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Enhancing the SHAD platform: Exploring the Emotional Influence of Telegram-supported supplementary tasks on Learners' Happiness, Technostress, Autonomy, Growth mindfulness, and Resilience

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Abstract

SHAD is a commonly utilized technological platform for educational purposes among children and adolescents in Iran. Yet, the ways to enrich it to enhance users' psychological well-being have remained underexplored. This experimental study aimed to investigate the impacts of incorporating supportive tasks through the Telegram app into the SHAD platform on the happiness, technostress, autonomy, growth mindfulness, and resilience of 87 male intermediate English language learners aged 17 to 19 years over an academic semester. The participants were randomly assigned to an experimental group (EG) comprising 44 students and a control group (CG) consisting of 43 students who underwent pretest and posttest assessments. While the CG received standard online instruction via the SHAD platform, the EG received additional supportive tasks through the Telegram app alongside the standard instruction. A MANOVA analysis demonstrated that integrating Telegram as a supplementary tool within the SHAD platform significantly enhanced learners' psychological well-being, increasing happiness, autonomy, growth mindfulness, and resilience while reducing technostress. These findings underscore the potential of integrating complementary technological tools to alleviate the negative repercussions, such as technostress, associated with educational technology and enhance positive psychological outcomes for learners. The implications of this study can guide the development and implementation of future educational technology initiatives, fostering a more supportive and empowering learning environment for students.

Keywords: Autonomy, Growth mindfulness, Resilience, SHAD application, Technostress.



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I | INTRODUCTION

Pursuing student happiness and engagement in virtual classrooms is a central objective for educators (Bond, 2020). Engagement in education encompasses guiding students, fostering attentive behavior, facilitating assignments, and nurturing curiosity so that they can embark on their educational journey with a sense of enjoyment, vitality, and elation (Lu et al., 2022). These procedures will result in inducing positive emotions in the students, which, in turn, play a pivotal role in shaping resilience during the educational journey of school-age children whose learning characteristics are different from



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those of adults (Li et al., 2020). To enhance these unique learning characteristics of young learners, the strategic use of diverse technological tools has emerged as transformative (Aminov & Mirxayitova, 2023). Among these tools, mobile technologies have stood out as influential educational facilitators (Ahmadi & Esmali, 2023). They serve to introduce innovative pedagogical approaches that can optimize children's learning potential (Shobeiry, 2023). Additionally, the ubiquity, flexibility, and multifaceted capabilities of mobile technologies make them compelling educational instruments for today's school-age children.

However, the attraction of mobile technologies was met with numerous challenges during the unprecedented COVID-19 pandemic lockdown, which prompted a global shift from traditional classrooms to virtual instruction. This abrupt transition placed immense pressure on educational systems worldwide, directing a surge in studies examining students' perceptions of virtual learning environments across diverse settings to improve virtual pedagogy (Zhang & Wu, 2022; Mirzadeh Rahni & Parsaiyan, 2023). Like other regions, Iran faced this abrupt transition in late February 2020 when the government closed schools and universities in response to the pandemic. Consequently, the Iranian Ministry of Education introduced a national virtual learning platform, SHAD, an acronym translated into the Students' Education Network in Persian. SHAD was initially conceived as a mobile-assisted learning application; however, the Ministry of Education later introduced a computer-supported version. Notably, early users of SHAD, including educators and students, encountered problems regarding the software quality and a lack of interactive pedagogical features (Shobeiry, 2022). Despite recent updates, SHAD still requires substantial improvement to reach the standards of an effective virtual learning environment. In this sense, two critical areas of enhancement are reported within the SHAD application, including motivating language learners for immersive experiences and offering pedagogical options for autonomous learning (Moaddab et al., 2022). In addition to these shortcomings of SHAD, considering the potential of well-established e-learning platforms to cultivate sustained mindfulness and consistency in the learning process (Wang et al., 2020), the existing literature lacks a practical framework for optimizing SHAD to engage, inspire, and integrate students actively. Noticing this gap, the current study seeks to address the limitations of the existing literature by proposing a practical approach to enhance the application of SHAD. By investigating the potential impact of integrating supportive activities delivered via the Telegram app, this research aims to shed light on their influence on students' happiness, technostress, autonomy, growth mindfulness, and resilience in virtual education. Doing so, this research is of significance as it makes contributions to the knowledge base, providing insights to educators, policymakers, and researchers engaged in the field of virtual education. By exploring the interplay between supportive activities and students' psychological well-being, the study promises to guide the development of effective virtual learning environments.

