

Gamma as a Digital Pedagogical Tool for Enhancing Learner Engagement, Autonomy, and Motivation in Blended Language Learning Contexts

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Abstract. *This study empirically examines undergraduate students' attitudes toward Gamma as a digital pedagogical tool used in online and blended foreign language learning contexts. Drawing on the Technology Acceptance Model (TAM) and Self-Determination Theory (SDT), the research investigates learners' perceptions of Gamma in terms of usability, interactivity, engagement, learner autonomy, motivation, and instructional preference. A quantitative research design was employed, using a structured questionnaire administered to undergraduate students at El-Bayadh University Centre. The findings indicate consistently positive attitudes toward Gamma, particularly regarding ease of use, interactivity, and motivational impact. The results further suggest that Gamma supports learner autonomy and self-regulated learning processes, while also highlighting a continued preference among some students for traditional face-to-face instruction. These findings underscore the pedagogical value of blended learning models, in which digital tools complement rather than replace conventional classroom practices. The study contributes empirical evidence from an underrepresented higher education context and offers practical implications for technology-enhanced language instruction.*

Keywords: *Gamma, blended learning, learner autonomy, technology acceptance, language education*

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Qarışıq dil öyrənmə kontekstlərində tələbə məşğulluğunu, müstəqilliyini və motivasiyasını gücləndirən rəqəmsal pedaqoji alət kimi Gamma

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Xülasə. Bu tədqiqat onlayn və qarışıq xarici dil öyrənmə kontekstlərində istifadə olunan rəqəmsal pedaqoji alət Gamma-ya bakalavr tələbələrini münasibətini empirik olaraq araşdırır. Tədqiqat Texnologiyaların Qəbul Modeli (Technology Acceptance Model – TAM) və Özünüməyyənetmə Nəzəriyyəsinə (Self-Determination Theory – SDT) əsaslanaraq tələbələrin Gamma haqqında istifadəyə yararlılıq, interaktivlik, öyrənmə prosesində iştirak, öyrənən müstəqilliyi, motivasiya və tədris üstünlükləri baxımından təsəvvürlərini öyrənir. Kəmiyyət tədqiqat dizaynı tətbiq edilmiş və El-Bayad Universitet Mərkəzinin bakalavr tələbələrinə strukturlaşdırılmış sorğu təqdim olunmuşdur. Nəticələr Gamma-ya qarşı ardıcıl müsbət münasibət nümayiş etdirmiş, xüsusilə istifadənin asanlıq, interaktivlik və motivasiyaedici təsiri baxımından yüksək qiymətləndirmələr göstərmişdir. Eyni zamanda, nəticələr Gamma-nın öyrənən müstəqilliyini və özünü tənzimləyən öyrənmə proseslərini dəstəklədiyini, bununla yanaşı bəzi tələbələrin ənənəvi üzbəüz tədrisə üstünlük verməyə davam etdiyini göstərmişdir. Bu nəticələr rəqəmsal alətlərin ənənəvi sinif təcrübələrini əvəz etməkdən daha çox onları tamamladığı qarışıq öyrənmə modellərinin pedaqoji əhəmiyyətini vurğulayır. Tədqiqat ali təhsildə kifayət qədər öyrənilməmiş bir kontekstdən empirik sübutlar təqdim edir və texnologiya ilə zənginləşdirilmiş dil tədrisinin inkişafı üçün praktik tövsiyələr irəli sürür.

Açar sözlər: Gamma, qarışıq öyrənmə, öyrənən müstəqilliyi, texnologiyaların qəbulu, dil təhsili

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Introduction

The use of digital technologies has completely transformed the landscape of language learning education. In the context of second language acquisition (SLA), the combination of computer-assisted language learning (CALL) environments, mobile-assisted language learning (MALL) systems, and blended learning environments has further increased the trend towards learner-focused and self-directed learning processes (Lee, 2016; Noori, 2025). In higher education, this change has been further enhanced by the increased use of online and blended learning, thereby creating a burning need for well-designed and pedagogically sound digital applications that not only focus upon content presentation but also upon learning motivation and autonomous learning processes.

An increasing number of studies have found that online environments can increase engagement and autonomy of learners when they are designed with tasks and feedback that can be adapted through interaction and when they offer elements of learner control (Salami and Althaqafi, 2023). For example, when considered through the lens of self-regulated learning theory, superior online environments can help learners design, track, and analyze their processes of learning, and this way, they can develop learners' awareness and motivate learners' strategical actions (Noori, 2025). Additionally, theories on motivation and theories like Self-Determination have highlighted the key role of autonomy, excellence, and feelings of relatedness brought about by using online environments and related online technologies and artifacts (Edwards and Terantino, 2025; Almayez et al., 2025).

However, both theory and education technology adoption studies highlight that learners' adoption and acceptance of technology are influenced by perceived functionality and ease of use, as proposed by the Technology Acceptance Model TAM (Granić & Marangunić, 2019). There is evidence that students are often more receptive to technology when it is easier to understand and did not overload their minds cognitively and technically (Mansha et al., 2024). Note that not all students will react to technology in the same manner, as certain groups have been found to play a crucial role in influencing how students think about online learning practices in education institutions (Seredycz, 2020; Karasová et al., 2023).

Notwithstanding the growing body of literature on digital language learning, current research remains limited in several respects. For example, although widely used systems such as Learning Management Systems, Google Classroom, and gamified applications have received considerable scholarly attention, empirical research examining newly emerging digital pedagogical tools remains comparatively limited. Furthermore, existing studies have often emphasized technological affordances and general learning outcomes, while comparatively less attention has been devoted to learners' attitudinal responses, autonomy, self-directed learning, and motivational processes. Recent work on artificial intelligence in language learning highlights the potential of AI-supported tools to provide personalized and interactive learning experiences (Egbert et al., 2020, Mammadova, 2025), while research on EFL self-study emphasizes the importance of learner autonomy, self-directed learning, motivation, and digital literacy (Umaraliyeva, 2025). Lastly, relatively few studies have systematically examined how learners at different academic levels perceive and engage with emerging digital pedagogical tools within institutional learning environments.

Within this progressively dynamic environment, Gamma has emerged as an increasingly versatile learning platform in the digital age, incorporating tasks based on visualization, as well as adaptability. Gamma is a digital content-creation and presentation platform that enables users to create visually structured presentations, documents, and interactive learning materials. Its main technological functions include organizing text and visual content into adaptable layouts, integrating multimedia elements, and presenting and sharing information digitally. The platform also incorporates artificial intelligence features that assist users in generating and organizing content, refining presentations, and developing visually coherent materials from user instructions. Its interactive features allow learners to engage with structured visual content in a more flexible way than with conventional linear presentations.

These characteristics distinguish Gamma from conventional presentation tools by bringing together content creation, AI-assisted design, visual organization, multimedia integration, and interactive digital delivery within a single platform. In the present study, Gamma is therefore conceptualized

primarily as a digital pedagogical tool whose value lies in its potential to support the organization, presentation, and interactive use of instructional content.

