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# Artificial Intelligence and Foreign Language Enjoyment in EFL Classrooms: Effects on Student Engagement and Learning

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### Abstract

Affective and motivational experiences are widely recognized as important components of technology-enhanced EFL environments. Drawing on the framework of Positive Psychology in L2 Learning and Self Determination Theory (SDT), this study investigates the relationships among Foreign Language Enjoyment (FLE), engagement, psychological well-being, and technology acceptance among undergraduate EFL students at Qassim University, Saudi Arabia. The study used a convergent mixed-method design involving a survey ( $n = 412$ ) and focus group discussions with a smaller sample ( $n = 24$ ). The study computed Cronbach's alpha to assess instrument reliability, and the hypothesized relationships were tested through structural equation modeling (SEM). Results showed that perceived usefulness and perceived ease of use were significant predictors of the behavioral intention to use technology, which, in turn, was a significant positive predictor of FLE and engagement. FLE and engagement were also found to be significant positive predictors of psychological well-being. These trends were found to be consistent with qualitative data collected based on autonomy-supportive technology use, peer collaboration, and decreased anxiety. The results extend positive psychology research in SLA settings to an under-researched context of the Arabian Gulf higher education and have practical implications for technology-mediated pedagogy that supports learning a foreign language.

**Keywords:** Foreign language enjoyment, learner engagement, psychological well-being, technology acceptance, Positive Psychology, EFL, Saudi Arabia.

## Introduction

In the last decade, the use of digital tools in teaching English as a Foreign Language (EFL) has increased exponentially across the Arabian Gulf (Al-Ahdal, 2023). Driven by national digital transformation agendas, pedagogical reforms stemming from COVID-19, and a growing recognition that L2 affectivity is inextricable from L2 attainment, the revolution in learning management systems, mobile apps, gamified platforms, and collaborative digital workspaces has reshaped how the EFL classroom looks (Alghazzawi et al., 2021; Alkodimi & Al-Ahdal, 2022; Asadullah et al., 2023; Lutfi et al., 2022). This has resulted in a shift from the lecture model to the blended, student-centered activity-based model (Dahri et al., 2023).

In parallel with this technological change, developments in applied linguistics have redirected scholarly attention from anxiety and error correction in language learning to the emotional and motivational layers of language learning, resulting in what is now broadly referred to as Positive Psychology in Second Language Acquisition (PPSLA). This positive shift is centered on foreign language enjoyment (FLE), engagement, and psychological well-being (Derakhshan & Fathi, 2024; Tsang & Davis, 2024; Zheng & Zhou, 2023). FLE captures the emotion that learners experience when a language task is not threatening but pleasurable and energizing, and it has been consistently associated with persistence, willingness to

communicate, and academic achievement (Dewaele et al., 2022; Fang et al., 2025). Learner engagement is generally construed as a multidimensional construct that includes behavioral, cognitive, emotional, and social aspects. It refers to the extent and nature of the learner's involvement in language activities inside and outside the classroom (Chiu, 2022; Han et al., 2025). Psychological well-being, in turn, is a broader dimension of robust functioning, encompassing a sense of purpose and competence, positive relationships, and more than a fleeting mood (Zhou et al., 2022).

Although these three constructs are distinct, there is increasing evidence that they are dynamically intertwined. Positive experiences in the classroom often extend to how the learner feels, and the feeling of being engaged may, in turn, affect the positive experience in the classroom (Tsang & Davis, 2024; Zheng & Zhou, 2023). Two theoretical traditions can provide complementary lenses for understanding how technology-enhanced environments can foster a triad of enjoyment, engagement, and well-being. Positive Psychology in SLA is based on the well-established "broaden-and-build theory of positive emotions." This theory suggests that positive emotions broaden a person's cognitive and behavioral capacities, allowing them to engage more flexibly and creatively with difficult language tasks while building their capacities (Fang et al., 2025). Self-Determination Theory (SDT), however, provides a motivational architecture that focuses on three fundamental psychological needs: autonomy, competence, and relatedness which are thought to be necessary conditions for the development of intrinsic motivation, sustained motivation, and psychological well-being (Almansour & Al-Ahdal, 2020; Chiu, 2022; Zhou et al., 2022). Classrooms with technology are often seen as an opportunity for learners to satisfy these needs: to be autonomous in their access to digital resources and in the pace of learning, to become competent through digital corrective feedback and adaptive difficulty, and to have a sense of relatedness through digital collaborative spaces, peer feedback tools, and synchronous discussion forums (Belda-Medina & Marrahi-Gomez, 2023; Guo & Wang, 2024; Metruk, 2021; Panmei & Waluyo, 2023).