II. REVIEW OF LITERATURE

The world of education has witnessed a significant transformation in recent years, with virtual learning environments emerging as a prominent avenue for language learners. In this digital age, where technology permeates every aspect of our lives, using virtual platforms for language acquisition has become commonplace (Wong, 2023). In light of this, it appears essential to establish a precise definition of the term "student enjoyment/happiness" and review the research conducted on this aspect. Such a review is significant for gaining a deeper insight into the elements that can shape this sentiment among language learners and, in turn, impact the overall quality of their language-learning endeavors.

1. Student Enjoyment or Happiness

Student enjoyment or happiness in e-learning contexts is defined as the learners' positive perception of their online learning experiences throughout the virtual pedagogical programs (Díaz-Noguera et al., 2022). In this regard, student enjoyment or happiness is considered a powerful catalyst in language



learning (Alqurashi, 2019). Students who enjoy the learning experience are more likely to be motivated, engaged, and persistent in their learning efforts (Ahmadi, 2023). Furthermore, student enjoyment is a driving force that encourages language learners to proactively participate in language lessons, practice, and interact with their peers, all essential for a successful language learning procedure (Baber, 2020).

The significance of student enjoyment is well-documented in current literature to determine students' dropout rates, motivation to complete online courses and overall academic success (Landrum et al., 2021). Moreover, other pertinent studies have shed light on the factors contributing to student enjoyment, including self-perception, capacity for sustained focus, and inclination toward autonomous learning (Hamdan et al., 2021). For instance, Abuhassna et al. (2020) investigated students' perceptions of online courses. They revealed a strong connection between the students' enjoyment and various aspects of their online learning experience, such as their learning time, motivation, and degree of interaction with instructors. Similarly, Alqurashi (2019) explored the intricate interplay of the multiple variables of learners' self-efficacy, learner-learner interaction, learner-instructor interaction, learner-content interaction, and student enjoyment. The outcomes of this study underscored the significance of learner-content interaction as the most influential factor contributing to the students' perceived sense of enjoyment.

In another study, Hamdan et al. (2021) explored the university students' perception of their self-efficacy, self-regulation, and enjoyment of the online schooling program during the COVID-19 lockdown. Their results revealed that the learner-instructor interaction was of the highest importance for university students, while their enjoyment of the course was found to be of the lowest level due to the shortages of learner-instructor interactions during the course. Moreover, student enjoyment was predictable in this research based on their self-regulation, self-efficacy, peer interactions, and learning content. Concentrating on the utilization of the SHAD platform in Iran, another study was conducted on the impact of various aspects of SHAD on Iranian elementary school students. It showed a positive influence of SHAD on students' creativity, enjoyment, and motivation during the course (Ahmadi, 2023). In a similar vein of research in the context of Iran, Seyri et al. (2021) studied the perceptions of female high school students regarding their online English learning experiences through e-learning platforms. Their findings provided valuable insights, showcasing that students enjoyed their online learning experiences. They attributed this enjoyment to several factors, including their self-efficacy, the quality of interaction with the course content, and engagement with instructors. Moreover, the students were found to believe that online courses could be highly effective in facilitating their learning when they felt a sense of independence and self-regulation.

