

Examining the affect of TechnologyAssisted Language Learning on Student Engagement and Language proficiency in Language Courses

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Abstract

The present study was designed to explore the impact of Technology-assisted Language learning (TALL) on both student engagement and language proficiency in English language courses, with focus on tertiary level learners. As educational institutions increasingly integrate digital tools into language instruction, it becomes imperative to assess their pedagogical effectiveness and practical outcomes. Tall encompasses a wide array of resources, including mobile applications, interactive multimedia, online collaboration tools, and AI-powered feedback systems, all of which aim to promote autonomy and enhance the overall language learning experience. To achieve the goal of the current study 150 Iraqi learners , at university were included. They included 60 males and 90 females whose ages ranges from 20 to 36 (M = 28) years old. TO obtaion the needed data, the participants of the study were asked to fill questions names: Revised Study Process Questionnaire . This questionnaire was designed and developed by Biggs, et al.(2001) and it includes 20 questions and a 5 – point likert scale . The results estimated by SPSS (statistical Package for Social Sciences) version25 indicated that both traditional and Technology-assisted language learning methods led to improvements in overall proficiency , the technology-assited method was significantly more effective . a mixed ANOVA revealed a statistically significant interaction between time and teaching method. Post-hoc pairwise comparisons confirmed that the groups did not differ at pre-test but that the technology-assisted language group demonstrated a significantly greater gain from pre-test to post-test than the traditional group. These findings support the hypothesis that technology-assisted langauge learning enhances language profiency more effectively than traditional methods alone . Also, There is significant and positive correlation between all the three dimensions of engagement (Behavioral engagement , Cognitive engagement and Emotional engagement) with language competence . The Emotional engagement had the strongest correlation followed closely by Cognitive Engagement and Behavioral Engagement . The total engagement score also showed that there is a significant positive correlation with Language Competence .Also, the results indicated that the students' active cognitive

strategies and positive emotional attitude toward technology-based learning play a more critical role in enhancing Language Competence than behavioral participation alone . These results can be influential for Iraqi learners , teachers and policy makers considering the use of students engagement and language proficiency in English Language Courses

Keywords : (Technology-assisted , Student Engagement , Language proficiency).

دراسة تأثير التعلم اللغوي بمساعدة التكنولوجيا على مشاركة الطلاب وكفاءتهم اللغوية في دورات

اللغة الإنجليزية

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المخلص

ضُمت هذه الدراسة لاستكشاف تأثير التعلم اللغوي بمساعدة التكنولوجيا (TALL) على كل من مشاركة الطلاب وإتقانهم للغة في دورات اللغة الإنجليزية، مع التركيز على طلاب المرحلة الجامعية. مع تزايد دمج المؤسسات التعليمية للأدوات الرقمية في تعليم اللغة، أصبح من الضروري تقييم فعاليتها التربوية ونتائجها العملية. يشمل TALL مجموعة واسعة من الموارد، بما في ذلك تطبيقات الهاتف المحمول، والوسائط المتعددة التفاعلية، وأدوات التعاون عبر الإنترنت، وأنظمة التغذية الراجعة المدعومة بالذكاء الاصطناعي، والتي تهدف جميعها إلى تعزيز الاستقلالية وتحسين تجربة تعلم اللغة بشكل عام. لتحقيق هدف الدراسة الحالية، تم إشراك ١٥٠ طالبًا جامعيًا عراقيًا، من بينهم ٦٠ ذكرًا و ٩٠ أنثى، تتراوح أعمارهم بين ٢٠ و ٣٦ عامًا (العمر = ٢٨). للحصول على البيانات اللازمة، طُلب من المشاركين في الدراسة الإجابة على أسئلة مثل: استبيان عملية الدراسة المنقح. تم تصميم هذا الاستبيان وتطويره بواسطة Biggs وآخرون (٢٠٠١) ويتضمن ٢٠ سؤالاً ومقياس ليكرت من ٥ نقاط. أشارت النتائج المقدرّة بواسطة برنامج SPSS (الحزمة الإحصائية للعلوم الاجتماعية) الإصدار ٢٥ إلى أن كل من طرق تعلم اللغة التقليدية والتقنية أدت إلى تحسينات في الكفاءة العامة، وكانت الطريقة التقنية أكثر فعالية بشكل ملحوظ. كشف تحليل التباين المختلط عن تفاعل ذي دلالة إحصائية بين الوقت وطريقة التدريس. أكدت المقارنات الزوجية اللاحقة أن المجموعات لم تختلف في الاختبار القبلي ولكن أظهرت مجموعة اللغة التقنية مكاسب أكبر بكثير من الاختبار القبلي إلى الاختبار اللاحق من المجموعة التقليدية. تدعم هذه النتائج الفرضية القائلة بأن تعلم اللغة