The learning platform appears aligned with the most modern views on learning by supporting well-organized content, interaction, and control of learning. Nevertheless, in spite of increasing adoption in learning institutions, there has been little investigation on the learning effectiveness of Gamma, especially in language learning environments. The absence of context-sensitive studies on Gamma is an important gap within the existing online instructional literatures.

The research aims to fill a void in literature by empirically examining attitudes displayed by undergraduate university students concerning Gamma in online and blend learning courses at El-Bayadh University Centre. Drawing from models rooted in the Technology Acceptance Model and theories underpinned by engagement and Self-Regulated Learning theories and frameworks, the research proposes that student attitudes are reflective of broader instructional processes entailing usability and learner engagement or autonomy as motivational and engagement principles and mediators for deeper learning interventions. The research examines learner attitudes concerning Gamma along several instructional elements and seeks to unearth potential differences according to academic and discipline background and instructional preferences concerning learning between Gamma-enabled and conventional learning courses.

The objectives of the research are to:

1. Investigate the attitudes of undergraduate students towards the ease of use of Gamma, its interactivity, engagement, autonomy, and motivation.
2. Determine differences in attitudes toward Gamma by academic level (first- vs. second-year) and major (English vs. Social Sciences).
3. Explore instructional preferences among students in Gamma-supported and conventional instructional environments.

Research questions that direct this study are:

1. What are undergraduate students' attitudes toward Gamma regarding usability, interactivity, engagement, autonomy, and motivation?
2. Are there any marked discrepancies in attitude towards Gamma depending on levels or fields of study?
3. What is the distribution of students' instructional preferences between Gamma-supported and traditional teaching?

From these questions, the research hypotheses are as follows:

H1: The students will show a positive attitude towards Gamma in every pedagogical aspect.

H2: No statistical significance is expected between the attitudes of the different levels of academia towards the Gamma Corporation.

H3: There will be no statistically significant differences in attitudes toward Gamma by academic majors.

H4: Most students will find Gamma-supported teaching more preferable to conventional teaching.

2. Literature Review

2.1 Introduction

Digital technology has radically impacted second language acquisition (SLA) by creating unique opportunities for autonomy, engagement, and differentiated instruction. CALL, MALL, and blended learning have diversified the long-established paradigm of teaching, transforming it from a teacher-centric to a learner-centered paradigm. This literature review records contemporary research on language knowledge development using technology addition, motivational and autonomy-enhancing principles and concepts, individual preferences on blended learning settings, theories on technology acceptability, and research gaps.

2.2 Technology Acceptance and Digital Language Learning

More recently, research has also proved the significant role of self-regulated learning (SRL) within successful language learning. Online learning systems offer learners the opportunity to design, control, and evaluate their learning processes. This is due to the ability to provide adaptive feedback and cooperation (Noori, 2025). The online approach to task-based learning encourages self-regulated learning practices. According to Lee (2016), learners participate in self-directed investigations as well as a process of collaborating for knowledge construction, which further develops both language and metacognitive capabilities. The important role online forums, video activities, and online quizzes play in monitoring, getting instant feedback, and adapting strategies was also observed by Suarez Garcia and Almeida (2025).

Apart from cognitive aspects, online platforms have had a positive effect on affective elements. Almayez et al. (2025) discovered that learners participating in MALL and gamification apps had increased levels of intrinsic motivation, lower levels of anxiety, and increased desires for communication, as advocated in self-determination theory related to autonomy, competence, and relatedness (Edwards and Terantino, 2025).

Current studies highlight the application of online platforms in promoting Self-Regulated Learning (SRL). The online environments and structures supporting independent navigation encourage metacognitive awareness and strategic behaviors in the learners (Noori, 2025). This points towards the instructional value offered by the incorporation of the use of online tools in support of autonomy and the need for instructional structures.

2.3 Learner Autonomy, Motivation, and Self-Determination Theory

Motivation and autonomy play an essential role in digital learning effectiveness. Students become interested when learning is directed at self-regulated decision making and immediate feedback (Salami & Althaqafi, 2023). Points, badges, and leader boards used in gamification effectively engage students and improve their performance. A 30% improvement in vocabulary and grammar achievement and an increase of 85% in engagement were recorded by Rabi'ah et al. (2025).

Intrinsic motivation within digital learning contexts can also be addressed by the theory of Self-Determination Theory (SDT). The theory focuses primarily on meeting the learners' need for autonomy, competence, and relatedness. Online learning platforms where learners can exercise their choices in terms of monitoring their progress and interacting digitally increase intrinsic learning motivation and learner perseverance in language learning.

Notwithstanding these promising findings, there still lie some research gaps in ascertaining the long-run efficacy and applicability of gamification. This has been observed as an area requiring further investigation into long-run effects, as highlighted by Adzmi et al. (2024) and a lack of appropriate guidelines for more qualitative information about the learner experience, as highlighted by Alsawaier (2018).

2.4 Blended Learning Preferences and Pedagogical Effectiveness

Blended learning, which incorporates both offline and online learning tools and technology, enjoys popularity. According to Alqurashi (2025), 60% of participants supported blended learning; offline learning was found to be beneficial for speaking and listening skills, while online learning aided vocabulary and reading skills. Mansha et al. (2024) supported that participants generally preferred blended learning to online learning and cited academic years and types of institutions as factors influencing their preference. Karasová and Uherková (2023) suggested that explanations and visual inputs from teachers are crucial in blended learning.

Engagement theory and second language acquisition interactionist approaches also strongly underline the role of active learner engagement when learning online. Engagement theory suggests that learning is most effective when learners participate in tasks that engage their attention and cognitive processing (Moleda Learning Technologies, 2019). Recent research on digital game-based language learning similarly emphasizes active participation, interaction, and learner involvement in technology-mediated language learning (Hung et al., 2018; Shortt et al., 2021). This theoretical background helps to interpret how blended learning can function effectively since it combines classroom interaction with online interactive tasks, while the interactive use of multimedia materials can further support active participation in English-language learning (Allahverdiyeva, 2025).

The advantages of the blended learning approach include adaptability, accessibility, and personalization, which can support students' self-regulation while maintaining systematic instructional guidance. Seredycz (2020) reported that a 70:30 online-to-offline instructional ratio was associated with more favorable outcomes, particularly among younger and employed learners. These findings suggest that the effectiveness of blended learning may depend not only on the availability of digital technologies but also on how online and face-to-face components are pedagogically balanced. In language education, the interactive use of multimedia materials can further contribute to the effective integration of digital resources into classroom instruction (Allahverdiyeva, 2025).

Complementing these findings, Makhoul and Al-Qaisi (2025) investigated the efficiency of Gamma, Padlet, and Google Classroom for undergraduate Yemeni students and reported generally very positive learner attitudes toward digital instruction, especially in terms of motivation and usability. However, this study also revealed residual traditional learning preferences among some students, which again bolsters the case that blended learning models, rather than fully digital approaches, hold more promise for accommodating diverse expectations and disciplinary needs of learners.