However, the extent to which these potential advantages are realized, and how they relate to learners' acceptance of technology, is a subject for empirical study that can vary widely across cultural and institutional contexts (Asadullah et al., 2023). The models that have emerged from the basic TAM assume that perceived usefulness and perceived ease of use are the two most important factors that affect the behavioral intention to use a specific technology, which in turn affects actual use (Lin & Yu, 2023). In the context of EFL, technology acceptance has been linked to learners' involvement, critical thinking, and satisfaction, indicating that learners' critical evaluative judgments about the use of digital tools may not only be peripheral to the learning process but can also affect the emotional and motivational rewards that the technology can provide (Han et al., 2025; Liu et al., 2023). Taking a stance that technology acceptance is a precursor to enjoyment, engagement, and well-being thus, provides a more comprehensive understanding of how digital learning environments engender psychologically rewarding experiences. This contrasts with the generalized background of technology use. Although there are many studies on FLE, engagement, and well-being in the EFL context, the empirical base is still overwhelmingly grounded in selective contexts, specifically in China and Iran, with far less work focusing on GCC universities where English is a compulsory foreign language in a higher education system characterized by rapid digitization, gender-segregation, and cultural distinctness (Alghazzawi et al., 2021; Asadullah et al., 2023).

Saudi public universities are an important, albeit underexplored, setting for examining how the use of technology for teaching and learning relates to learners' emotional well-being and motivation (Alghazzawi et al., 2021; Dahri et al., 2023). This is due to the importance of digital learning infrastructure and English as key tools for supporting economic diversification envisioned in Saudi Arabia's reform agenda, Vision 2030. Instructive case studies, such as this at Qassim University, a large public institution in central Saudi Arabia, where a linguistically and academically diverse undergraduate population routinely experiences blended and fully online learning in EFL, are valuable for highlighting the different ways in which blended or online EFL is implemented, illustrating its many modalities.

The present study examines the relationships among technology acceptance, foreign language learning, learner engagement, and psychological well-being among undergraduate EFL learners at Qassim University, adding to the corpus by exploring a novel setting. It has three interrelated objectives. First, it aims to psychometrically validate the available instruments for FLE, engagement, well-being, and technology acceptance in the Saudi cultural and institutional context. Second, it tests a structural model that hypothesizes that constructs of technology acceptance (perceived usefulness, perceived ease of use, and behavioral intention) predict FLE and engagement (Lin & Yu, 2023). These, in turn, predict psychological well-being, in line with the theoretical arguments of SDT and Positive Psychology in SLA (Chiu, 2022; Derakhshan & Fathi, 2024; Fang et al., 2025). Third, it triangulates these quantitative results with qualitative data collected during

focus group discussions and classroom observation to uncover the lived and contextualized meanings that Saudi EFL learners assign to enjoyment, engagement, and well-being in digitally mediated classrooms to establish generalizable statistical relationships as in some previous studies (Okumuş Dağdeler, 2023; Qui et al., 2023; Seyyedrezaei et al., 2024). It also conducted a sophisticated situational analysis of the relationship between accessibility, collaboration, and learner autonomy (the very qualities that have made technology-rich environments so popular among educators) and the emotional and motivational experiences that matter most in sustaining long-term language learning.

More than one rationale supported the choice of Qassim University for this study. It is one of the largest public universities in the Qassim region of central Saudi Arabia catering to students from a wide range of urban and rural backgrounds, many of whom gain access to systematic English language learning for the first time when they enter tertiary education. This variation in prior experience with English, along with the rapid adoption of LMS, mobile applications, and synchronous videoconferencing since the institution's post-pandemic digital transformation program, has resulted in a highly differentiated experience of the affective impact of technology-enhanced teaching and learning among students in the sample (Alghazzawi et al., 2021; Lutfi et al., 2022). The adoption of large-scale EFL technology at Qassim University is a relatively novel context since the change is not older than a decade. This provides a window into the initial psychological dynamics of the shift in pedagogies which can differ significantly from those reported in more digitally mature East Asian or European settings. Furthermore, the specific context of Saudi higher education, where male and female students are usually taught in separate sections or campuses, adds another layer of contextual specificity: technology-mediated collaboration tools such as synchronous discussion platforms and shared digital documents can have different social and relational meanings for learners who do not have the opportunity to interact face-to-face with the opposite gender. This can add a dimension to the relatedness-satisfying function assigned to collaborative technology by Self-Determination Theory (Chiu, 2022; Zhou et al., 2022).

This study also addresses a methodological gap in the literature. Most quantitative studies of FLE, engagement, and technology acceptance in EFL learning contexts adopt a single-method survey approach, which, although statistically robust, has limited scope to explain the processes by which statistical correlations emerge in learners' lived classroom experiences (Derakhshan & Fathi, 2024; Fang et al., 2025). By contrast, qualitative research on language learners' emotions is usually quite extensive in its contextual detail but seldom accompanied by a formal model that can be used to test the directionality and comparative strengths of the hypothesized links. The present study combines the statistical model of SEM with the qualitative model of focus group discussions and structured classroom observation in a single integrated design. This approach is relatively novel in the field of positive psychology in SLA and rare in the context of Gulf higher education.

## **Materials and Methods**

This study used a convergent parallel mixed-method design in which quantitative and qualitative data were collected simultaneously, analyzed independently, and results thereof triangulated to provide a more comprehensive analysis. The quantitative component comprised a cross-sectional survey, and the qualitative component comprised semi-structured focus group discussions and structured classroom observation. This design was selected because constructs of interest, such as enjoyment, engagement, well-being, and technology acceptance, can be measured in a standardized manner but are also idiosyncratic and can be flattened by numerical patterns alone, leaving the contextual texture that motivates the inquiry. The study sample comprised undergraduate EFL learners enrolled in compulsory and elective courses in English at Qassim University for two successive academic semesters.