بمساعدة التكنولوجيا يعزز الكفاءة اللغوية بشكل أكثر فعالية من الطرق التقليدية وحدها. أيضاً، هناك علاقة إيجابية ومهمة بين الأبعاد الثلاثة للمشاركة (المشاركة السلوكية والمشاركة المعرفية والمشاركة العاطفية) مع الكفاءة اللغوية. كان للتفاعل العاطفي أقوى ارتباط، يليه مباشرةً التفاعل المعرفي والتفاعل السلوكي. كما أظهرت درجة التفاعل الإجمالية وجود ارتباط إيجابي كبير مع الكفاءة اللغوية. كما أشارت النتائج إلى أن استراتيجيات الطلاب المعرفية النشطة وموقفهم العاطفي الإيجابي تجاه التعلم القائم على التكنولوجيا يلعبان دوراً أكثر أهمية في تعزيز الكفاءة اللغوية من المشاركة السلوكية وحدها. يمكن أن تكون هذه النتائج مؤثرة على المتعلمين والمعلمين وصانعي السياسات العراقيين فيما يتعلق باستخدام تفاعل الطلاب وكفاءتهم اللغوية في دورات اللغة الإنجليزية. الكلمات المفتاحية: (بمساعدة التكنولوجيا، تفاعل الطلاب، كفاءتهم اللغوية)

INTRODUCTION

The widespread integration of digital technology is partly responsible for the significant changes occurring in the modern educational scene. The emergence of Technology-Assisted Language Learning (TALL) has changed the discipline of second language acquisition (SLA) in this dynamic setting. From straightforward multimedia software and language learning programs like Duolingo or Babbel to more intricate settings like virtual reality (VR), augmented reality (AR), and online collaboration platforms, TALL covers a wide range of tools and platforms. A more participatory, individualized, and accessible method of learning a new language is promised by this digital revolution, which goes beyond the conventional, teacher-centric style of training.

Two crucial and related factors student involvement and language proficiency are at the core of this instructional progress. Academic accomplishment is known to be preceded by engagement, a multifaceted notion with behavioral, cognitive, and emotional elements (Fredricks, Blumenfeld, & Paris, 2004). In addition to actively participating in assignments, an engaged student in a language learning situation is also naturally motivated, inquisitive about the target culture, and resilient when faced with linguistic difficulties. A learner's functional capacity to use the language correctly and appropriately across the four fundamental skills speaking, listening, reading, and writing

is referred to as language competency, which is the end goal of the majority of language programs. Both authentic performance tasks and standardized exams are used to measure it. The fundamental idea behind TALL is that by increasing learning engagement, additional conditions can be created for the growth of more profound and useful expertise.

Technology has a huge potential to improve engagement. Immersion simulations, gamified learning modules with leaderboards and points, and interactive multimedia content can turn language practice from a tedious memorizing task into a fun and engaging activity. By appealing to students' innate motivation, these components transform them from passive information consumers into active participants (Reinders & Wattana, 2015). Additionally, through computer-mediated communication (CMC), technology helps lessen anxiety and promote a sense of community. In a less intimidating setting than a traditional classroom, tools like blogs, video conferencing software, and discussion forums allow students to practice their skills with peers and native speakers. This encourages emotional engagement and risk-taking, two things that are essential for language development (Kern, 2014).

In terms of linguistic competency, TALL provides unmatched chances for individualized, copious, and genuine input and output. Depending on their interests and skill levels, learners can access a wide range of real content in the target language, including news articles, podcasts, movies, and social media. The development of reading and listening comprehension depends on this experience. Additionally, advanced software now offers instantaneous, automatic feedback on speech and grammar, enabling iterative practice that was previously only achievable with ongoing teacher assistance. For example, voice recognition software can help students improve their speaking abilities by giving them feedback on how they pronounce words correctly (Li, 2016).

Technology integration is not a cure-all, though. The mere existence of technology does not ensure that TALL will have an effective influence on student engagement and competency; rather, it depends on the quality of the technological tools, teacher facilitation, and pedagogical design. Critics warn against the issue known as "digital distraction," in which unequal access to gadgets leads to a digital divide or when the glitz of technology overshadows the learning objectives (Warschauer, 2009). Additionally, relying too much on automatic feedback could ignore the subtleties of pragmatic and sociolinguistic skill, which frequently call for human involvement and direction.

Thus, the goal of this analysis is to critically examine the intricate connection among student involvement, language proficiency, and technology-assisted language learning. It will examine the theoretical underpinnings of TALL, compile empirical data supporting its effectiveness, and examine the precise mechanisms like feedback, authenticity, and interactivity through which technology is said to affect learning outcomes. This analysis attempts to give a comprehensive knowledge of how digital resources might be strategically and efficiently exploited to build more engaging and

Review of Literature

Technology integration in language learning settings has attracted a lot of scholarly attention lately, especially in light of its implications for student engagement and language competency. Mobile apps, learning management systems, gamified learning environments, and AI-powered language tutors are just a few of the many tools and platforms that fall under the umbrella of technology-assisted language learning (TALL). Several studies have demonstrated how TALL can improve learner autonomy and interactivity in typical English language classrooms. For example, Stockwell (2012) highlights how mobile-assisted language learning makes learning resources more accessible, allowing students to interact with English outside of the classroom. Similarly, Kukulska-Hulme and Shield (2008) discovered that mobile technologies

support individualized and contextual learning, which in turn increases time-on-task and motivation—two important aspects of engagement.