2.5 Technology Acceptance and Adoption

Perceived ease of use, perceived usefulness, self-efficacy, enjoyment, accessibility, and prior experience with technology are the main interrelated factors that may affect the adoption of digital learning technologies. This is according to Granić & Marangunić (2019), respectively. Apparently, those learners who may possess experience related to digital technology, that is, youth, can adopt online and blended courses promptly, and those from the senior batch may show a marked inclination toward offline courses, that is, classroom delivery. Another factor that may impact the acceptance of

online courses and related technology among the learners could be instructor support. Indeed, proper guidance and instruction from tutors may be essential for the proper use of digital technology.

Beyond these general determinants, TAM provides a robust explanatory framework for understanding learners' attitudes toward educational technologies. According to the model, perceived ease of use and perceived usefulness directly influence users' behavioral intentions and actual system usage. The intuitive interfaces and clearly perceived pedagogical benefits have been found to be crucial for ensuring high level of acceptance, sustained engagement, and continued use of digital learning tools within educational contexts (Granić & Marangunić, 2019). These findings suggest that only those pedagogical technologies will see wider diffusion that minimize cognitive load while offering explicit academic value. Instructional platforms like Gamma, therefore, are more likely to be accepted when they align with the learners' disciplinary needs and support meaningful learning outcomes.

Although Gamma incorporates AI-assisted features, the present study does not examine or measure the platform's underlying artificial intelligence capabilities separately. The term AI-assisted is therefore used to describe the platform's content-generation and design-support functions rather than to suggest that all of its pedagogical functions are inherently AI-based.

Recent empirical evidence supports these findings even further. Investigating the efficiency of Gamma, Padlet, and Google Classroom with undergraduate students at Seiyun University in Yemen, Makhlouf and Al-Qaisi (2025) focused their attention on learners' attitudes in terms of accessibility, interactivity, motivation, and skill development. Employing a quantitative students' questionnaire across several academic majors and levels, their study reached an overall positive attitude toward all three platforms, mostly in relation to usability and motivational effects. No less importantly, whereas there were no statistically significant differences across levels, statistically significant differences appeared across disciplines to the effect that learners' academic backgrounds substantially affect their acceptance of digital learning technologies.

Further, Makhlouf and Al-Qaisi (2025) reported that some students continued to express a preference for traditional instruction, highlighting the continuing relevance of conventional pedagogical practices alongside digital learning environments. This finding is consistent with the view that digital technologies are most effective when they are integrated into pedagogically meaningful instructional designs rather than treated as replacements for established teaching practices. Allahverdiyeva (2025) similarly emphasizes the importance of selecting and using multimedia materials interactively in English-language classrooms, reinforcing the need for purposeful pedagogical integration. In addition, Mammadova (2025) highlights the potential of artificial intelligence to support language learning through personalized and interactive learning experiences, suggesting that AI-powered tools can enhance rather than necessarily replace teacher-guided instruction. Accordingly, effective implementation requires appropriate teacher preparation and context-sensitive instructional design to ensure that digital platforms contribute meaningfully to learner engagement and learning outcomes.

The literature put together suggests that technology acceptance in educational contexts is not a question of technological affordances alone but is Embedded within the interstices of pedagogical alignment, disciplinary relevance, and instructional support. Application of TAM to Gamma and similar platforms underlines the need for not only user-friendly educational technologies but also pedagogically purposeful ones. These provide a theoretical and an empirical basis to analyze learners' attitudes toward Gamma in particular instructional contexts and justify the focus of the present study on disciplinary background, academic level, and instructional preference.

2.6 An Integrated TAM-SDT Conceptual Framework

In order to synthesize the various theoretical viewpoints that were explored in the literature review, a theoretically integrated conceptual framework is presented in this study, using Technology Acceptance Model (TAM) and Self-Determination Theory (SDT), in an attempt to account for both adoption of digital tools in language learning, as well as processes involved in successfully learning a language in web-based learning settings. The relationships between constructs in this study framework are presented in Figure 1.



Figure 1

The conceptual framework of Integrated Technology Acceptance Model (TAM) and Self-Determination Theory (SDT) in digital language learning

Figure 1 illustrates the conceptual framework for the current study, in which TAM and SDT combine to explain learners' engagement with digital language learning environments. The framework is set within the literature on CALL, MALL, blended learning, motivation, and self-regulated learning in second language acquisition.

Drawing on TAM, it is hypothesized that learners' adoption of digital learning tools will primarily be influenced by perceived ease of use and perceived usefulness, which act to shape their willingness both to engage with, and sustain, the use of technology-mediated instruction. The more learners perceive the digital platforms as user-friendly and pedagogically useful, the better positioned they are for actual adoption and active use within language learning contexts.

Grounded in this initial acceptance, the framework embeds the Self-Determination Theory to describe the quality of learners' motivation subsequent to technology adoption. In particular, the model assumes that an efficient, accessible digital learning environment supports the satisfaction of learners' basic psychological needs for autonomy, competence, and relatedness. These needs are satisfied

through giving the learners control of pacing, immediate feedback, tracking of their progress, collaboration activities, and also interactive tasks.

These psychological needs are likely to facilitate intrinsic motivation, engagement, persistence and reduced learning anxiety, which are critical affective factors in second language acquisition. Again, higher motivation promotes the acquisition of self-regulated learning behavior such as planning, monitoring, strategy use and self-evaluation in digitally mediated learning environments. Finally, it is assumed that self-regulated learning serves as a mediating mechanism which links motivation to the endpoints of language learning such as linguistic proficiency, communicative competence and learning satisfaction. In this model, TAM and SDT are integrated to explain both learners' acceptance of digital technologies and the motivational and self-regulatory processes that eventually lead to effective language learning in blended and online contexts.

2.7 Research Gaps and Future Directions

In spite of the increasing evidence available for digital language learning, some remaining gaps still include:

1. Limited level-specific research: There exist a few research papers that explore specific proficiency levels, age groups, or subjects, thereby lacking generalizability (Boudadi & Gutiérrez-Cólon, 2020; Hung et al., 2018).
2. Autonomy and Motivation Mechanisms: Although the relationship between self-regulated learning, learner autonomy, and motivation in digital learning environments remains insufficiently explored, recent research has increasingly highlighted the importance of self-directed learning and autonomy-supportive conditions in EFL contexts (Salami & Althaqafi, 2023; Umaraliyeva, 2025). This gap is particularly relevant when examining emerging AI-supported pedagogical tools, whose interactive and flexible affordances may influence learners' engagement, autonomy, and motivation in different ways.
3. The Effects of Gamification in the Long Run: Scientific research regarding the consequences of a gamified learning process is limited (Shortt et al., 2021 ; Alsawaier, 2018).
4. Insights from Qualitative Research: Experiences, perspectives, and engagement techniques of students have received lesser focus in the existing body of knowledge on the subject (Shortt et al., 2021; Salami & Althaqafi, 2023).
5. Tool-Oriented Literature: Tool design is often given a higher priority than pedagogical efficiency (Shortt et al., 2021).
6. Cultural and Contextual Limitations: Studies are mostly on English language learning and Western culture, to a great extent neglecting other languages and cultural settings. Future studies should adopt mixed-method designs and cross-cultural approaches to allow for further strengthening of the evidence base and development of practical implications for learning design.