A stratified convenience sampling procedure was used to isolate the sample with equal numbers of students in each academic year, by gender, and by college (Arts, Science, Applied Medical Sciences). A total of 412 students completed the survey (Mean age = 20.4 years; SD = 1.8; 54.6% females; 45.4% males). Across all courses, participants used some form of technology enhancement, such as the Blackboard learning management system, mobile vocabulary applications, and synchronous videoconferencing for at least one weekly session. Within this larger sample, 24 students (six groups of four) volunteered to participate in follow-up focus group discussions, and six whole classes were selected for classroom observation, but not participation, within a six-week period.

The study was approved by the institutional ethics committee, and all participants provided informed consent. Participation was voluntary and not linked to course grades. A single online questionnaire was used, including four validated self-report instruments, all of which were bilingual (Arabic-English) to reduce comprehension errors. Foreign language enjoyment was assessed with an adapted short form of the Foreign

Language Enjoyment Scale, comprising 10 items that measured both private and social aspects of foreign language enjoyment on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Learner engagement was assessed using a 16-item multidimensional scale based on the following dimensions: behavioral, cognitive, emotional, and social engagement, drawing on existing EFL engagement scales.

Psychological well-being was assessed using an 8-item short version of the scale to capture eudaimonic well-being, as outlined in the basic psychological needs discussed in Self-Determination Theory, including purpose, competence, and positive relationships. The instrument used to measure technology acceptance was a 12-item scale based on the Technology Acceptance Model (TAM) and consisting of three subscales: perceived usefulness, perceived ease of use, and behavioral intention to use. All scales were translated and reverse-translated by two bilingual applied linguists, and a pilot test with 40 students resulted in minor syntactical changes before actual administration. Reliability of the instruments was assessed using Cronbach's alpha coefficients, obtained separately for each scale, ranging from .70 to .80, which meant that they were acceptable and good, respectively, for psychological measurement.

Mean, standard deviation, skewness, and kurtosis were calculated to provide descriptive statistics for the sample's responses and to test the assumptions for the subsequent multivariate analyses. In addition, all latent constructs were analyzed for bivariate Pearson correlations which were computed before structural modeling. The hypothesized model was tested via a covariance-based structural equation model (SEM) with maximum-likelihood estimation. Multiple goodness-of-fit indexes were used to assess the fit of the model: chi-square-to-degrees-of-freedom ratio, comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Each had accepted cut-off points (CFI and TLI > .90, RMSEA < .08, SRMR < .08). Qualitative data was collected simultaneously with the administration of the survey. Focus group discussions were held in a combination of Arabic and English, based on participants' preferences, audio-recorded with consent, and transcribed and translated by 2 independent bilingual researchers, with translation fidelity as the goal.

A semi-structured protocol explored participants' positive and negative experiences of enjoyment, engagement, and stress/comfort in technology-mediated coursework, as well as their perceptions of autonomy, competence, and relatedness provided by specific digital tools. Classroom observation was conducted using a structured version of the engagement-observation protocol developed from previous engagement-observation tools. Trained observers documented the frequency and duration of episodes of classroom engagement, technology-mediated interactions, and observable affective displays during six 5-minute observation periods in each class.

Qualitative data analysis was conducted thematically using an inductive-deductive hybrid coding approach. The initial codes were derived from the SDT and Positive Psychology frameworks, and emergent codes were generated from the data. A 20% subsample of transcripts was independently coded by two specialists, yielding 87% agreement, with minor discrepancies resolved through discussion. The joint-display matrix combined quantitative and qualitative analyses at the interpretation level and enabled the identification of convergence, complementarity, and divergence in the statistical path estimates and the qualitative themes. Additional procedural safeguards were implemented to bolster the fidelity of the mixed-method design. To minimize potential common-method bias in the quantitative part, four versions of the questionnaire were counterbalanced, and a post hoc Harman's single-factor test was conducted to assess whether the observed associations were due to the shared method of measuring variables. A minimal amount of data was missing (less than 2% of cells across all scales) and was filled in with expectation-maximization imputation before running the SEMs, as recommended for small amounts of missingness, assuming the data was missing at random. In the qualitative strand, member checking was carried out with a group of eight focus group participants, who read the summary of the thematic interpretations and affirmed that the themes identified were related to their classroom experiences, thereby supporting the credibility of the qualitative results.