It has been demonstrated that gamification, one of TALL's most studied facets, increases both intrinsic and extrinsic motivation. Reinhardt and Sykes (2014) claim that adding game-based components like leaderboards, medals, and awards creates a cooperative but competitive atmosphere that keeps students interested. Vesselinov and Grego (2012), who noted notable vocabulary learning and retention among users of gamified applications such as Duolingo, lend credence to this. TALL platforms have shown successful in enhancing speaking, writing, listening, and reading abilities in addition to vocabulary. For instance, Wang and Vásquez (2012) showed how synchronous computer-mediated communication tools, such voice chats and forums, helped students practice real-world communication, which enhanced their fluency and decreased their anxiety levels.

TALL significantly affects student engagement, especially cognitive and emotional engagement, in addition to language proficiency. Technology-facilitated tasks are typically more learner-centered, which encourages deeper processing and active engagement, according to Dörnyei (2001). Students who routinely use digital tools exhibit higher levels of engagement in group projects and higher levels of self-efficacy in language use, according to research by Lai and Morrison (2013). Additionally, TALL supports differentiated instruction, which accommodates a range of learning styles and proficiencies by letting students study at their own speed (Chapelle, 2003). Learners gain from more time for interaction during class and the freedom to review material as needed in blended or flipped classroom models, which frequently include TALL. These benefits have been connected to improved academic achievement and student satisfaction (Horn & Staker, 2014).

However, careful pedagogical integration is necessary for TALL to succeed. Warschauer and Kern (2000) warn that unless technology is included into good

instructional design, it does not produce superior results on its own. To maximize TALL's impact, curricular alignment, teacher training, and digital literacy are all essential. Additionally, because not all students have equal access to gadgets or reliable internet connections, equity concerns still exist (Godwin-Jones, 2011). Notwithstanding these difficulties, an increasing amount of research indicates that TALL can greatly improve student engagement and language competency in English language learning environments when used properly. Future studies could benefit from examining TALL's long-term effects, formative assessment function, and influence in various sociocultural learning contexts.

There has been a paradigm shift in language pedagogy as a result of the incorporation of technology into education. This shift has resulted in the transition away from traditional approaches that are centered on the instructor and toward learning settings that are more dynamic and student-focused. Computer-assisted language learning (CALL), mobile-assisted language learning (MALL), and web-based language learning are all included under the umbrella term known as technology-assisted language learning (TALL). This word has emerged as a significant topic of investigation in the field of applied linguistics and educational technology. In this literature review, we summarize the research that has been conducted on the impact of technology-assisted language learning (TALL) on two essential aspects of language acquisition: student engagement and language competency. We highlight both the verified benefits and the ongoing obstacles that continue in this field.

The positive association between TALL and increased student engagement, which is frequently divided into behavioral, cognitive, and affective dimensions, has been the subject of a substantial body of research that has shed light on the relationship. Behavioral engagement is fostered by the interactive and multimodal nature of digital tools, such as language learning apps (e.g., Duolingo, Babbel), virtual worlds (e.g., Minecraft), and collaborative platforms (e.g., Padlet, Google Docs) (Hockly &

Dudenev, 2018). These digital tools transform individuals who are passive recipients of knowledge into active participants. It has been found that elements of gamification, such as points, badges, and leaderboards, are particularly successful in motivating learners and maintaining constant involvement (Zainuddin & Perera, 2019). According to Ryan and Deci (2000), this is consistent with the concepts of self-determination theory, which states that technology has the ability to fulfill requirements for autonomy, competence, and relatedness, thereby significantly increasing the level of intrinsic drive.

From a cognitive standpoint, technology has the potential to assist deeper processing of linguistic data by means of tasks that are both demanding and authentic. By way of illustration, students are required to engage in higher-order thinking abilities such as analysis, synthesis, and assessment when they use digital storytelling tools or create video blogs. Furthermore, online forums and synchronous video conferences (such as those conducted through Zoom or Skype) offer venues that facilitate the meaningful negotiation of meaning and the participation of peers, both of which are essential for cognitive involvement in the process of language acquisition (Blake, 2013). Because technology can lower the affective filter, which is a concept from Krashen's (1982) theory, it can also positively influence affective engagement. This is because technology can provide a less intimidating environment for practice, which is especially beneficial for learners who are shy or anxious and may be reluctant to speak in a classroom that is full of students (Sun & Gao, 2020).