2.8 Conclusion

In a nutshell, technology supports and caters to learner autonomy, motivation, and investment in language learning. Blended learning is a combination of the best practices of offline and online learning models. The integration of technology in the learning process relies on usefulness, simplicity, and relevance, and there is some promise of potential within the idea of gamification regarding improving learner motivation and language proficiency. Gaps are identified in longitudinal, qualitative, and cross-cultural research in the domain of SLA and digital technologies.

3. Method

3.1 Research Design

This study is based on a post-positivist research paradigm, and it puts into practice a quantitative, non-experimental, and cross-sectional survey design. Its main objective was to investigate the attitude of university students toward Gamma as a digital pedagogical tool in online and hybrid instruction regarding usability, interactivity, engagement, learner autonomy, and motivation.

The researcher adopted a cross-sectional research approach to include perceptions of learners after the prolonged instructional implementation of Gamma. This research approach aligns with best research practices for high impact research in technology in education, specifically in the context of researching acceptance and perceptions associated with learning experiences or processes.

3.2 Context of the Study and Instructional Content

This research was conducted at El Bayadh University Centre, Algeria over a semester where classes were delivered through online and blended delivery modes. Gamma was fully integrated into regular teaching practices and functioned as the primary instructional presentation and interaction tool, not as a supplementary platform.

Alignment of Teaching Content with Majors and Levels

Instructional content was carefully aligned with students' academic level and major, ensuring pedagogical relevance and disciplinary appropriateness.

First-Year Students (English & Social Sciences)

Gamma-supported instruction focused on:

- Introduction to academic learning skills
- Basic language functions (describing, summarizing, explaining)
- Vocabulary development and sentence-level accuracy
- Guided reading comprehension activities

The usual activities of Gamma included:

- Visuals for lesson presentation with clear narrations
- Embedded questions of comprehension
- Reflection questions

Second-Year Students (English & Social Sciences)

Gamma-supported instruction emphasized:

- Paragraph and short-text construction
- Discipline-related texts (education, society, communication)
- Analytical reading and guided discussion
- Content-based language use

Typical Gamma activities include:

- Concept mapping slides
- Discussion-trigger slides
- Independent review modules designed for self-paced learning

This differentiated content allowed the students' experiences of Gamma reflected authentic pedagogical value, not generic exposure.

3.3 Pedagogical Implementation of Gamma

A gamma implementation was carried out over an eight-week continuous process.

- Number of weekly sessions: 2
- Session length: 90 minutes on average
- One concurrent Gamma session (online or hybrid)
- One asynchronous Gamma-supported review or task
- Gamma was utilized for:
 - Lesson delivery
 - Interactive explanation
 - Independent revision
 - Content visualization

This helped in ensuring that attitudes were based on meaningful instructional engagement.

3.4 Participants

The sample consisted of 150 undergraduate students, distributed across two academic levels and two majors.

Table 1

Distribution of participants by academic level and major (N = 150)

Academic Level	English	Social Sciences	Total
First year	42	33	75
Second year	39	36	75
Total	81	69	150

Note. N = number of participants. Both male and female students participated. All participants had prior instructional exposure to Gamma.

Both male and female students participated. All participants had prior instructional exposure to Gamma.

3.5 Sampling Technique

Non-probability convenience sampling technique was used as a consequence of institutional accessibility and course scheduling constraints. Despite this limitation, the sample size exceeds recommended thresholds for attitudinal survey research and supports reliable descriptive and inferential analysis.

3.6 Instrument Development

Data were collected using a researcher-developed structured questionnaire, informed by prior validated instruments in e-learning and digital pedagogy research.

3.6.1 Instrument Structure

Section A: Demographic information (academic level, major)

Section B: Attitudinal constructs measured on a *5-point Likert scale* (1 = Strongly Disagree, 5 = Strongly Agree)

Constructs included:

Ease of use

Accessibility of materials

Interactivity

Learner engagement

Learner autonomy

Motivation

Instructional preference (Gamma vs. traditional)

3.7 Reliability and Validity

3.7.1 Reliability

Internal consistency reliability was assessed using Cronbach's alpha: *Overall $\alpha = 0.86$* , indicating strong reliability.

3.7.2 Validity

Content validity: Established through expert review

Construct validity: Supported by theoretical alignment

Face validity: Confirmed during pilot testing

3.8 Data Analysis

Data were analyzed using *SPSS* following:

Data screening

Descriptive statistics

Independent-samples *t*-tests (academic level and major)

Statistical significance was set at $p \leq .05$.

4. Results

4.1 Preliminary Data Screening

Data screening revealed minimal missing values and no severe deviations from normality. The dataset was suitable for statistical analysis.

4.2 Overall Attitudes Toward Gamma

Table 2

Descriptive statistics for attitudes toward gamma (N = 150)

Variable	M	SD
Ease of use	4.28	0.61
Accessibility	4.21	0.65
Interactivity	4.35	0.58
Learner engagement	4.32	0.60
Learner autonomy	4.17	0.67
Motivation	4.26	0.63

Note. M = mean; SD = standard deviation; scale: 1 = strongly disagree, 5 = strongly agree.

The data presented in table 2 indicate the descriptive statistical values that measure students' attitude towards Gamma on six pedagogical facets, such as ease of use, accessibility, interactivity, engagement, autonomy, and motivation. The mean values for all facets were quite high and measured between 4.17 and 4.35 with low standard deviations.

