

Italian Teachers' Attitudes and Competence According to the Acceptance Game-Based Learning (AGBL) Questionnaire

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Abstract: In an ever-evolving educational landscape, the adoption of innovative approaches such as Game-Based Learning (GBL) has gained increasing attention for its potential to enhance student engagement, foster active learning, and promote intrinsic motivation. However, the systematic integration of such practices remains limited. This study aims to examine the attitudes of Italian teachers toward GBL, focusing on the role of demographic variables such as age, teaching experience, and school level as potential predictors of openness to these methodologies. The research was conducted using the Acceptance of Game-Based Learning (AGBL) Questionnaire, specifically developed and validated to measure teachers' willingness to adopt games as a teaching strategy. The questionnaire, grounded in well-established theoretical frameworks like the Technology Acceptance Model (TAM) and the TPACK-G framework, was distributed online to a random sample of 2,752 teachers across all school levels in Italy. Data analysis was carried out using ANOVA and multiple linear regression through Jamovi software. The findings indicate that school level is the only demographic variable that significantly predicts attitudes toward GBL. Specifically, preschool teachers report significantly more positive perceptions than their counterparts in secondary education. In contrast, neither age nor teaching experience showed a meaningful influence on GBL acceptance. The regression model confirms the limited explanatory power of demographic factors ($R^2 = 0.019$), suggesting that contextual and institutional elements play a much stronger role. These results offer relevant insights for both educational theory and practice. On one hand, they confirm the greater potential of early childhood education, characterized by curricular flexibility and constructivist approaches, to embrace game-based methodologies. On the other hand, they challenge the assumption that age or professional experience are decisive factors in the adoption of educational innovations. Additionally, the convergence of negative attitudes among all types of secondary schools (academic, technical, vocational) points to systemic resistance, likely stemming from curricular rigidity and a high-stakes assessment culture typical of upper-level education. Given the study results, for future research, it would be necessary and interesting to shift the focus from individual characteristics to broader predictors such as institutional support, access to digital resources, participation in professional learning communities, and ongoing teacher training. In fact, understanding these factors is essential to designing effective teacher development programs and policy strategies that support the widespread adoption of GBL. Ultimately, the successful integration of game-based approaches in schools requires not only teacher readiness, but also structural and cultural changes, supported by visionary leadership and collaborative school environments.

Keywords: GBL, AGBL, Teachers' attitudes, Educational innovation, Italian school system, Educational technology

1. Introduction¹

For millennia, games have been a fundamental component of human experience, serving as tools for socialization, learning, and cognitive development. In recent decades, the evolution of digital technologies has enabled games to take on new forms, emerging as a potentially transformative resource in educational contexts—Game-Based Learning (GBL). This pedagogical approach leverages game mechanics to foster student engagement, promote active learning, and stimulate intrinsic motivation (Plass et al, 2015; Orji et al, 2017).

Numerous studies have highlighted the benefits of GBL: increased participation, enhanced long-term memory retention, development of critical thinking skills, and improved social and collaborative abilities (Hartt et al, 2020; Qian and Clark, 2016). Educational games also provide immediate feedback, enable personalized learning pathways, and support the inclusion of students with diverse cognitive styles (Wu, 2023). However, despite its

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promise, the widespread and systematic integration of GBL into schools remains limited, often confined to isolated or pilot initiatives, even as interest among educators and researchers continues to grow.

The literature has identified a variety of barriers to the adoption of GBL: technological shortcomings, inconsistent access to digital tools, lack of teacher training, rigid curricular frameworks, time constraints, and cultural resistance within educational institutions (Baek, 2008; Watson and Yang, 2016; Mathe et al, 2019). In parallel, several studies have hypothesized that demographic factors, such as age, gender, teaching experience, and school level, may influence teachers' attitudes toward GBL (Lampropoulos, 2023; R  th et al, 2022; Malik et al, 2024). However, findings across studies are often fragmented and contradictory, leaving important questions unanswered regarding which educators are most likely to embrace GBL and under what conditions.