2. Technostress in Virtual Learning

Technostress, within virtual learning contexts, is characterized by the psychological discomfort or anxiety arising from the use of technology in various aspects of e-learning programs (Ingusci et al., 2023). As Asad et al. (2023) revealed, the intricacies of e-learning platforms often lead learners to experience technostress. This stress emerges from challenges related to platform navigation, content engagement, and data privacy and virtual security concerns. In this sense, Lee et al. (2022) argued that frequent software updates, technical glitches, and compatibility issues exacerbate learners' experience of technostress within e-learning environments. This state of technological anxiety can harm learners' overall sense of happiness and enjoyment in virtual learning settings, which manifests in various ways (Chen et al., 2019). For instance, it can result in reduced engagement and motivation (Adewale & Tahir, 2022), impair the overall learning experience (Ryan & Deci, 2000), and lead to a negative emotional state (Astin, 1975). To elaborate, technostress in e-learning contexts has several noteworthy consequences. Firstly, it can divert students' attention from the learning content, reducing participation and interest in the program and ultimately impacting their happiness and enjoyment (Adewale & Tahir, 2022). Secondly, technostress can hinder the quality of the learning experience by causing frustration as students constantly deal with technical issues (Ryan & Deci, 2000). Lastly, it can induce negative emotional states such as anxiety, frustration, and anger when students face technological challenges, which not only impede their learning but also harm their overall enjoyment of learning and happiness (Tarafdar et al., 2015).



3. Autonomy in Virtual Learning

An essential element within e-learning is autonomy, which signifies learners' control over their learning procedure (Baber, 2020). Autonomy in e-learning contexts empowers learners to take the reins of their educational journey, enabling them to decide what and how they learn and set their own pace. Noticing these points, autonomy is pivotal in shaping the learners' sense of enjoyment within virtual pedagogical settings (Atoy et al., 2020). This sense of enjoyment arises from the empowerment accompanying autonomous learning (Atoy et al., 2020). It grants students the freedom to choose when and where they engage in learning, what resources they utilize, and how they approach their studies (Atoy et al., 2020; Baber, 2020). Consequently, learners who possess a high degree of autonomy in their e-learning experiences tend to report a higher level of fulfillment and happiness in that rigid schedules or prescribed methods do not confine them; instead, they tailor their learning to align with their individual needs and preferences (Atoy et al., 2020). Autonomy also nurtures intrinsic motivation, where learners engage in learning for the sheer joy of it rather than for external rewards (Baber, 2020). This perspective aligns with the self-determination theory introduced by Ryan & Deci (2000), which identifies autonomy as a vital psychological need driving human behavior. In learning contexts where learners have autonomy, they are more likely to experience a sense of competence and relatedness, which enhances their enjoyment throughout the learning process (Atoy et al., 2020). Additionally, autonomy enables learners to select topics and methods that resonate with their interests and learning styles, which fosters higher engagement and enthusiasm in their studies. By theorizing learner involvement, Astin (1984) proposes that this involvement is closely linked to the students' achievement and overall sense of enjoyment in the classroom (Gupta & Verma, 2020).

4. Mindfulness in Virtual Learning

Within the context of e-learning, mindfulness is defined as an individual's capacity to sustain concentration on the ongoing learning task, effectively manage potential distractions, and uphold a serene, attentive mental state that embodies an active involvement in the learning process and intensified self-awareness (Berdida & Grande, 2023). As students increasingly immerse themselves in digital learning environments, an exploration of the role of mindfulness emerges as an imperative endeavor. Such exploration seeks to elucidate the impact of mindfulness on their educational experiences and, inextricably, on their overall enjoyment and happiness with the learning process (Eva et al., 2020). In this regard, incorporating mindfulness practices into the students' learning experience serves a twofold purpose. Firstly, it encourages students to engage critically with the course content. Secondly, it equips them with emotional resilience, allowing them to navigate challenges more effectively (Eva et al., 2020). Additionally, mindful engagement leads students to active participation in online discussions, assignments, and collaborative projects, which nurtures a sense of belonging and enjoyment among learners (Berdida & Grande, 2023). The sense of happiness and self-awareness, stemming from mindfulness in e-learning environments, offers a robust defense against procrastination (McClelland, 2015). By gaining awareness of their tendencies, students are better equipped to manage their time efficiently, creating a sense of accomplishment and happiness in their education (Ismail & Heydarnejad, 2023).