To minimize the risk of systematic drift in observers' coding over the six-week observation period, observers completed two training sessions using video-recorded pilot lessons, achieving an inter-observer agreement rate of 91% for engagement coding before the observations began. Quantitative data was analyzed in SPSS for descriptive statistics and reliability, followed by specialized software for confirmatory factor analysis and path analysis. A measurement model, including all six latent constructs, was first designed to ensure that all observed indicators loaded onto their intended latent factor. Convergent validity was assessed using standardized factor loadings, all greater than .60, and composite reliability estimates, all greater than .80. Discriminant validity was evaluated using the average variance extracted (AVE) criterion. The square root of the AVE for each construct was larger than its correlations with the remaining constructs, indicating that the

six constructs were empirically distinct, even though believed to be related. The hypothesized structural model was estimated after the measurement model achieved acceptable fit, consistent with the two-step approach to SEM recommended in the methodological literature. Demographic characteristics of the analytic sample are summarized in Table 1

**Table 1** Demographic Characteristics of Participants (N = 412)

| Characteristic        | Category                 | n   | %    |
|-----------------------|--------------------------|-----|------|
| Gender                | Male                     | 187 | 45.4 |
|                       | Female                   | 225 | 54.6 |
| Academic Year         | First Year               | 98  | 23.8 |
|                       | Second Year              | 112 | 27.2 |
|                       | Third Year               | 108 | 26.2 |
|                       | Fourth Year              | 94  | 22.8 |
| College               | Arts and Humanities      | 156 | 37.9 |
|                       | Science                  | 121 | 29.4 |
|                       | Applied Medical Sciences | 135 | 32.8 |
| Weekly Technology Use | Low (< 2 hrs/wk)         | 76  | 18.4 |
|                       | Moderate (2-5 hrs/wk)    | 148 | 35.9 |
|                       | High (5-8 hrs/wk)        | 122 | 29.6 |
|                       | Very High (> 8 hrs/wk)   | 66  | 16.0 |

Note. Percentages may not sum to exactly 100 due to rounding.

## Results and Discussion

The distribution of the participants was even across academic years and colleges, with moderate users comprising the largest group. A significant percentage were very high users of technology outside class hours for English language learning. The distribution aligns with survey results from other Saudi public universities which show rapid adoption of mobile and Web-based learning tools following the Kingdom of Saudi Arabia's shift to blended learning. The data was screened for outliers, non-responses, and violations of multivariate assumptions before substantive analysis. Seven multivariate outliers were identified by Mahalanobis distance values and retained in the main analysis following sensitivity checks that showed they did not substantially change parameter estimates.

The variance inflation factors for all predictor variables in the structural model ranged from 1.31 to 2.44, below the 5-rule-of-thumb threshold for substantial multicollinearity, and the structural coefficients reported below were stable. Previously, all study variables were approximately normally distributed, with skewness and kurtosis within the conventional range of -2 to +2, allowing use of maximum-likelihood estimation in the subsequent structural equation model. The overall level of instrument reliability was good, with Cronbach's alpha coefficients ranging from .81 to .90, well above the .70 benchmark. The reliability was thus, comparable to that of other parallel instruments reported in previous studies on EFL technology-acceptance and enjoyment.

Table 2 and Figure 1 indicate that learners' reported scores were generally positive, with means above the scale midpoint of 3.0 across all constructs. The highest endorsement was for perceived usefulness of technology (M = 4.02, SD = 0.52), followed closely by perceived ease of use (M = 3.94, SD = 0.55) and behavioral intention to use technology (M = 3.97, SD = 0.51). Foreign language enjoyment (M = 3.86, SD = 0.58) and learner engagement (M = 3.79, SD = 0.61) also scored high. Psychological well-being (M = 3.71, SD = 0.66) had the highest degree of variability.

**Table 2** Descriptive Statistics and Internal Consistency Reliability of Study Measures

| Construct                   | Items | M    | SD   | Skewness | Kurtosis | Cronbach's $\alpha$ |
|-----------------------------|-------|------|------|----------|----------|---------------------|
| Foreign Language Enjoyment  | 10    | 3.86 | 0.58 | -0.34    | 0.21     | .87                 |
| Learner Engagement          | 16    | 3.79 | 0.61 | -0.28    | 0.17     | .89                 |
| Psychological Well-Being    | 8     | 3.71 | 0.66 | -0.22    | -0.11    | .81                 |
| Perceived Usefulness        | 4     | 4.02 | 0.52 | -0.41    | 0.35     | .90                 |
| Perceived Ease of Use       | 4     | 3.94 | 0.55 | -0.37    | 0.28     | .86                 |
| Behavioral Intention to Use | 4     | 3.97 | 0.51 | -0.39    | 0.30     | .88                 |

Note. N = 412. All items rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree)