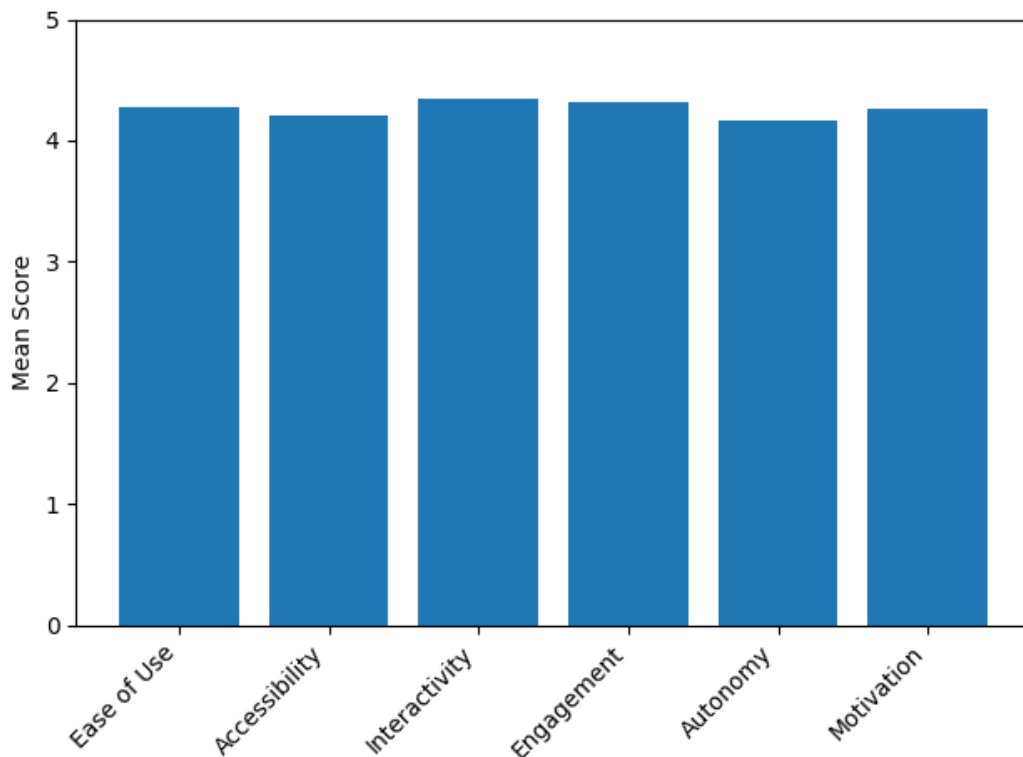


Figure 2

Mean attitude scores across pedagogical dimensions

Figure 2 shows mean scores on attitude for each of the different pedagogical factors that were considered. The value of recall, interactivity, and engaging the learner is considered most important in Gamma, followed closely by ease of use and motivation.

4.3 Ease of Use and Accessibility

Table 3

Frequency distribution of student responses to Gamma's Ease of use and accessibility

Response category	Percentage (%)
Strongly agree	46.7
Agree	38.0
Neutral	9.3
Disagree	4.0
Strongly disagree	2.0

Note. Percentages reflect students' combined responses to ease of use and accessibility items.

Table 3: Student response distribution to Gamma's ease of use and accessibility Majority of the students felt positive about Gamma, and 46.7% and 38.0% of the students strongly agreed and agreed, respectively, to the ease of use and accessibility of the software. The neutral and negative categories had only a small share of the percentages.

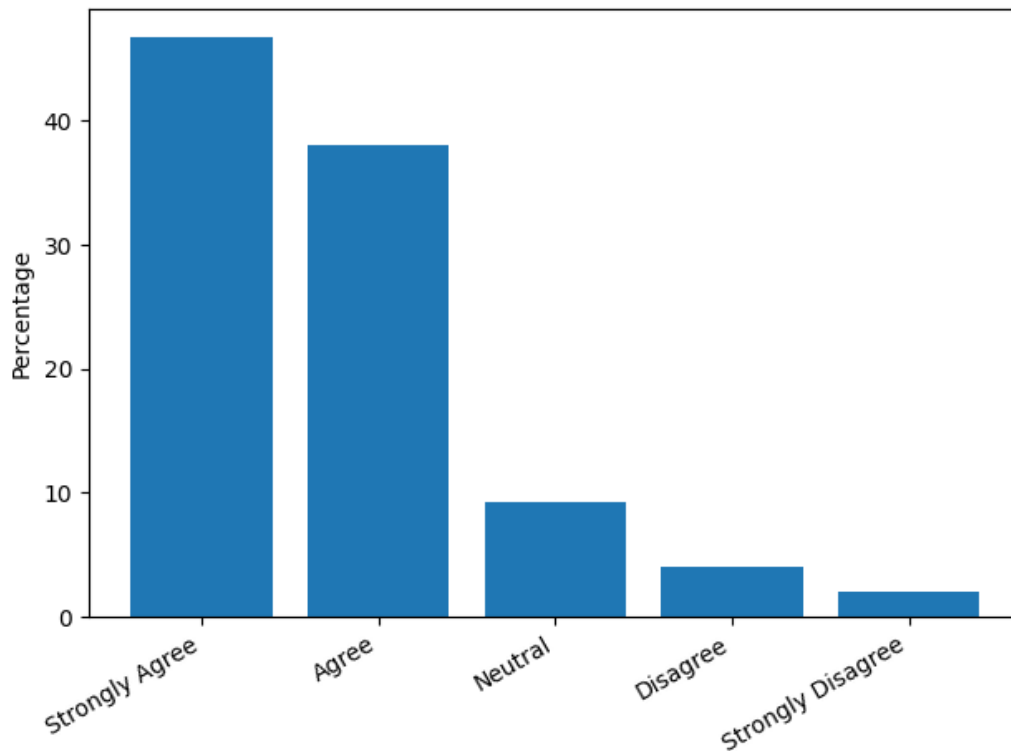


Figure 3

Ease of use and accessibility response distribution

As can be seen in Figure 3, the percentage distribution of the ease of use and accessibility of the questionnaire based on the Likert scale provides an even clearer indication of the degree to which the answers were positive. The majority of students responded positively to Gamma's ease of use and accessibility, with 84.7% agreeing or strongly agreeing.

4.4 Interactivity and Learner Engagement

Table 4

Perceptions of interactivity and engagement

Item	M	SD
Promotes active participation	4.37	0.56
Makes lessons more engaging	4.33	0.59
Enhances interaction with content	4.36	0.57

Note. M = mean; SD = standard deviation. Higher scores indicate more positive perceptions.

The findings of the students' perceptions regarding interactivity and engagement are summarized by the mean scores and standard deviations for the three selected items as shown below in Table 4. Each of the items chosen has a high mean value, that is, $M > 4.30$. This indicates that the students perceive that Gamma supports participation, interaction, and a high level of engagement.

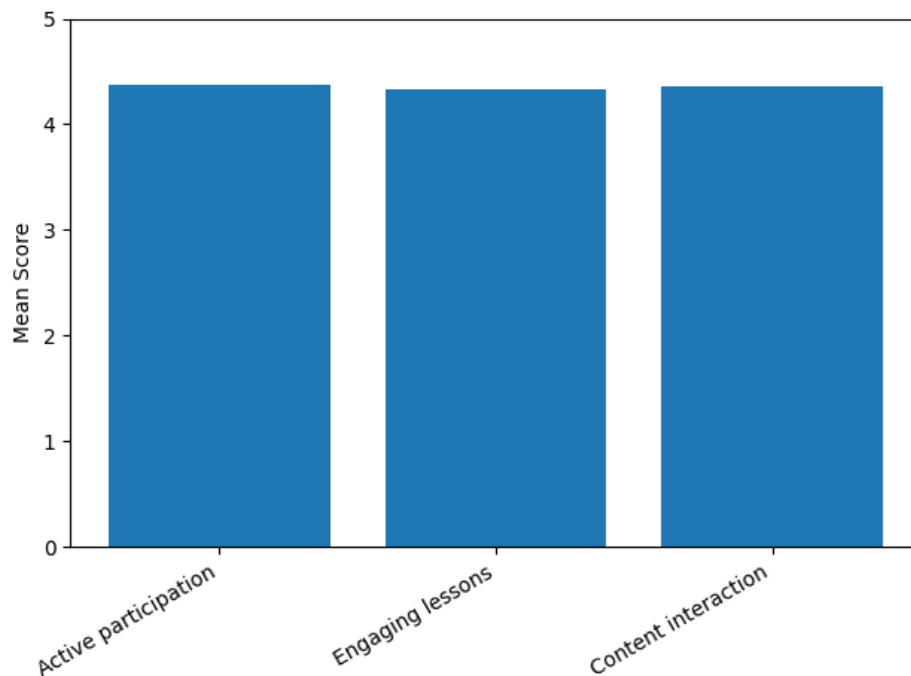


Figure 4

Interactivity and learner engagement items

As can be observed in Figure. 4, the average score for each interactivity and learner engagement item has been plotted for the comparison purpose.