5. Resilience in Virtual Learning

Resilience in educational psychology refers to an individual's capacity to adapt, rebound from setbacks, and flourish in the face of the difficulties existing in pedagogical contexts (Ryan & Deci, 2020). In the specific context of e-learning, resilience embodies a learner's ability to navigate the digital context, proficiently manage technical challenges, sustain motivation, and persist in pursuing knowledge despite potential obstacles (Eva et al., 2020). In virtual learning environments, resilience encapsulates the mental and emotional fortitude of learners and necessitates excelling in a particular task, which, in turn, can directly influence the students' sense of enjoyment in language learning (Eva et al., 2020). This enjoyment stems from various opportunities intertwined with students' resilience in e-learning settings. Firstly,



resilient learners are better equipped to tackle the inevitable obstacles encountered in online education. This point, in turn, positively impacts their academic performance, fostering a sense of accomplishment that contributes to their happiness (Namaziandoost et al., 2023). Secondly, resilient students tend to exhibit a high level of engagement in their e-learning courses, cultivating a positive learning experience and ultimately enhancing learners' overall enjoyment (Eva et al., 2020). Lastly, resilient learners adeptly manage stress (McClelland, 2015). Their ability to bounce back from setbacks diminishes anxiety from technological issues or academic difficulties (McClelland, 2015).

6. Conceptual Framework of The Study

The conceptual model for this research, illustrated in Figure 1, involves a triangle of interconnected theories, including achievement motivation theory (McClelland, 2015), involvement theory (Astin, 1975), and self-determination theory (Ryan & Deci, 2020). Within this model, the essential elements of each theoretical framework are delineated, demonstrating their interconnectedness and how they form a cohesive dynamic model that underpins the research design and structure of this study. The following lines provide a concise overview of each facet of the conceptual framework and its relation to the variables involved in this study.

Achievement motivation theory (McClelland, 2015) asserts that a desire for success and accomplishment drives individuals. When applied to virtual language learning, this theory implies that learners who possess an intrinsic motivation to attain language proficiency are more inclined to derive happiness and satisfaction from their e-learning endeavors. This occurs through the cultivation of autonomy and resilience within the learning process (Alam, 2022). To expound further, language learners driven by achievement motivation often establish well-defined, attainable language goals within their e-learning programs. This process of goal setting fills students with a sense of self-direction, subsequently contributing to their perception of autonomous learning and a sense of accomplishment as they progress (Alhazbi & Hasan, 2021). Furthermore, learners with high achievement motivation tend to exhibit greater resilience when confronting challenging language tasks and overcoming obstacles in their e-learning courses. This resilience, in turn, nurtures a profound sense of pride and contentment over time (Alam, 2022).

From a more technical perspective, achievement motivation theory focuses on individuals' intrinsic motivation for success. In the context of language learning, learners with high achievement motivation tend to set clear goals in their e-learning programs, which, in turn, could foster a sense of autonomy as they take charge of their language-learning journey. This point is the primary concern of the self-determination theory, which is described in the following lines. As the learners progress towards their goals, they experience a sense of accomplishment, contributing to their enjoyment and growth in their language learning procedure. Additionally, due to their achievements as a source of motivation, their resilience and involvement in the learning procedure could help them overcome their learning challenges, such as technostress and anxiety, which are the primary concerns of the involvement theory.