This study seeks to address this gap by empirically investigating teachers' attitudes toward GBL in the Italian education system and examining the extent to which demographic characteristics function as predictors. Specifically, it aims to: (1) assess teachers' general disposition toward GBL through a standardized scale; (2) test whether variables such as age, years of teaching experience, and school grade taught significantly influence GBL attitudes; and (3) identify potential differences across educational levels, particularly between early childhood and secondary education, in the openness to game-based methods.

The findings reveal a clear yet unexpected pattern: only the school grade taught emerges as a statistically significant predictor of GBL attitudes. Preschool teachers report significantly more positive perceptions than their secondary school counterparts, while no significant differences are observed in relation to age or teaching experience. Moreover, regression analysis confirms the limited explanatory power of demographic variables overall ($R^2 = 0.019$), suggesting that openness to GBL is shaped less by personal attributes and more by institutional and cultural contexts.

These results yield two primary implications. On the one hand, they confirm the central role of educational context: early childhood education, grounded in constructivist pedagogies and greater curricular flexibility, appears more conducive to GBL integration than secondary education, which remains tied to transmissive models and performance-driven assessments (Ertmer, 1999; Hirsh-Pasek et al, 2009). On the other hand, they challenge interpretive models that frame educational innovation primarily in terms of teacher characteristics.

In light of these findings, the study also aims to highlight the need to explore alternative, non-demographic predictors that may better explain variations in teachers' openness to GBL. These may include: pedagogical beliefs about student agency and creativity; the presence of supportive institutional leadership; access to digital tools and professional development; and participation in professional learning communities that encourage innovation. Understanding these factors is critical to informing training programs and policy strategies that can support the systemic adoption of GBL across educational contexts.

2. Methods and Materials

To investigate teachers' attitudes toward the integration of Game-Based Learning (GBL), this study employed the Acceptance of Game-Based Learning (AGBL) Questionnaire (Andreoletti and Tinterri, 2023). The instrument was specifically developed to measure teachers' openness to adopting games as a teaching methodology. It draws conceptually from the Technology Acceptance Model (TAM) (Davis, 1989), while also integrating elements of the Technological Pedagogical Content Knowledge (TPACK) Framework (Mishra and Koehler, 2006) and its game-specific extension, TPACK-G (Joshi et al, 2015).

The questionnaire is structured into three sections:

1. Demographic variables, including age, gender, school level taught, years of teaching experience, and geographical location;
2. A 13-item scale using a 4-point Likert response format, measuring four core constructs from the TPACK-G model:
 - Game Knowledge (GK);
 - Game Pedagogical Knowledge (GPK);
 - Game Content Knowledge (GCK);
 - Game Pedagogical Content Knowledge (GPCK).
3. A set of items addressing the contextual application of GBL in school settings.

The instrument underwent psychometric validation through both internal consistency analysis and Confirmatory Factor Analysis (CFA). The final version demonstrated excellent fit indices (CFI = .989; TLI = .986; SRMR = .0216; RMSEA = .0437) and strong internal reliability (Cronbach's $\alpha > .80$), in line with accepted methodological standards (Tavakol and Dennick, 2011; Harrington, 2009).

Data was collected using the Computer-Assisted Web Interviewing (CAWI) method via Google Forms. This approach allowed for efficient, low-cost, and large-scale distribution, maximizing heterogeneity and response rate (Couper, 2000). The questionnaire was disseminated to a random sample of 2,752 Italian teachers across all school levels. The final sample was characterized by substantial variation in demographic background, including age ($M = 44.6$, $SD = 7.81$), teaching experience, and regional distribution, ensuring strong representativeness.

Data analysis was conducted using Jamovi software (v. 2.6.26) (The Jamovi Project, 2025). After computing descriptive statistics to profile the sample, inferential tests were carried out to assess the relationship between teachers' demographic characteristics and their overall attitudes toward GBL. Specifically, ANOVA was used to examine mean differences in attitudes across categories of school grade and teaching experience. Additionally, a multiple linear regression analysis was conducted to evaluate the predictive power of continuous variables such as age and teaching experience, alongside categorical predictors such as school level. The aim was to determine whether and how these factors influence teachers' acceptance of GBL, and to assess the extent to which demographic variables explain variance in the AGBL index.