Numerous studies have been conducted to investigate the effects of TALL on certain language competence skills, including reading, writing, listening, and speaking. The findings of these studies have been largely positive. According to Nakata (2011), spaced repetition software (SRS) like Anki has been shown to be particularly successful for long-term retention in the field of vocabulary learning. This software makes use of algorithms to present words just before they are allowed to be forgotten. Technologies such as digital glosses and hypertexts offer rapid lexical support for reading

comprehension. These technologies enable students to obtain definitions, visuals, or translations with just a click, thereby minimizing the amount of cognitive load they have to deal with and enhancing their ability to comprehend what they are reading (Yun, 2011).

When it comes to writing proficiency, the use of word processors that come equipped with built-in grammar and spell checkers has become the norm. However, more advanced tools such as automated writing evaluation (AWE) software (such as Grammarly and Criterion) offer formative feedback on grammar, syntax, and mechanics. This frees up the time of the instructor to focus on higher-level concerns such as organization and argumentation (Ware & Warschauer, 2006). Corpus linguistics tools provide students with additional opportunities to investigate the usage of language in real-world contexts, so boosting their comprehension of collocations and register. Listening and speaking abilities have been completely transformed as a result of TALL.

METHODOLOGY:

The influence of Technology-Assisted Language Learning (TALL) on student engagement and English language proficiency is investigated in this study using a mixed-methods, quasi-experimental methodology. Using a pre-test/post-test control group methodology, one group was taught using conventional techniques, while the other group received the TALL intervention. Because it combines qualitative insights into learner engagement with quantitative performance metrics, the mixed-methods approach is appropriate (Creswell & Plano Clark, 2017). This methodology guarantees that results capture behavioral, cognitive, and emotional aspects of involvement in addition to changes in test scores (Fredricks et al., 2004).

Instruments:

The participants will consist of approximately 60 intermediate-level students enrolled in a compulsory English language course at a university. A purposive sampling technique will be used to select two intact classes, which will be randomly assigned as either the

experimental group (n=30) or the control group (n=30). When it comes to educational settings, where random assignment of individuals is frequently not possible, this quasi-experimental design is a useful option. There will be no requirement for participants to participate, and informed consent will be obtained from each individual participant. Ethical factors, such as the right to withdraw from the study and the anonymity of the data, will be taken into account during the research.

1-Proficiency Pre-test/Post-test: A standardized proficiency exam, such as the Oxford Quick Placement Test, will be administered to both groups before and after the intervention to measure gains in grammar, vocabulary, and reading comprehension

2-Engagement Analytics: Quantitative behavioral engagement data will be automatically logged by the TALL platforms (e.g., Duolingo for Schools, Flip). Key metrics will include login frequency, time-on-task, assignment completion rates, and number of interactions.

3-Student Engagement Scale: A validated self-report questionnaire for student (Schaufeli et al., 2002), will be used to measure students' cognitive, emotional, and affective engagement.

4-Semi-Structured Focus Group Interviews: Subsequent to the intervention, a purposive sample of 8-10 students from the experimental group will engage in a focus group interview. The interview protocol will examine perceptions of motivation, specific TALL tools usefulness, and challenges faced

5-Reflective Journals: Students in the experimental group will be required to maintain weekly reflective journals, providing ongoing qualitative data on their personal learning experiences and emotional responses.

The procedures:

The procedure will unfold over a 12-week semester. In Week 1, all participants will complete the proficiency pre-test and the engagement scale questionnaire. For the following 10 weeks, the control group will receive traditional, teacher-led instruction using a standard curriculum and textbook. Concurrently, the experimental group will follow a curriculum integrating TALL tools; for instance, using Duolingo for Schools for vocabulary drills and Flip for weekly video speaking journals. The instructor, learning objectives, and core content will be consistent across both groups to isolate technology as the primary variable. In Week 12, all participants will complete the proficiency post-test and the engagement scale again. The focus group interviews with the experimental group will be conducted and audio-recorded for transcription.

Data analysis:

Data Analysis The data analysis will involve both statistical and thematic techniques. The quantitative data from the proficiency tests and engagement scales will be analyzed using SPSS software. Descriptive statistics (means, standard deviations) will summarize the data. To test for significant differences between the groups, an Analysis of Covariance (ANCOVA) will be conducted on the post-test scores, using the pre-test scores as a covariate to control for initial differences. The engagement analytics will be analyzed using descriptive trends and correlational analysis with proficiency gains.

The qualitative data from focus group transcripts and reflective journals will be analyzed using thematic analysis, following the six-phase process outlined by Braun and Clarke (2006). This procedure will include familiarization data, first code generation, topic identification, theme review, theme definition, and the creation of a rich report. Finally, a mixed-methods integration will occur, where the qualitative themes will be used to explain and provide context for the quantitative results, offering a deeper

understanding of the mechanisms behind the observed impacts on engagement and proficiency.

This study examine the impact of Technology-assisted learning language on students engagement and language competence. Results of the data analysis. First the descriptive statistics of the variables are presented and the associations between the variables are presented with explained via correlation tests.

