is therefore a need for guidance that is specifically developed for early childhood education. Such framework should be made in Greece, taking into consideration the Greek specifics and the context and could bring together technical knowledge, ethical considerations, developmental knowledge, and pedagogical principles, while also making clear where responsibility lies between teachers, educational institutions, policymakers, and AI developers. In every scenario, one should be able to answer the question *who is the deployer*. The focus should move beyond asking whether individual teachers are sufficiently prepared for AI and towards creating the conditions that allow them to use it ethically and responsibly. Adequate, targeted legislation, policy and training are prerequisites to an ethical, responsible introduction of AI in preschool education. Research focused on these variables is of immediate importance.

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[i] The Ministry was renamed Ministry of Education, Religious Affairs and Sports in June 2023. Citations retain the name appearing on each source at the time of publication.

APPENDIX: The Questionnaire

This survey explores preschool teachers' awareness, attitudes, and readiness regarding the use of artificial intelligence (AI) in kindergarten. It will be used for my master's thesis at Jönköping University in Sweden. The participation is voluntary and all responses are anonymous. Estimated time: 7-10 minutes.

Section 1: Demographics

1.1: Gender

1.2: Age

1.3: Level Of Education

1.4: Years of experience as a kindergarten teacher in the public sector

Section 2: Awareness about AI

Q1: I know what artificial intelligence (AI) is.

Q2: AI differs from other digital technologies.

Q3: AI tools may provide inaccurate information.

Q4: I know examples of AI tools that can be used in preschool education.

Q5: There are risks in using AI in preschool education.

Section 3: Attitudes toward AI

Q6: AI can help me save time on planning and preparation.

Q7: AI can help me differentiate the content of my teaching, adapting it to the individual needs of the children.

Q8: AI can help me with administrative workload and communication with families.

Q9: AI will reduce human interaction and diminish my role in the classroom.

Q10: AI will introduce tools that are not developmentally appropriate for young learners.

Q11: AI will compromise children's right to privacy and expose them to risks.

Section 4: Readiness to use AI

Q12: I feel confident in my digital skills.

Q13: I have received training on AI tools.

Q14: I can evaluate whether an AI tool is appropriate for young children.

Section 5: Opinion on AI (optional open question)

Q15: What do you want to say about the use of AI in the Greek public kindergarten?