4.5 Learner Autonomy and Motivation

Table 5

Learner autonomy and motivation scores

Variable	M	SD
Self-paced learning	4.18	0.66
Independent access	4.20	0.64
Motivation to learn	4.26	0.63

Note. M = mean; SD = standard deviation.

Table 5 provides summary statistics for the variables of learner autonomy and motivation. A high mean score for self-paced learning, independent access, and motivation to learn with low dispersion of the data can be observed.

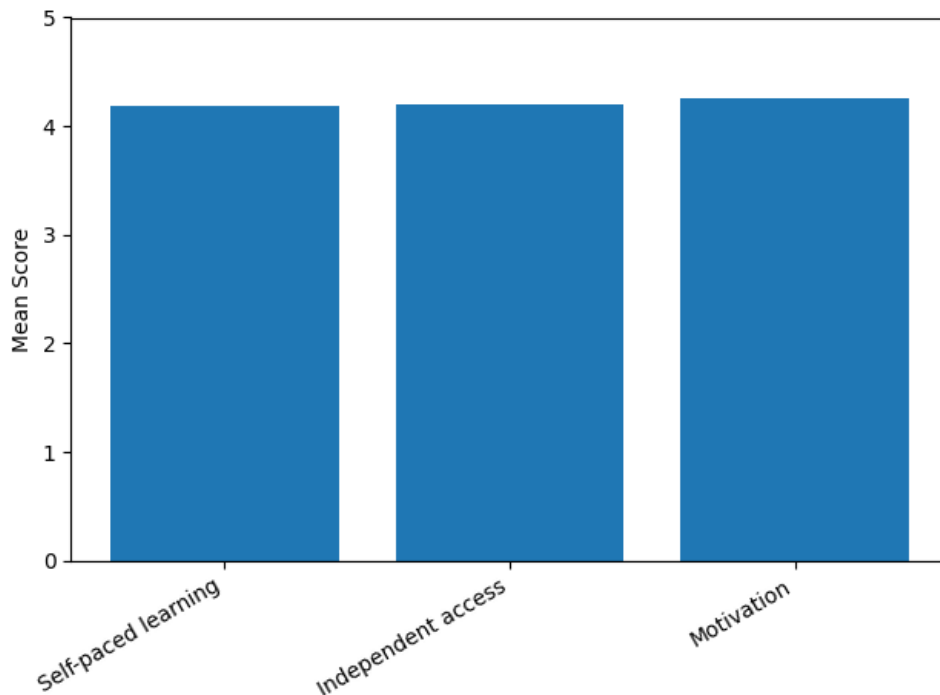


Figure 5
Learner autonomy and motivation

As evidenced in Figure 5, the mean scores of the constructs of learner autonomy and motivation reflect the positive views that students have of the role played by Gamma in facilitating learning autonomy and motivation.

4.6 Instructional Preference

Table 6
Instructional preference distribution

Instructional mode	Percentage (%)
Gamma-supported	62.0
Traditional	23.3
No clear preference	14.7

Note. Percentages represent students' preferred instructional mode.

Instructional preference data is presented in Table 6, which shows that most of the participants (62.0%) were in favor of Gamma-supported instruction, fewer were in favor of traditional instruction (23.3%), and only 14.7% had no preference.

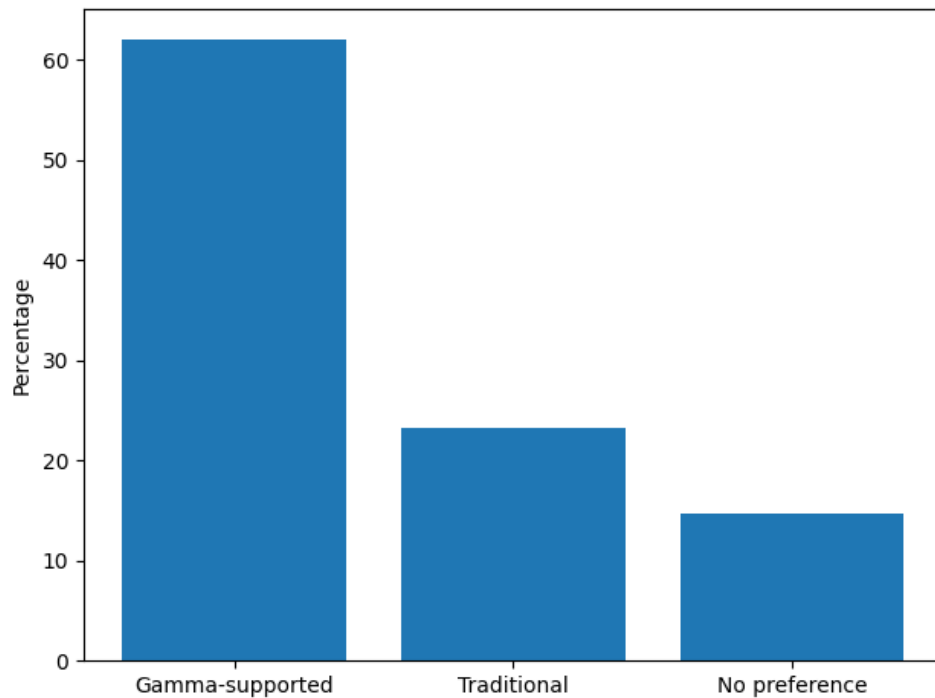


Figure 6
Instructional preference distribution

Figure 6 shows the distribution in the form of a graph that compares the three teaching methods.

4.7 Group Comparisons by Level and Major

Independent-samples *t*-tests revealed no statistically significant differences by academic level or major.

Table 7

Group comparisons of attitudes toward Gamma

Variable	T	P
Academic level	1.12	.26
Academic major	0.94	.35

Note. Independent-samples *t* tests were conducted. No statistically significant differences were observed ($p > .05$).

Table 7 shows the comparisons of the data grouped by academic levels as well as academic majors. Results of the independent samples *t*-test did not show significance in having attitudes towards Gamma considering both variables, $p > .05$. This indicates that there were similarities in student perceptions towards Gamma.