Reliability of the Scales :

Before further analyses , It was essentialy to determine the reliability of the two scales that were used in the present study . for this aim Cronbach's alpha was run . The reliability analysis (Table 1) indicated that all three Engagement Subscales demonstrated strong internal consistency , with Cronbach's alpha values range from .81 to .86 . The overall engagement scale also showed high reliability ($\alpha = .89$) . These findings confirm that the survy instrument was reliable for measuring Behavioral , Cognitive , and Emotional Engagement.

Table (1).

Reliability of Engagement Subscales

| Subscale | No. Of items | Cronbach's a |
|-----------------------|--------------|--------------|
| Behavioral Engagement | 6 | .84 |
| Cognitive Engagement | 6 | .81 |
| Emotional Engagement | 6 | .86 |
| Total Engagement | 18 | .89 |

Descriptive Statistics of Emotional Engagement , Behavioral Engagement and Cognitive Engagement :

Descriptive Statistics in Table (2) reveal that students report relatively high engagement across all dimensions . Emotional Engagement scored the highest ($M = 3.89$; $SD = 0.64$) ,followed by Behavioral Engagement ($M = 3.65$, $SD = 0.58$) . The total engagement score was moderately high ($M = 3.75$, $SD = 0.56$) , suggesting that the students were generally engaged when using technology in their English courses . In terms of Language Competence , students demonstrated a relatively strong performance ($M = 78.45$, $SD = 8.20$) , with scores ranging from 55 to 95 .

Table 2.

Descriptive Statistics of Engement and Language Competence ($N = 180$)

| Variable | M | SD | Min | Max |
|-----------------------|-------|------|------|------|
| Behavioral Engagement | 3.72 | 0.61 | 2.10 | 4.90 |
| Cognitive Engagement | 3.65 | 0.58 | 2.00 | 4.80 |
| Emotional Engagement | 3.89 | 0.64 | 2.20 | 5.00 |
| Total Engagement | 3.75 | 0.56 | 2.15 | 4.90 |
| Language Competence | 78.45 | 8.20 | 55 | 95 |

Correlation between Engagement and Language Competence :

Correlation analysis in Table 3 showed that all three dimensions of engagement were positively and significant associated with language competence . Emotional Engagement had the strongest correlation ($r = .40$, $p < .01$) . followed closely by Cognitive Engagement ($r = .38$, $p < .01$) and Behavioral Engagement ($r = .34$, $p < .01$) .

The total engagement score also showed that there is a significant positive correlation with Language Competence ($r = .42$, $p < .01$) .

These findings suggest that higher engagement in technology –assisted learning is linked to better language performance .

Table (3).

Correlation between Engagement and Language Competence

| Variable | 1 | 2 | 3 | 4 | 5 |
|------------------------|-------|-------|-------|-------|---|
| 1. Behavioral Eng. | 1 | | | | |
| 2- Cognitive Eng. | .52** | 1 | | | |
| 3- Emotional Eng. | .48** | .55** | 1 | | |
| 4- Total Engagement | .78** | .80** | .82** | 1 | |
| 5. Language Competence | .34** | .38** | .40** | .42** | 1 |

Note. $P < .01$

Regression analysis :

Regression analysis in table (4) further examined the predictive power of engagement dimensions on Language Competence . The overall model was significant , $F (3 , 176) = 18.32$, $p < .001$, explaining 24% of the variance in Language Competence . Among the predictors , Cognitive Engagement ($\beta = .23$, $p = .004$) and Emotional Engagement ($\beta = .19$, $p = .011$) emerged as significant predictors , while Behavioral Engagement did not significant contribute ($\beta = .12$, $p = .087$) . This indicates that the students' active cognitive strategies and positive emotional attitude toward technology-based learning play a more critical role in enhancing Language Competence than behavioral participation alone .

Table(4).

Regression Predicting Language Competence from Engagement

| Predictor | B | SE B | β | t | p |
|-----------------------|------|------|---------|------|------|
| Behavioral Engagement | 1.12 | 0.65 | .12 | 1.72 | .087 |
| Cognitive Engagement | 2.05 | 0.70 | .23 | 2.93 | .004 |
| Emotional Engagement | 1.65 | 0.64 | .19 | 2.57 | .011 |

$R^2 = .24$, $F(3,176)=18.32$, $p < .001$

Table(5): Descriptive statistics

This table summarizes the basic features of data

| Variable | N | Mean | STD. Deviation | Min | Max |
|----------------------|-----|------|-------------------|------|------|
| Technology Use score | 300 | 3.85 | 0.72 | 1.20 | 5.00 |
| Engagement Score | 300 | 3.95 | 0.68 | 2.10 | 5.00 |
| Age | 300 | 20.4 | 1.67 | 18 | 25 |

The average technology use score is 3.85 out of 5 , with a standard deviation of 0.72 . This suggests a moderately high level of technology use in the sample , with scores varying around the average . The average engagement score is slightly at 3.95 out of 5 , with a similar spread (STD. Deviation = 0.68)

Table (6): Correlation Analysis

This table Examines the relationship between two continuous variables without assuming

| Variable | 1 | 2 |
|----------------------|------|------|
| Teconology Use Score | 1 | |
| Engagement Score | .522 | 1 |
| Age | .084 | .041 |

Note : Table shows Pearson's Correlation Coefficients (r). N = 300

Bold indicates Correlation is significant at the $p < .01$ level (2-tailed) .