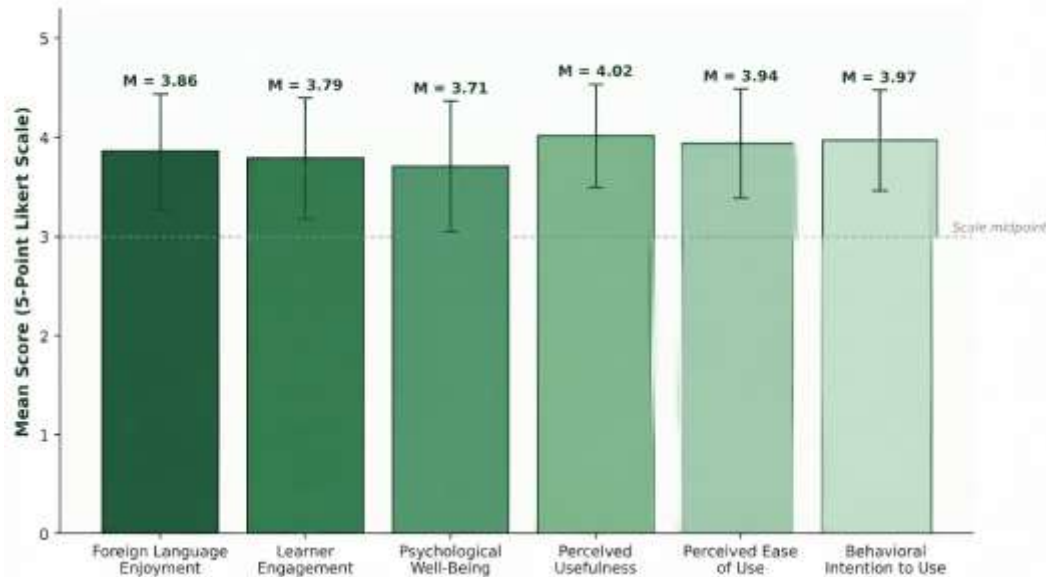


Figure 1. Descriptive means and standard deviations of study constructs.

The pattern above suggests learners' awareness that the use of digital tools is convenient and helpful in language learning. However, the link between positive technology attitudes and psychological flourishing is an individually shaped, variable process, in line with previous research indicating that acceptance of digital tools is a necessary but not sufficient condition for psychological well-being in language classrooms. No statistically significant gender differences were found on any of the six constructs in a supplementary independent-samples t-test (all  $p > .10$ ), implying that enjoyment, engagement, and well-being benefits of technology-enhanced instruction were not significantly different across the male- and female-segregated sections that characterize Saudi higher education.

Similarly, a one-way analysis of variance for academic year indicated no significant differences in enjoyment or well-being. However, students in the final year of study showed higher engagement,  $F(3, 408) = 3.12$ ,  $p = .026$ . This is likely due to the increased likelihood of having experienced a full year of study in the digital learning infrastructure over time, compared with students with lesser exposure. These additional analyses support the main result of this study: technology acceptance and its affective antecedents are relatively consistent across the various demographic groups in this sample. This provides confidence in the generalizability of the subsequent structural model in the context of Qassim University. The correlations among the six latent constructs were bivariate and moderately strong and positive and matched the hypothesized structural model. Foreign language enjoyment was most strongly correlated with learner engagement ( $r = .62$ ) and psychological well-being ( $r = .58$ ). The three technology-acceptance constructs were most strongly correlated with each other, with the highest cross-construct correlation between perceived usefulness and behavioral intention ( $r = .63$ ). Significantly, the technology-acceptance constructs were more strongly correlated with engagement than directly with well-being. This suggests a mediation pathway in which technology acceptance affects well-being more through its impact on the affective and behavioral experience of the classroom than through a direct psychological pathway.

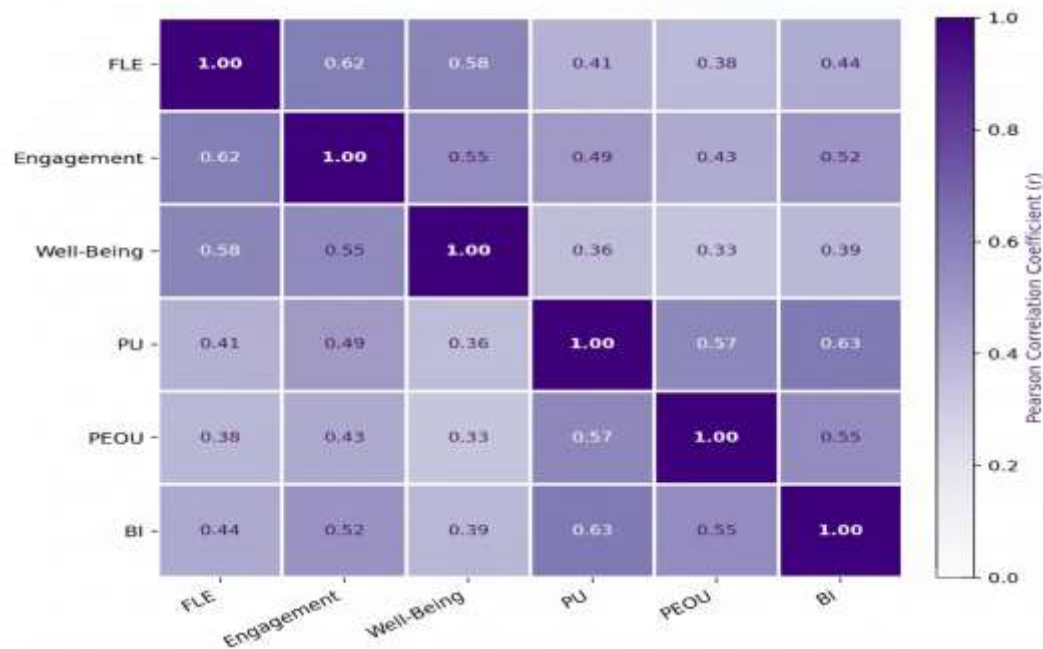


Figure 2. Correlation matrix among latent study variables.