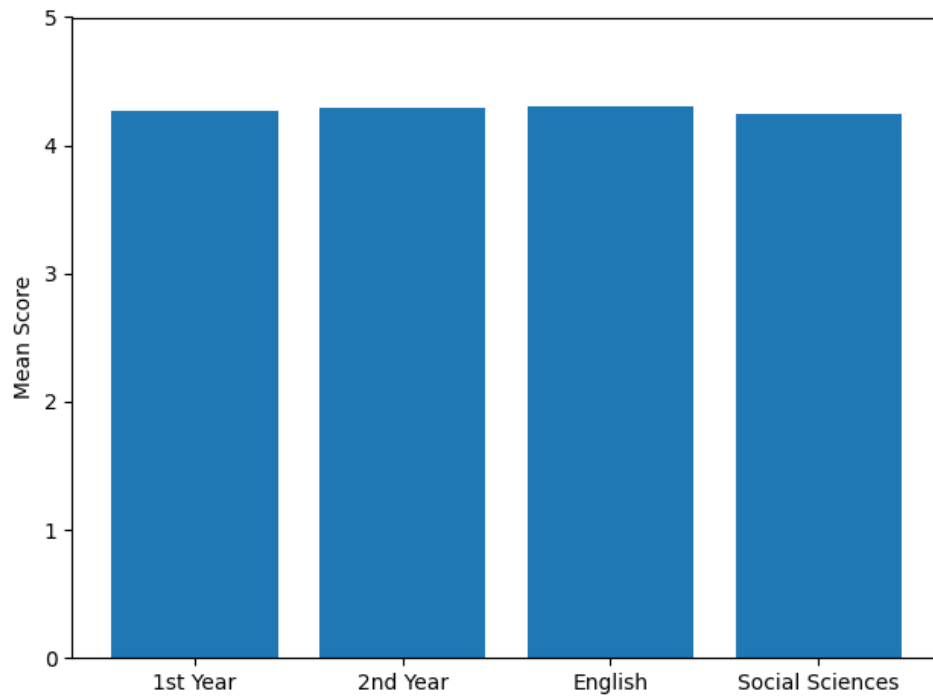


Figure 7
Mean attitude scores by academic level and major

Figure 7 tends to provide a graphic verification regarding the lack of significant differences among the data presented.

4.8 Summary of Results

The findings clearly indicates positive attitudes held by the students towards Gamma, irrespective of their levels and disciplines. The high average scores for all the pedagogical values clearly indicate the effectiveness of Gamma towards facilitating interactive, accessible, and autonomy-friendly approaches to education, even when conducted online.

The above-mentioned quantitative analysis clearly indicates a positive outcome in terms of usability and interaction for the undergraduate group in evaluating Gamma as a highly usable and interactive system in various academic levels and disciplines. Based on descriptive and inference analysis, it has been revealed that there are no significant differences among the learner groups to accept hypotheses H1 to H4; therefore, the following section will discuss the outcome based on the theory of technology acceptance model and self-determination theory related to language learning and education platforms like Gamma.

5. Discussion

In this current research, there was a goal to empirically investigate the attitudes of university students towards Gamma as a learning technology for language learning in terms of usability, interactivity, learner engagement, autonomy, motivation, and preference for instruction. In sum, this research suggests that the current study offers strong support for all the hypothesized research questions, validating the learning potential of Gamma in digitally mediated learning contexts and its importance in innovative language learning in universities.

5.1 Usability, Accessibility, and Technology Acceptance

The strong average levels of ease of use and accessibility that have been consistently reported offer strong support for hypothesis 1, suggesting that both levels of learners and fields of study found Gamma to be user-friendly and manageable. This result is consistent with the existing Technology Acceptance Model that suggests that both Perceived Ease of Use and Perceived Usefulness play important roles regarding how levels of learners will adopt an online system (Granić & Marangunić, 2019).

In keeping with TAM literature, it can be seen that the lack of technical hurdles has helped to avoid cognitive overload and generate positive learning experiences, especially in remote environments wherein technological irritations tend to detract from engagement. The findings lend support to previous literature that shows user-friendly interfaces can aid in generating satisfaction and adoption in learning environments (Bhattarai & Maharjan, 2020). Notably, with no statistical significance in either academic level or major, it can be supported that claims in H2 and H3 are true and that Gamma's usability has pedagogic scalability, thus meeting the need for level and discipline-specific evaluations of digital tools.

5.2 Interactivity and Learner Engagement

The high level of ratings on interactivity and engagement with learning suggests that Gamma effectively operated as an engagement-enabling learning environment and not as a mere content dissemination tool. The perceptions by learners that Gamma supported active engagement and interaction with learning content align with engagement theories that require participation in learning for cognitive processing to occur at a deeper level.

From an SLA point of view, the results are consistent with interaction-oriented approaches that emphasize the role of meaningful interaction and learner participation in effective language development. Moreover, the results support the CALL literature indicating that digital technology can create additional opportunities for learner engagement, interaction, and active participation in language learning (Hung et al., 2018; Shortt et al., 2021). Recent research on AI-supported language learning further suggests that emerging digital technologies can provide personalized and interactive learning experiences that encourage active learner involvement (Mammadova, 2025). In this respect, Gamma can be interpreted as a complementary digital pedagogical tool that extends opportunities for interactive engagement within blended language-learning contexts.

5.3 Learner Autonomy, Motivation, and Self-Regulated Learning

Pedagogically, one of the most important findings emerging from this research is the evidence supporting learner autonomy and motivation, further justifying H1. Also, since students showed positive attitudes towards self-paced learning and self-directed access, this also indicates that Gamma facilitated self-regulation of learning (SRL) process activities, like planning, control, or monitoring (Noori, 2025).

On the other hand, these results can be interpreted through another theoretical framework, namely Self-Determination Theory (SDT). According to SDT, autonomy-supportive learning contexts can enhance intrinsic motivation when learners experience autonomy, competence, and meaningful involvement in learning activities. Gamma may support these psychological needs by enabling learners to explore and organize learning materials in flexible and interactive ways while remaining actively engaged with learning tasks. This interpretation is consistent with recent research emphasizing the role of interactive and AI-supported technologies in creating more personalized language-learning experiences (Mammadova, 2025) and with research highlighting the relationship between self-study, learner autonomy, motivation, and digital learning in EFL contexts (Umaraliyeva,

2025). In this respect, the present findings extend the existing literature by examining how an emerging AI-powered digital pedagogical tool may contribute simultaneously to learner engagement, autonomy, and motivation within blended language-learning contexts.

5.4 Instructional Preferences and the Role of Hybrid Pedagogy

The result indicating the preference for Gamma-supported instruction over the traditional method confirms hypothesis H4 and is in line with the general preferences for a combination of different teaching methods. The preference for mixed environments in teaching has been shown to provide the best possible combination of flexibility and structure (Alqurashi, 2025; Mansha et al., 2024). In this context, Gamma's value should be understood through its combination of visually organized content, AI-assisted content development, multimedia presentation, and interactive digital delivery. These affordances can complement teacher-led instruction rather than replace it, particularly in blended language-learning environments.