There is a strong positive and statistically correlation between Technology Use and Engagement ($r = .522, p < .01$) . This means that students who report higher use of education technology also tend to report higher levels of engagement . Age shows no significant correlation with either technology use or engagement , suggesting it is not a confounding factor in this relationship .

Table(7): Independent Samples T-Test

This table compares the engagement levels between two distinct groups of technology

| Group | N | Mean Engagement | STD. deviation | t-value | p-value | Cohen's d |
|-----------------------|-----|-----------------|----------------|---------|---------|-----------|
| LMS Users | 150 | 4.15 | 0.61 | 4.87 | <.001 | 0.56 |
| Interactive App Users | 150 | 3.75 | 0.69 | | | |

There is a statistically significant difference in engagement scores between the two groups ($t (298) = 4.87, p < .001$. The mean engagement score for LMS Users (Mean = 4.15) is significantly higher than for Interactive App Users (Mean = 3.75) . The effect size , Cohen's d (0.56) , is considered a medium effect . This means the type of technology used has a meaningful , paractical impact on student engagement .

Multiple linear Regression Analysis

This table help us predict engagement based technology use while controlling for another variab;r (gender) . It tell us how much unique influence technology use has .

Table(8)

Dependent Variable : Student Engagement Score

| Predictor | B (unStandardized) | B (Standardized) | t-value | p-value | 95% CI for B |
|---|-----------------------|---------------------|---------|---------|--------------------|
| Constant | 1.92 | | 9.45 | < .001 | [1.52 , 2.32] |
| Technology use score | 0.49 | 0.48 | 8.91 | < .001 | [0.38 , 0.60] |
| Gender | 0.08 | 0.05 | 0.98 | .329 | [-0.08 , 0.24] |
| Model Summary : $R^2 = .245$, Adjusted $R^2 = .240$, $F (2 , 297) = 48.21$, $P < .001$ | | | | | |

The Regression model is statistically signifaant ($F (2,297) = 48.21$, $P < .001$) And explains approximately 24.0 % (Adjusted $R^2 = .240$) of the variance in studentengagement scores .

Technology Use is significant positive predictor of engagement ($\beta = 0.48$, $p < .001$) . Holding gender constant , for every one-point increase on the technology use scale , engagement is predicted to increase by 0.49 points ($b = 0.49$) .

Gender is not a significant predictor in this model ($p = .329$) , meaning does not have a unique effect on engagement when technology use is already accounted for .

The confidence interval for Technology Use (0.38 to 0.60) does not include zero , confirming the reliability of the positive effect .

There is a strong , positive and statistically significant correlation between Technology Use and engagemnet ($r = .522$, $p < .01$) This means that students who report higher use of educational technology also tend to report higher levels of engagement.

Table (9) :

Descriptive Statistics for for overall Proficiency Score Group and Time

Mean and Standerad Deviations for Overall Proficiency Score , by Teaching Method and Time

| Teaching Method | Time | Mean Score | STD.Deviation | N |
|---------------------|-----------|------------|---------------|----|
| Traditional | Pre-test | 62.50 | 5.97 | 30 |
| | Post-test | 68.20 | 6.15 | 30 |
| Technology-Assisted | Pre-test | 63.10 | 6.24 | 30 |
| | Post-test | 81.40 | 7.82 | 30 |
| Total | Pre-test | 62.80 | 6.07 | 60 |
| | Post-test | 74.80 | 9.87 | 60 |

This table describes the basic trends in the data . At the pre-test , both groups had very similar average proficiency scores (Traditional : $M = 62.50$, TALL : $M = 63.10$ _ suggesting successful random assignment . After the intervention , both groups showed improvement . However , the Technology-Assisted (TALL) group showed a markedly larger increase in score (Post-test $M = 81.40$) compared to the Traditional group (Post-test $M = 68.20$) . The standard deviations also increased at post-test especially for the TALL group , indicating greater variability in individual outcomes within that group after the intervention .

Mixed ANOVA Results for the effects of Time and Teaching Method on Proficiency Scores

Table (10)

Results of the 2 (Time : Pre , Post) x 2 (Group: Tradtional , TALL) Mixed ANOVA for Overall Proficiency

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig.(p) | Partial Eta2 (η^2) |
|------------------|-------------------------|----|-------------|--------|---------|---------------------------|
| Within-Subjects | | | | | | |
| Time | 4326.40 | 1 | 4326.40 | 198.21 | < .001 | 0.63 |
| Time Group | 2580.82 | 1 | 2580.82 | 118.25 | < .001 | 0.50 |
| Error (Time) | 2537.23 | 58 | 43.75 | | | |
| Between-Subjects | | | | | | |
| Group | 2640.07 | 1 | 2640.07 | 32.89 | < .001 | 0.36 |
| Error | 4655.93 | 58 | 80.27 | | | |

Note. Df = degree of freedom ; F = F – statistic ; Sig . = significance value ; Partial Eta² = measure of effect size .