3. Results

3.1 Analysis of Variance

ANOVA permits to determine whether the mean of the AGBL dependent variable varies significantly across multiple levels of both school grade and years of teaching experience as independent variables.

The AGBL dependent variable represents the average score of the AGBL items from 1 to 5 (Appendix I), reflecting overall attitudes toward game-based learning. The first independent variable (school grade taught) includes 7 categories: Preschool; Primary school; Secondary school I grade; Secondary school II grade (high school); Secondary school II grade (vocational); Secondary school II grade (technical); I do not teach. Table 1 shows how AGBL varies across school grades in which teachers teach.

Table 1: The ANOVA shows how the AGBL dependent variable varies according to the School grade

	Sum of Squares	df	Mean Square	F	p
In which school grade do you teach?	12.4	6	2.062	5.53	<.001
Residuals	1023.0	2745	0.373		

The results indicate that the effect of school grade on attitudes toward game-based learning is statistically significant ($p < .001$), meaning that at least one school group differs significantly from the others in their perception of AGBL. In order to identify which is the significantly different grade, the Tukey post-hoc test was performed. Table 2 summarizes the statistically significant comparisons.

Table 2: The Tukey post-hoc test allows to compare statistically significant differences between groups

Comparison							
In which school grade do you teach?		In which school grade do you teach?	Mean Difference	SE	df	t	p _{Tukey}
Secondary School I grade	-	Preschool	-0.29330	0.0641	2745	-4.5730	<.001
Secondary School II grade (high school)	-	Preschool	-0.29432	0.0712	2745	-4.1364	<.001

Comparison							
Secondary School II grade (vocational)	-	Preschool	-0.29657	0.0700	2745	-4.2394	<.001
Secondary School II grade (technical)	-	Preschool	-0.23893	0.0708	2745	-3.3767	0.013

This test reveals that preschool teachers demonstrate significantly more positive attitudes toward game-based learning compared to all levels of secondary education. No other statistically significant differences were found among the different levels of secondary education. The findings suggest that game-based learning is perceived as more natural, appropriate, or relevant in early childhood education.

The second independent variable (years of teaching) includes 8 categories: Less than 1 year; 1–2 years; 3–5 years; 6–10 years; 11–15 years; 16–20 years; More than 20 years; Never taught. Table 3 shows how AGBL varies according to the teachers' experience in terms of years of teaching.

Table 3: The ANOVA shows how the AGBL dependent variable varies according to years of teaching

	Sum of Squares	df	Mean Square	F	p
How many years have you been teaching?	2.69	7	0.384	1.02	0.414
Residuals	1032.68	2744	0.376		

This analysis indicates that teachers' attitudes toward game-based learning do not significantly differ based on their years of teaching experience ($p = 0.414$), suggesting that the differences in AGBL scores across the years of teaching categories are likely due to chance and do not reflect meaningful or systematic variation.

3.2 Linear Regression

Linear regression intends to estimate the relationship between the AGBL (dependent variable) and age, school grade and years of teaching as multiple predictive independent variables. Table 4 reports the Model Fit.

Table 4: Model Fit Measures assess how well the statistical model represents the observed variables

Model	R	R ²	N
1	0.138	0.0190	2,236

While the model is statistically estimable, it only explains 1.9% of the variance in AGBL score. In fact, most of the variation in AGBL is not explained by age, school grade or years of teaching experience.

Table 5 explains the variability of the predictors through their coefficients.

Table 5: Model Coefficients quantify the relationship between predictor variables and the response variable of the statistical model

Predictor	Estimate	SE	t	p
Intercept	3.54390	0.15040	23.563	<.001
How many years have you been teaching?:				

Predictor	Estimate	SE	t	p
From 11 to 15 years – From 1 to 2 years	-0.13015	0.05919	-2.199	0.028
Others – From 1 to 2 years	All $p > .05$			
In which school grade do you teach?:				
All grades – Not teaching	All $p > .05$			
Age	-0.00371	0.00196	-1.894	0.058

Age cannot be considered a statistically significant predictor of attitudes toward game-based learning ($p = 0.058$). However, the negative coefficient suggests a slight (non-significant) tendency for attitudes to decline with age.