Notwithstanding, the presence of a minority who support traditional instruction implies that technology works well when incorporated substantively rather than purely as a tool for replacing traditional instruction. In pedagogy, this verifies arguments that technology must be incorporated in a complementary fashion that supports rather than replaces traditional instruction (Karasová & Uherková, 2023).

These results are also supported by the study conducted by Makhoul and Al-Qaisi (2025), which examined the attitudes of the learners towards the use of Gamma, Padlet, and Google Classroom by the undergraduate students of Yemen. The findings of this study found that the learners had positive attitudes towards the use of technology-based teaching, which are largely similar to the results of the current study. Notably, the study found that some of the learners still had a preference for the conventional teaching methods, which seems to be highly relevant to the teaching practices of the blended models rather than the purely digital models.

In addition, there were no statistically significant differences in technology acceptance based on academic levels according to the study of Makhoul and Al-Qaisi in 2025, which corresponded to the findings of this research. Yet, it is interesting to note that there were varying degrees of learner acceptance depending on the discipline in which the learner is enrolled according to the cited study. These findings, taken in context, emphasize the role of alignment and disciplinary orientation in technology-mediated language learning.

Within this broader empirical context, the literature and the present findings indicate that technology acceptance in higher education depends on considerations that extend beyond the technical attributes of a digital tool. Consistent with the Technology Acceptance Model, the effective adoption of Gamma in higher education is likely to depend on perceived usefulness and ease of use, as well as on the extent to which the tool is aligned with pedagogically meaningful educational practices (Granić & Marangunić, 2019). For language learning in particular, the value of digital and AI-supported tools also lies in their capacity to promote interactive learning, learner autonomy, and self-directed engagement (Mammadova, 2025; Umaraliyeva, 2025). Thus, Gamma is most appropriately conceptualized as a complementary pedagogical resource that can enrich teacher-led instruction through interactive content creation and learner-centered activities rather than as a substitute for human instruction.

5.5 Absence of Group Differences: Equity and Pedagogical Inclusivity

The lack of statistically significant differences for levels and majors adds strength to the conclusion that Gamma creates an equal educational environment for students. It contradicts the presumption that technology primarily favors particular groups of students. It corroborates the idea that technology

based on pedagogy can create a more equal environment for learning. From the point of view of research, this result adds important empirical data to the scarce body of research that investigates consistency for particular groups in digital language learning.

5.6 Theoretical and Pedagogical Contributions

Collectively, results inform that Gamma can be viewed from a Leaning-Liberty-Engagement perspective. In contrast to other investigations focused on technology-based aspects only, this investigation tends to instructional influence rather than technological influence per se and thus corresponds to some demands in CALL/SLA scholarship regarding cultural issues of inequality (Shortt et al., 2021). Furthermore, by incorporating an Algerian higher education setting into its framework, this investigation corrects an imbalance of geographical representation noted in SLA/CALL scholarship.

6. Limitations and Future Research

Though the results obtained from the study reveal that students' attitude towards the usage of Gamma as a teaching technology is positive, there exist several limitations that need to be taken into consideration. First, the non-probability convenience sampling technique that was adopted for conducting the study involved participants belonging to two university majors. This indicates that the findings of the study might not be comprehensive enough and may target a specific group belonging to a particular university only. At the same time, the sample adopted for the purpose of the study might be sufficient enough for the completion of the study but might lag behind in representing the diverse view of the students.

Second, though the study has tapped important pedagogical attitudes such as ease of use, interactivity, engagement, autonomy, and motivation, there could be some important dimensions that might not have been tapped into. For example, it may not have included perspectives of cognitive load, long-term retention, or collaborative learn dynamics.

Third, the cross-sectional design with a non-experiment restricts the ability to make conclusions about causations. Even though the study subjects had a long-term engagement with Gamma, the study cannot ascertain if the positive attitudes that the subjects exhibited were a result of Gamma alone because there could be other factors that might influence the results. Furthermore, the study might be restricted in terms of external validity particularly because the study took place in a specific instructional context that may not be the same in other settings.

One potential area that can be explored in future studies related to this investigation would be to examine other aspects related to outcome or performance and determine the value of the Gamma effects using longitudinal or experimental approaches. By increasing the population size across multiple institutions, it is possible to obtain higher levels of generalizability related to the results, while using other approaches related to methodology, including analysis or focus group discussions or observational studies related to Gamma, can possibly lead to a higher degree of understanding related to learning attitudes associated with digital tools like Gamma.

7. Conclusion and Implications

The investigation examined undergraduate students' attitude towards Gamma as a pedagogical technology in online and blended language courses. The result shows a highly positive attitude in functionality, interactivity, engagement, autonomy, and motivational facilitation, confirming Gamma's pedagogical efficacy not only in a supporting capacity but also in a mediating capacity. The lack of statistically significant disparity in functionality across academic and subject categories also provides an indication that Gamma's pedagogical functionality is quite versatile and supports a holistic integration.

Notably, students' choice of Gamma represents a growing trend towards flexible or blended forms of learning, while their concurrent dependence on traditional learning represents a need for critical and intentional application of educational technologies. These findings remedy a research literature lag and respond to a call for empirical research that explores technology in a pedagogy-focused manner as opposed to a pure tool approach.

Pedagogical Implications

The findings from this study prove that Gamma can be appropriately embedded in order to increase learner engagement, motivation, and autonomy. The importance of using Gamma in a more engaging learning environment rather than a traditional content delivery platform cannot be overstated. Furthermore, the positive attitude results indicate the significance of training and development in terms of digital pedagogy so that educators can create autonomy-supportive learning environments as well as engagement-oriented settings.

Theoretical Implications

The results emphasize the importance of Technology Acceptance Model (TAM), Self-Regulation Theory, and engagement theory in shaping learner behavior by emphasizing the roles of technology-based learning tools in the context. The variables related to perceived usability, interactivity, and autonomy support showed importance in shaping positive attitudes, thereby underlining the importance of technology in the efficient improvement of learning outcomes in accordance with teaching methodologies. The paper contributes to theoretical development by illustrating that technology is an important teaching agent in defining both cognitive and motivational features in learning.

Research Implications and Future Research Outlines

In future studies, it would be interesting to explore the long-term impact of Gamma upon Language Proficiency and SL Behaviors by adopting longitudinal and hybrid research methodologies. For instance, qualitative research methodologies may help explore the SL engagement mechanism and experiences among students, while inter-institution and inter-disciplinary studies would add to the overall externality of the research results. The limitations discussed within the current study demonstrate that future research work must adopt representative sampling techniques and objective indicators to measure students' performance.

In summary, Gamma shows potential as an adaptive, interactive, and autonomy-friendly learning technology that has the ability to reinvent blended language learning on the web. Integration of Gamma, with empirical evidence as well as theoretical underpinnings, can provide ways to move web-based tools from the periphery to the center of an effective educational process.

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