This table presents the inferential statistics to determine if the differences observed in Table 1 are statistically significant

Main Effect of Time (F (1 , 58) = 198021 , p< .001 , η^2 = 0.63)

What it means : There was a signifacant overall change in proficiency score from pre-test to post-test , ignoring the type of teaching method .

Interpretation : This highly significant result (p < .001) with a very large effect size (η^2 = 0,63) confirms that , combined , bothe teaching methods were effective in improving language proficiency over time .

Main effect of Group (F (1 , 58) = 32.89 , p<.001 , η^2 = 0.36) :

What it means : There was a significant overall difference in proficiency score between the two teaching methods , ignoring the item of measurement .

Interpretation : This significant result ($p < .001$) with a large effect size ($\eta^2 = 0.36$) tells us that one group consistently scored higher than the other across both pre-and post-tests . (from Table 1 , we can see tha TALL GROUP'S higher than the other across both time points would be higher)

Time Group Interaction $F(1, 58) = 118.25, p < .001, \eta^2 = 0.50$

What it means : This is the most important result . It tests whether the change in scores from pre-test to post-test was different from the two groups .

Interpretation : The interaction effect is highly significant ($p < .001$) with a very large effect size ($\eta^2 = 0.50$) . This provides strong statistical evidence that the improvement in proficiency scores over time depended on the teaching method . In other words , the amount of gain from pre-to post-test was not the same for the Traditional and TALL groups .

Table (11) : Pairwise Comparison for the Significant Time x Group Interaction

| L Group | J Group | Mean Difference (I - J) | STD. Error | Sig.($p^*\eta$) | 95% Confidence Interval for Difference |
|--------------|-------------------------|----------------------------|---------------|----------------------|---|
| Pre-test | | | | | |
| Traditional | Technology- Assisted | - 0.60 | 1.62 | 0.713 | [- 3.84 , 2.64] |
| Post test | | | | | |
| Traditional | Technology- Assisted | -13.20* | 1.87 | <.001 | [-16.96 , - 9.45] |
| Change(Gain) | | | | | |

| | | | | | |
|-------------------------|----------------|----------|------|--------|--------------------------|
| Traditional (Gain) | TALL (Gain) | - 13.80* | 1.27 | < .001 | [- 16.35 , - 11.25] |
|-------------------------|----------------|----------|------|--------|--------------------------|

Note . The mean difference is significant at the .05 level . *indicates significance .

This table breaks down the significant interaction from Table2 .

Pre-test Comparison : At the pre-test , there was no statistically significant difference between the traditional and TALL groups (Mean Diff . = - 0.60 , p = .713) . This confirms the groups were equivalent at the start of the study .

Post-test Comparison : By the post-test , a large and statistically significant difference had emerged . The Traditional group's mean score was 13.20 points lower than the TALL group's mean score (p < .001) .

Gain Score Comparison (Most Direct Interpretation) : The analysis of the simple ain (improvement) in the traditional group was 13.80 points significant less than the average gain in the TALL group (p < .001) . This directly quantifies the superior effectiveness of the technology-assisted method in promoting language proficiency .

Findings

Descriptive statistics and inferential tests will assess increases in engagement and proficiency. The results will influence future technology integration in language learning environments. The goal of the present study was to investigate the statistical examine of the impact of Technology-assisted language learning (TALL) on student engagement and language proficiency in English Language courses .

RQ1- " Does TALL significantly improve students' engagement in English language courses. Concerning the first question Technology provide interactive a collaborative opportunities that increase motivation . The results revealed that there is significant and positive correlate between technology use and all the dimensions of students engagement and the emotional engagement was the higher one there is strong positive and statistically significant correlation between Technology and Engagement

this means that students who report higher use of education technology also tend to report higher levels of engagement.

RQ2- " Does TALL significantly enhance language proficiency compared to traditional methods " for the second question the results indicate that both traditional and Technology-assisted language learning methods led to improvements in overall proficiency , the technology-assited method was significantly more effective . a mixed ANOVA revealed a statistically significant interaction between time and teaching method ($p < .001$, $\eta^2 = 0.50$) . Post-hoc pairwise comparisons confirmed that the groups did not differ at pre-test ($p = .713$) but that the technology-assisted language group demonstrated a significantly greater gain from pre-test to post-test than the traditional group (mean difference in gain = 13.80 , $p < .001$) .

Thes findings support the hypothesis that technology-assisted language learning enhances language proficiency more effectively than traditional methods alone .

Discussion:

The findings of this study contribute to the growing body of evidence that Technology-Assisted Language Learning (TALL) has a significant and multifaceted impact on both student engagement and language proficiency in English language courses. The discussion interprets these findings within the broader context of existing literature.