Involvement theory, deeply rooted in psychology and education and initially proposed by Astin (1975), strongly emphasizes the active engagement of learners in the learning process. When applied to language learners in e-learning programs, this theory underscores the pivotal role of active participation and a sense of ownership over their educational journey (Pirson et al., 2012). Active participation refers to students' robust engagement in various e-learning activities, including discussions, group projects, and language immersion exercises. This dynamic involvement creates a profound sense of belonging and connectedness among learners, ultimately contributing to their enjoyment of the learning procedure (Eva et al., 2020).

Self-determination theory (Alam, 2022) posits that individuals possess intrinsic needs for autonomy, competence, and relatedness. When these fundamental needs are met, individuals are more likely to experience high motivation, happiness, and satisfaction. This theory holds significant implications for language learners in e-learning programs. The theory underscores the importance of learners' competence in their language-learning journey. It suggests that e-learning programs that provide opportunities for



learners to monitor their progress and receive constructive feedback significantly contribute to their sense of competence and, by extension, their happiness (Agawa et al., 2023). Additionally, self-determination theory highlights the significance of social interactions for language learners in e-learning settings. It emphasizes the role of these interactions in learners' overall satisfaction (Agawa et al., 2023). According to this theory, learners who have the autonomy to make choices in their e-learning procedure, such as selecting study materials and setting their pace of learning, are more motivated and satisfied. This autonomy also reduces technostress, as learners control their learning environment (Agawa et al., 2023). Additionally, providing opportunities for learners to monitor their progress and receive feedback enhances their competence, leading to enjoyment and growth (Alam, 2022). Lastly, emphasizing social interactions in e-learning settings satisfies the need for relatedness, enhancing learner satisfaction and mindfulness (Agawa et al., 2023).

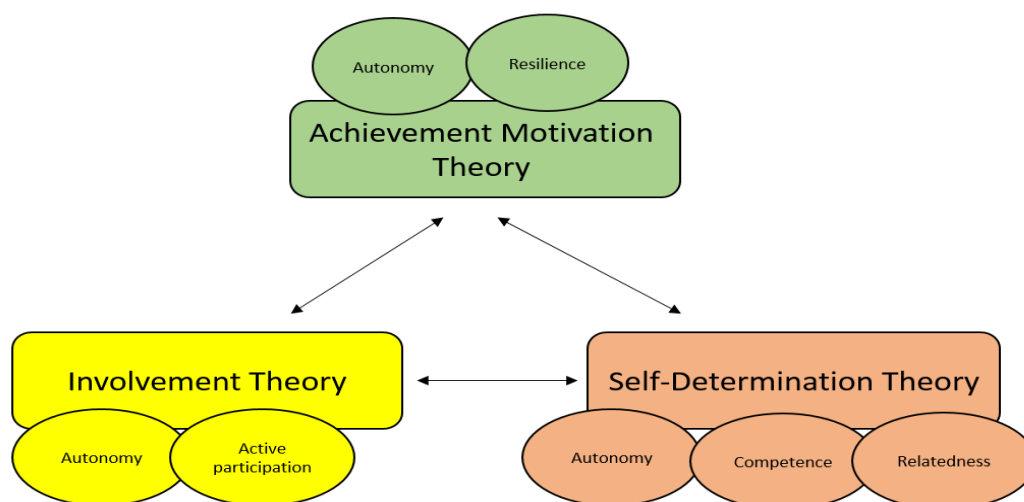


Figure 1. The conceptual framework of the study.

As elucidated in the preceding paragraphs, a combination of achievement motivation, involvement, and self-determination theory provides valuable insights into the determinants of language learners' psychological well-being in e-learning programs. They highlight the role of autonomy, engagement, and competence in promoting enjoyment, reducing technostress, fostering growth, and enhancing mindfulness and resilience in language learning within e-learning environments. By comprehending and applying these theories, this study aimed to enrich the e-learning application of SHAD since the users frequently reported problems concerning its lack of interactive pedagogical features (Mirzadeh Rahni & Parsaiyan, 2023).