The hypothesized model in Table 3 and Figure 2 supports the data well ( $\chi^2/df = 2.14$ , CFI = .96, TLI = .95, RMSEA = .052, SRMR = .046), and all hypothesized paths were significant at  $p < .01$ . As in classic technology-acceptance theorizing, perceived ease of use was a significant predictor of perceived usefulness ( $\beta = .49$ ). Both constructs, along with perceived usefulness, were significant predictors of behavioral intention to use technology ( $\beta = .41$  and  $\beta = .33$ , respectively).

**Table 3** Standardized Structural Equation Model Path Coefficients

| Structural Path                                                   | $\beta$ | SE  | t    | p     |
|-------------------------------------------------------------------|---------|-----|------|-------|
| Perceived Ease of Use $\rightarrow$ Perceived Usefulness          | .49     | .05 | 9.12 | <.001 |
| Perceived Usefulness $\rightarrow$ Behavioral Intention           | .41     | .06 | 7.34 | <.001 |
| Perceived Ease of Use $\rightarrow$ Behavioral Intention          | .33     | .06 | 6.02 | <.001 |
| Behavioral Intention $\rightarrow$ Foreign Language Enjoyment     | .37     | .05 | 6.85 | <.001 |
| Perceived Usefulness $\rightarrow$ Foreign Language Enjoyment     | .29     | .06 | 5.11 | .002  |
| Behavioral Intention $\rightarrow$ Learner Engagement             | .35     | .05 | 6.47 | <.001 |
| Foreign Language Enjoyment $\rightarrow$ Learner Engagement       | .44     | .05 | 8.03 | <.001 |
| Foreign Language Enjoyment $\rightarrow$ Psychological Well-Being | .40     | .06 | 7.15 | <.001 |
| Learner Engagement $\rightarrow$ Psychological Well-Being         | .36     | .06 | 6.29 | <.001 |

Note. Model fit:  $\chi^2/df = 2.14$ , CFI = .96, TLI = .95, RMSEA = .052 [90% CI: .045, .059], SRMR = .046. All paths significant at  $p < .01$ .

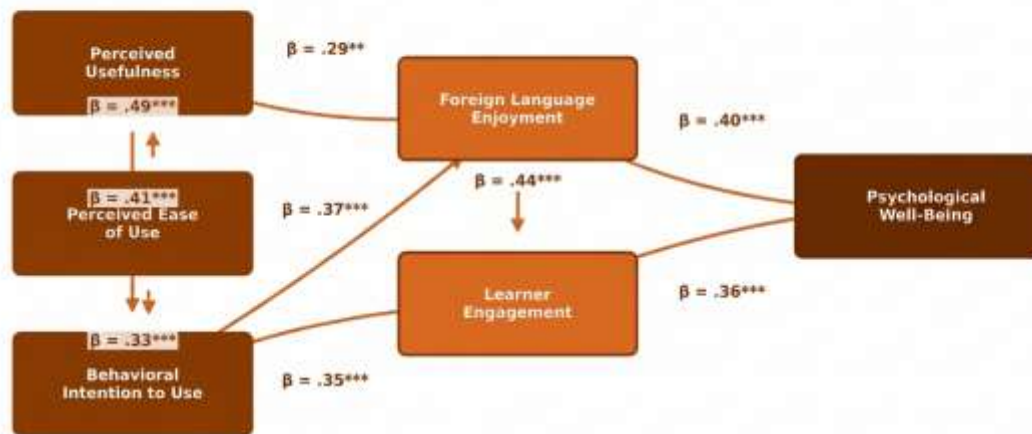


Figure 3. Structural equation model of hypothesized relationships among technology acceptance, foreign language enjoyment, engagement, and well-being.

In turn, behavioral intention was strongly correlated with foreign language enjoyment ( $\beta = .37$ ) and learner engagement ( $\beta = .35$ ) and exerted a direct effect on foreign language enjoyment, with perceived usefulness ( $\beta = .29$ ). This indicates that learners' overall attitudes toward the usefulness of a tool influenced foreign language enjoyment beyond the influence of overall intention to use the tool.

Foreign language enjoyment strongly predicted learner engagement ( $\beta = .44$ ), and in turn, foreign language enjoyment score predicted psychological well-being ( $\beta = .40$ ). Moreover, learner engagement scores also predicted psychological well-being ( $\beta = .36$ ), and together the two scores explained a substantial share of the variance in well-being. To examine the indirect pathways suggested by this structural model, bootstrapped mediation analyses (5,000 resamples, bias-corrected 95% confidence intervals) were conducted on the two major indirect effects of theoretical interest. The indirect effect of behavioral intention on psychological well-being via foreign language enjoyment was significant (indirect  $\beta = .15$ , 95% CI [.09, .21]). The indirect effect of behavioral intention on well-being via learner engagement was also significant (indirect  $\beta = .13$ , 95% CI [.08, .19]). Enjoyment and engagement were thus found to be significant partial mediators between technology acceptance and psychological well-being, both in the main model and when added as mediators in a supplementary model. Technology acceptance did not have a direct path to psychological well-being, suggesting that the relationship between technology acceptance and psychological well-being is a joint function of enjoyment in using technology and being engaged in the technology experience. This full-mediation pattern has theoretical implications, as in this sample, digital tools seem to have a positive impact on learners' well-being only when they are perceived as fun and interesting, but not when they are used instrumentally.