1- Enhanced Student Engagement: Beyond Novelty to Meaningful Interaction The marked increase in student engagement aligns with theories of multimedia learning(Mayer, 2009) and the concept of flow (Csikszentmihalyi, 1990). The use of interactive tools such as language learning apps (e.g., Duolingo, Quizlet), collaborative platforms (e.g., Padlet, Google Jamboard).

-Behavioral Engagement: The use of interactive quizzes and games led to higher participation rates and more time-on-task. The immediate feedback mechanisms in these tools made students motivated and focused.

-Cognitive Engagement: Platforms that required students to create digital content (e.g., short videos, podcasts, blogs) fostered deeper cognitive processing. Students were not just consumers of language but active producers, which required higher-order cognitive skills like analysis and synthesis.

-Emotional and Social Engagement: Tools that facilitated peer collaboration (e.g., breakout rooms in Zoom, collaborative documents) reduced the anxiety often associated with speaking in a traditional classroom. The more anonymous or low-stakes nature of some digital interactions (e.g., answering a poll) encouraged shy or less confident students to participate, creating a more inclusive learning environment. However, it is crucial to note that engagement was not uniform. A small subset of students reported feeling overwhelmed by the multitude of platforms or frustrated by technical issues. This underscores the importance of pedagogical design over mere technology adoption.

2-Tangible Gains in Language Proficiency: Differentiated Impacts The study observed statistically significant enhancements in overall language proficiency, but the impact varied across specific skills.

-Receptive Skills (Listening and Reading): Technology provided unparalleled access to authentic, multimodal materials (news clips, podcasts, e-books, blogs). Exposure to varied accents, speeds, and genres significantly enhanced the comprehension of listening and reading fluency. Adaptive software that adjusted text difficulty was particularly effective in scaffolding reading skills.

-Productive Skills (Speaking and Writing): Gains here were closely tied to the specific tools used. Speech recognition software and apps like ELSA Speak provided students with invaluable, immediate pronunciation feedback, which is logistically impossible for a teacher to provide to each student consistently. Similarly, writing tools like Grammarly or collaborative blogs encouraged more drafting and revision, thereby improving writing accuracy and fluency.

-Vocabulary and Grammar: Gamified learning proved highly effective for the acquisition and retention of discrete language items like vocabulary and grammar rules. The repetitive, spaced repetition algorithms used by many apps align with cognitive science principles for memory retention.

3-The Crucial Role of the Teacher and Pedagogical Integration: A critical finding that resonates with prior research(e.g., Warschauer, 1996) is that technology itself is not a magic bullet. The most significant gains were observed in classrooms where technology was seamlessly integrated into a clear pedagogical framework. The teacher's role evolved from a "sage on the stage" to a "guide on the side" designing meaningful tasks, curating appropriate digital resources, and facilitating technology-mediated interactions. This study supports the TPACK (Technological Pedagogical Content Knowledge) framework, emphasizing that effective TALL requires a blend of technological, pedagogical, and content knowledge.

Conclusion

This study demonstrates that Technology-Assisted Language Learning, when implemented thoughtfully and pedagogically, is a powerful catalyst for enhancing both student engagement and language proficiency in English courses. It moves the learning experience beyond the confines of the textbook and classroom walls, offering personalized, interactive, and authentic language practice. The key conclusions are:

1-Engagement is Multidimensional: TALL positively impacts behavioral, cognitive, and emotional engagement by promoting active learning, collaboration, and reducing anxiety.

2-Proficiency Gains are Skill-Specific: Technology offers particularly strong support for receptive skills through authentic materials and for the acquisition of vocabulary and grammar through gamification. It additionally offers distinctive opportunities for improving productive skills via immediate feedback mechanisms.

3-Pedagogy is Paramount: The effectiveness of TALL is contingent on effective

integration into curriculum design. The teacher remains an indispensable element as a facilitator and designer of learning experiences.

4-Equity and Access are Fundamental Concerns: For TALL to be truly effective, institutions must address issues of digital equity to ensure all students have the necessary tools and connectivity to participate fully.

Recommendations and Future Directions Based on these findings, It is recommended that:

Educational institutions invest not only in technology but also in comprehensive professional development for teachers to build their capacity for effective TALL integration. Course designers adopt a blended learning model that strategically combines the best of face-to-face interaction with the advantages of digital tools. Further research be conducted over longer periods to examine the long-term sustainability of these gains. Future studies should also delve deeper into the differential impacts of specific types of technology (e.g., VR, AI chatbots) on various learner profiles. In conclusion, Technology-Assisted Language Learning represents a significant evolution in language education. It has the potential to create more dynamic, inclusive, and effective learning environments that prepare students not just to pass exams, but to use the English language confidently and competently in a globalized, digital world. proficient language learning settings for the student of the twenty-first century by going over both the compelling advantages and the considerable hurdles.

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