III. AIM OF THE STUDY

The existing literature emphasizes the need for substantial improvement in the application of SHAD to meet the standards of an effective virtual learning environment, particularly concerning language learners' psychological well-being in virtual language learning contexts (Ahmadi & Esmali, 2023; Mirzadeh Rahni & Parsaiyan, 2023). This point underscores the significance of the present study, as the current literature lacks a practical framework to optimize SHAD for active student engagement and improve their psychological status while using the platform. Therefore, the study aims to address these gaps by answering the following research questions:

RQ 1: Does integrating supportive tasks via the Telegram app affect EFL students' technostress while using the SHAD app?



RQ 2: Does integrating supportive tasks via the Telegram app affect EFL students' autonomy while using the SHAD app?

RQ 3: Does integrating supportive tasks via the Telegram app affect EFL students' growth mindfulness while using the SHAD app?

RQ 4: Does integrating supportive tasks via the Telegram app affect EFL students' resilience while using the SHAD app?

RQ 5: Does integrating supportive tasks via the Telegram app affect EFL students' enjoyment while using the SHAD app?

IV. METHODOLOGY

1. Research Design

As demonstrated in Figure 2, this study employed a randomized subject, pretest-posttest, control group standard experimental research design (Ary et al., 2019), in which the participants were randomly assigned to a control group (CG) and an experimental group (EG). In this design, only the EG received the treatment, while both groups underwent a pretest at the beginning of the research and a posttest at the end of the study to determine the influence of the treatment on the EG (Ary et al., 2019).

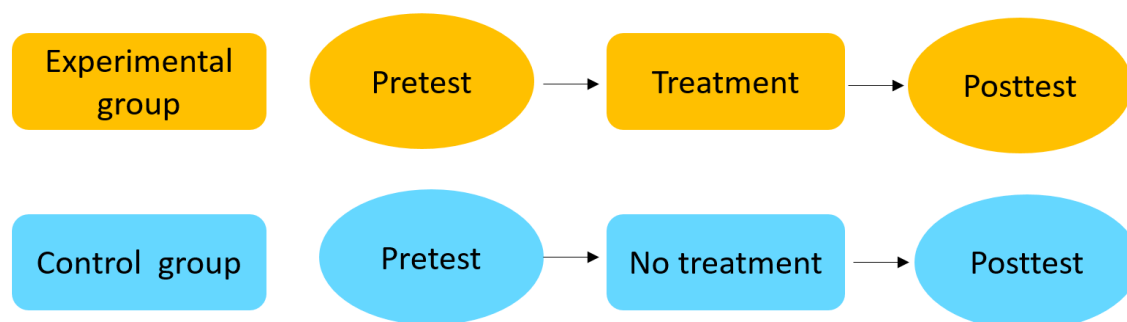


Figure 2. Standard experimental pretest-posttest control group research design (Ary et al., 2019).

2. Participants and Settings

The study involved 87 male high school students, aged from 17 to 19, studying English as a foreign language in four public schools in Mashhad, Iran. These participants were selected from a larger group of 257 individuals based on their performance on the Oxford Quick Placement Test (OQPT), indicating an intermediate English proficiency level. Notably, none of the participants had undertaken any additional English classes before or during the study; thus, a relatively uniform baseline of language skills was ensured at the commencement of the research.

The students were randomly divided into the two groups of EG, consisting of 44 students, and CG, comprising 43 students. The study focused on the curriculum content known as Vision 3, developed by the Iranian Ministry of Education, which aims to enhance EFL students' English proficiency in speaking, listening, reading, and writing.

Before participating in this study, the participants were informed of the research objectives and their right to withdraw from the study at any time before the end of the data collection. Only the participants who provided a letter of consent were permitted to participate in this research.



3. Instruments

To fulfill the objectives of this study, the following instruments were employed:

The Oxford Quick Placement Test (OQPT) assessed the students' English proficiency level, categorizing individuals as intermediate if they achieved scores from 0.4 to 0.6 on a scale ranging from 0.1 to 0.9. The test's reliability was evaluated using Cronbach's alpha, yielding a satisfactory coefficient of 0.899.