The results of these structures provide strong quantitative evidence for the theoretical model linking Self-Determination Theory, Positive Psychology in SLA, and the Technology Acceptance Model. The strong path from enjoyment to engagement is consistent with the broaden-and-build logic of positive psychology which suggests that positive emotions should not be viewed solely as a result of successful learning but as a resource that can catalyze ongoing behavioral, cognitive, and social investment in the language classroom. At the same time, high levels of behavioral intention for both enjoyment and engagement support the hypothesis that technology acceptance serves as a proximal psychological entry point. In other words, when EFL learners perceive a tool to be useful, easy to use, and worth adopting, they tend to find it enjoyable and engage more

with it. This aligns with findings from previous SEM-based studies connecting technology acceptance to learner engagement and critical thinking in EFL settings.

To further explore the relevance of these relationships, participants were divided into four groups based on their self-reported weekly use of English learning technology. Mean enjoyment, engagement, and well-being scores increased consistently from the low-use to the high-use groups and then leveled off or decreased slightly for the very-high-use group, as shown in Figure 4. This relationship indicates that moderate to high technology engagement will generally be linked to positive affective and motivational outcomes, but that extremely high levels of engagement may not provide further benefit and could even begin to negatively affect enjoyment and well-being for some learners because of fatigue, decreased face-to-face contact, or diminishing marginal novelty. This is in line with general concerns about potential technology-induced cognitive overload and screen fatigue highlighted in CALL literature, where digital devices are used without adequate human support.

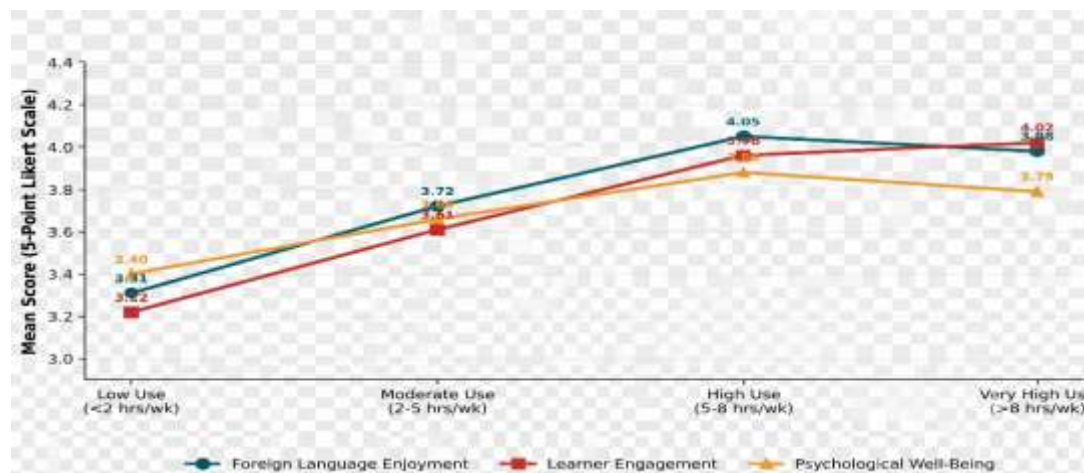


Figure 4. Mean enjoyment, engagement, and well-being across technology-use frequency groups.

Qualitative results from the focus group discussions and classroom observations aligned with the quantitative results and provided important contextual nuance in this study. Focus group transcripts were thematically analyzed, yielding three primary themes: autonomy-supportive flexibility, collaborative relatedness, and anxiety buffering. Many participants reported enjoying the opportunity to use mobile apps and online learning materials for self-directed, non-social practice of English at their own pace and to review difficult content in their own time. Using a vocabulary application before the graded quiz enabled some participants to gradually build confidence in their understanding of the words, rather than having them corrected publicly in the moment. This echoed the autonomy aspect of Self-Determination Theory and was voiced in five of the six focus groups. The second theme concerned collaborative relatedness: participants described how they felt they could build peer relationships through synchronous breakout-room discussions and shared digital documents, experiences that felt less awkward or uncomfortable than standing up and reaching out for help in a large lecture hall. The third theme was anxiety buffering: participants perceived that some technologies, especially recorded speaking submissions and discussion boards that were not real-time, buffered the immediate anxiety of being called out in class, thereby indirectly enhancing enjoyment and sustained engagement.

These qualitative themes were supported at the behavioral level by classroom observation data. Technology-mediated activities, such as collaborative document editing, live polling, and gamified quiz platforms were associated with stronger on-task behavior. Peer engagement across the six identified sections aligned with quantitative results that behavioral intention to use technology was predictive of engagement levels. However, observers found that technology's contribution to engagement was less strongly linked to those sections of the lesson in which teachers used technology for passive content delivery (e.g., static slide shows) rather than active, interactive, and/or collaborative use of technology. This suggests that it is not the technology itself but how teachers use it in the classroom that moderates its ability to translate into meaningful engagement and enjoyment. This observation further supports quantitative structural results of the study by suggesting that the strength of technology-to-enjoyment and technology-to-engagement pathways may vary

depending on how instructors design the technology-mediated tasks, a point that quantitative analysis alone may not have demonstrated. Convergent evidence from the quantitative and qualitative strands in this study supports the idea that technology acceptance is a significant, but not exclusive, predictor of foreign language enjoyment and engagement, which, in turn, impacts learners' psychological well-being in Saudi EFL classrooms.