Years of teaching experience shows only one small significant effect. Teachers with 11–15 years of teaching experience report slightly lower AGBL scores compared to those with 1–2 years ($p = 0.028$).

School grade taught does not significantly influence attitudes toward game-based learning. No school level differed significantly from the reference group ("not teaching").

Therefore, the model indicates that other factors not included in the analysis, such as training, school culture, exposure to game-based learning, likely play a more substantial role.

4. Discussion

The findings of the present study offer important insights into the multifaceted factors influencing teachers' attitudes toward Game-Based Learning (GBL) within the Italian educational system. By examining differences across school levels and years of teaching experience, this research both corroborates and extends current theoretical perspectives on the adoption of educational innovations. In particular, the observed patterns reveal systemic tendencies that not only support but also, in some respects, challenge established models of technology integration and pedagogical change.

The ANOVA results confirm that preschool teachers exhibit significantly more positive attitudes toward GBL compared to all secondary education levels ($p < .001$), with no meaningful differences among secondary school types. Preschool and primary education that are rooted in constructivist paradigms, basically legitimize play as a pedagogical tool (Hirsh-Pasek et al, 2008). Some studies support that early childhood educators frequently adopt experiential and active learning approaches, viewing play not only as developmentally appropriate but as central to cognitive, social, and emotional growth (Pękala and Wichrowska, 2022; Ernst and Burcak, 2019). Some researchers point out that preschool teachers with specialized training in early childhood education emphasize play and spontaneous learning situations as possible critical teaching strategies that can be included in daily routines to support children's development (MacQuarrie et al, 2013; Flanagan and Symonds, 2022). Furthermore, international analyses of learning through play (LTP) in diverse contexts reinforce the link between constructivist theory and play-based pedagogy in early years, noting that supportive policies and professional development are key to its effective implementation (Asfaw et al, 2024).

The absence of significant differences between secondary school types (vocational, technical, high school) suggests that resistance to GBL is systemic rather than subject specific. This challenges assumptions that vocational tracks, with their emphasis on practical skills, might be more open to experiential methods (Bellotti et al, 2013). Instead, institutional pressures to prioritize exam preparation and content coverage likely homogenize attitudes across secondary contexts (Malvasi and Recio-Moreno, 2022).

A counterintuitive finding emerged regarding teaching experience: years of service showed no statistically significant association with GBL attitudes ($p = 0.414$). This contrasts with studies suggesting novice teachers exhibit greater openness to pedagogical innovations due to recent exposure to contemporary methodologies during training (Kaimara et al, 2021). Nevertheless, the non-significant relationship aligns with research demonstrating that institutional culture and systemic support outweigh individual seniority in predicting technology adoption (An and Cao, 2016). The slight dip in GBL acceptance among mid-career teachers (11–15 years) may reflect systemic disillusionment rather than personal burnout. In the GBL context, mid-career

educators, having witnessed multiple "transformative" initiatives fail due to inadequate training or infrastructure, may adopt cautious scepticism toward new methodologies (Burton, 2024; Whitton, 2010).

The minimal explanatory power of the linear regression model ($R^2 = 0.019$) indicates that demographic variables alone are inadequate for predicting teachers' attitudes toward GBL (Hsu et al, 2020). This underscores the necessity of examining contextual and institutional determinants. Technological disparities further compound inequities in Italian schools; the availability of interactive whiteboards and other digital resources is significantly higher in primary schools than in secondary schools, particularly in Northern regions, thus limiting the adoption of advanced digital game-based learning practices (Sica et al, 2022). It is important to underscore that the development of a collaborative institutional culture constitutes a pivotal determinant in the successful integration of GBL (Sung and Whuang, 2013). Empirical evidence indicates that institutions fostering communities of practice dedicated to the exchange of GBL-related knowledge and experiences demonstrate significantly higher rates of adoption (Zhong, 2019).