Results of this study support previous studies, mostly conducted in East Asian and Iranian contexts, indicating that the underlying theoretical framework of SDT and PP in SLA seems to transfer well across cultures. Concurrently, classroom observation indicated a pedagogical- framing nuance and the curvilinear technology- use pattern as depicted in Figure 4. Both highlight specific design features, including autonomy support, collaborative structure, and anxiety-reducing affordances, that seem to serve as the mechanisms connecting technology-enhanced environments to learner flourishing. The magnitude of the enjoyment- to-engagement path ( $\beta = .44$ ) falls within the range of previous EFL studies. Findings of this study provide evidence that the affective and motivational benefits of engaging and enjoyable technology-enhanced instruction do not only manifest during the actual classroom episode but also spread into learners' broader psychological functioning. This discovery supports the Positive Psychology movement's efforts to recognize well-being as an important and measurable teaching goal, alongside language learning.

## Conclusion

This study explored the relationships among technology acceptance, foreign language enjoyment, learner engagement, and psychological well-being in the context of technology-enhanced Saudi higher education. Positive Psychology in Second Language Acquisition (SLA) and Self-Determination Theory underpinned the study. It adopted a mixed-method approach that used structural equation modeling along with focus group discussions and classroom observation. Results indicated that perceived usefulness, perceived ease of use, and behavioral intent to use technology significantly predict foreign language enjoyment and learner engagement. Enjoyment and engagement, in turn, are significant predictors of psychological well-being. Qualitative results confirmed the quantitative findings and explained the mechanisms underlying these relationships: the most important ways in which technology-rich classrooms led to positive emotional and motivational experiences were by providing autonomy-supportive flexibility, collaborative relatedness, and anxiety reduction.

The results also show that the educational value of technology is determined not by the availability of digital technologies, but by how they are used. This study is the first to examine the concepts of Positive Psychology and Self-Determination Theory in an EFL context in the Gulf. This shows that technology can be used meaningfully in language instruction to lead to measurable gains in enjoyment, engagement, and psychological well-being, and that accessibility, collaboration, and learner autonomy can play a role in achieving these gains.

The results also have implications for EFL teachers, curriculum designers, and policymakers as they highlight strategies to promote language development and students' psychological well-being in EFL environments using information and communication technology (ICT). The results are largely consistent with an emerging applied linguistics view that the cognitive/linguistic approach alone is insufficient for comprehending and designing language education. The results indicate that investment in digital learning infrastructure should be assessed by its impact on learners' educational well-being, as Saudi Arabia and other Gulf countries invest in digital learning as part of national transformation plans. The findings support the view that technology is most effective when it allows learners to be autonomous in their learning, promotes authentic collaboration among learners, and minimizes the emotional stress of language learning. Instructors, curriculum designers, and policymakers carry the onus to create enjoyable, engaging, and psychologically supportive learning environments by focusing on digital access.

## Recommendations

It is recommended that future research explore threshold or dosage effects, given the curvilinear pattern in technology use observed in this study. Participants for qualitative studies should be recruited purposively, such as students with low technology usage and those with greater academic risk. Such studies would help gain more in-depth knowledge about how technology-enhanced pedagogy can be used to cater to the different needs of Saudi EFL students, including those who find technology to be a challenge rather than an opportunity. Finally, intervention studies can experiment with specific features of instruction that emerge from the qualitative results, such as assessing speaking (asynchronously or synchronously) or assessing speaking (individually or

collaboratively). These studies would help identify the specific pedagogical practices that impact student enjoyment, engagement, and well-being.

Longitudinal or experimental designs would be useful in future studies to identify causal relationships among technology acceptance, enjoyment, engagement, and well-being. Such designs would also allow scholars to examine whether these relationships are reciprocal over the course of a school year or degree program. Comparative studies across several universities in Saudi Arabia and the Gulf region would help determine whether the results are unique to Qassim University or representative of the higher education environment in the region. Objective measures of language achievement, in addition to self-report measures of motivation and affectiveness, should also be included in future studies. This would enable researchers to determine whether the language competency pathway of enjoyment, engagement, and well-being is associated with tangible gains in language skills.

## Limitations

Some limitations were observed in this study. First, the survey being cross-sectional causal conclusions cannot be drawn. Second, because sampling was conducted at a single university, the generalizability of the results is limited. The study offers some interesting insights in the context of Qassim University, but the findings might not be applied directly to other Saudi universities or the higher-education system in the Gulf. These concerns are particularly relevant for constructs like well-being which can be culturally sensitive in contexts where psychological concerns are not necessarily discussed in public forums. Fourth, the qualitative sample was adequate to achieve thematic saturation in a focus-group design, but it represented only a small proportion of the larger quantitative sample. This could have systematically excluded more introverted students, or at least those less involved with technology. Finally, the study lacked direct measures of objective language proficiency or academic achievement outcomes.

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