The dominance of school grade as a predictor highlights institutional barriers, such as curriculum alignment and assessment systems, as greater obstacles than individual factors like age or experience. Secondary schools' focus on summative assessments conflicts with GBL's formative, process-oriented nature (Plass et al, 2015), forcing teachers into a "pedagogical double bind" where innovation risks compromising exam results (Biesta, 2010). These findings support prior research suggesting that early childhood educators, benefiting from greater curricular flexibility, are better positioned to integrate game-based learning (GBL) as a natural extension of play-based pedagogies (Papadakis and Kalogiannakis, 2020). In contrast, the prescriptive nature of secondary education curricula tends to limit such experimentation, particularly in the absence of broader institutional support (Fante et al, 2024).

Accordingly, the extent to which GBL can be meaningfully implemented across educational stages may be contingent upon both the degree of curricular flexibility and the presence of systemic, top-down support.

5. Conclusion

GBL is able to foster student engagement, promote active learning, and stimulate intrinsic motivation (Plass et al, 2015; Orji et al, 2017), however, its systematic integration into schools remains limited and confined to isolated or pilot initiatives. Through the submission of the *Acceptance of Game-Based Learning* (AGBL) Questionnaire (Andreoletti and Tinterri, 2023), this study empirically investigated teachers' attitudes toward GBL in the Italian education system and examined the extent to which demographic characteristics, such as age, school level taught, years of teaching experience, may function as predictors. Data analysis was conducted using Jamovi software (v. 2.6.26) (The Jamovi Project, 2025), specifically ANOVA and linear regression were computed to measure the impact of the demographic variables. The results showed that only the school grade taught emerges as a statistically significant predictor of GBL attitudes, while no significant differences are observed in relation to age and years of teaching experience. Preschool educators show significantly positive attitudes toward GBL, likely due to the constructivist and flexible nature of early childhood curricula, whereas secondary education's rigid, assessment-driven structure poses systemic barriers to its adoption. These findings strongly suggest that demographic characteristics alone are not sufficient to explain teachers' attitudes toward GBL. Rather, attention must be redirected toward deeper contextual variables such as the presence of visionary and supportive school leadership, institutional cultures that foster innovation, access to adequate technological infrastructure, and the promotion of pedagogical mindsets open to student-centred, creative learning. Among these factors, teacher training emerges as a central lever: the absence of structured, curriculum-integrated professional development programs, for both in-service and pre-service Italian school teachers, represents a critical barrier to the widespread adoption of GBL (Andreoletti, Tinterri and Dipace, 2024). Without equipping educators with the necessary knowledge, tools, and confidence to design and implement game-based methodologies, any systemic change remains unlikely. Therefore, ensuring the successful integration of GBL requires not only addressing structural inequalities and contextual gaps but also investing in long-term, coherent teacher education policies capable of transforming practice across educational levels.

Ethics declaration: The data collected through the questionnaire comply with ethical standards for the treatment of personal data. All participants were informed about the purpose of the study, and their participation was entirely voluntary. Informed consent was obtained, and all responses were anonymized to ensure confidentiality. The study adheres to relevant data protection regulations and ethical guidelines governing research involving human participants.

AI declaration: Artificial intelligence (AI) tools were used to support the preparation of this manuscript. Specifically, AI language models were employed to assist in the revision and refinement of certain sections of the text, including improving clarity and coherence. Additionally, SciSpace was utilized to aid in the literature search and bibliographic exploration. The authors maintained full responsibility for the final content, interpretation, and conclusions presented in the paper.

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Appendix 1

Appendix 1 specifies each single item included in the Acceptance of Game-Based Learning Questionnaire. The questionnaire precisely contains 5 items listed below:

AGBL – Acceptance of Digital Game-Based Learning

Item	Item Statement
AGBL1	Digital game-based learning can enhance students' motivation to learn.
AGBL2	Digital games can be integrated into everyday classroom activities.
AGBL3	Digital game-based learning requires well-structured instructional design.
AGBL4	Digital game-based learning requires specifically designed evaluation methods.
AGBL5	Digital game-based learning represents a future trend across all educational levels.