The Foreign Language Enjoyment Scale (FLES), created and verified by Dewaele and MacIntyre (2016), was used to investigate the level of pleasure and happiness experienced by the participants. The FLES has 21 questions and is rated on a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree". The Cronbach's alpha coefficient ($\alpha = 0.873$) indicated that the reliability of the FLES measure in this research could be considered adequate.

To assess the technostress of the participants, the Technostress Scale designed by Wang et al. (2020) was employed. This instrument comprised nine items, each given a score based on a Likert scale of five points, with 1 representing strong disagreement and 5 representing strong agreement. Based on the findings of this study, the reliability coefficient of this scale was found to be 0.865, indicating a satisfactory level of reliability to meet the criteria.

The Learner Autonomy Questionnaire (LAQ) of Zhang and Li (2004) measured the participants' autonomy. This questionnaire has a response format based on a 5-point Likert scale with eleven questions. Upon assessing the instrument's internal consistency, the researchers determined that the results were acceptable, with a reliability coefficient of 0.893.

The Langer Mindfulness Scale (LMS) (2004) was employed to evaluate the respondents' mindfulness. LMS analyzes the three aspects of novelty seeking, novelty generating, and engagement using a scale of seven points, which consists of fourteen questions. The dependability of the scale was found to be satisfactory, as shown by the alpha values, which ranged from 0.833 to 0.912.

The Academic Resilience Scale (ARS) of Kim and Kim (2016) was used for the assessment of participants' academic resilience. The scale has twenty-six distinct items, each giving a Likert value ranging from one to five. The subscales of the ARS are classified into five different groups, namely subjective pleasure (9 items), empathy (7 items), sociability (3 items), persistence (4 items), and self-regulation (2 items). The results revealed a coefficient ranging from 0.751 to 0.911, which was deemed to be within an acceptable range.

4. Procedures and Data Analysis

The study commenced with assessing the students' English language proficiency through the administration of the OQPT, which determined an intermediate level of English ability in the score range of 0.4 to 0.6. The participants with exceptionally high (0.9 or above) or low (0.1 or below) language skills were excluded from the research. Subsequently, the students were randomly divided into CG (43 participants) and EG (44 participants) groups. To maintain the integrity of the study, the participants were instructed not to engage in any additional English language lessons during the research period. Both CG and EG were given a pretest at the outset of the study. The test consisted of five sections assessing the participants' levels of happiness, technostress, autonomy, growth mindfulness, and resilience. Following this preliminary phase, the standard instructional plan for teaching the instructional material of Vision 3 was initiated. The curriculum content of Vision 3 was delivered to both CG and EG groups over 16 sessions spanning one academic semester in 2022. The CG exclusively received online lessons through the SHAD platform, whereas the EG engaged in English language learning via



the SHAD platform in conjunction with a private Telegram group established by the researchers to share supplementary teaching materials around the contents of Vision 3.

Unlike SHAD, the Telegram platform facilitated real-time communication between instructors and students, allowing for exchanging messages, images, and audios during lessons. The participants in the EG were encouraged to seek assistance from each other during the scheduled class time and outside the regular sessions. This approach allowed the EG students to access the course content using their mobile phones at any time and place, encouraging interaction through queries, peer responses, and peer and instructor feedback. Upon completion of the intervention, a posttest evaluating happiness, technostress, autonomy, growth mindfulness, and resilience was administered to both CG and EG participants to assess progress and the effectiveness of the intervention. Five EFL teachers reviewed the pre- and posttest results to ensure their accuracy and reliability. Subsequently, a one-way MANOVA (multivariate analysis of variance) was conducted to examine the impact of implementing the supplementary tasks via the Telegram app on the participants' happiness, technostress, autonomy, growth mindfulness, and resilience while utilizing the SHAD platform for online language learning.

V. RESULTS

A multivariate analysis of variance (MANOVA) was performed to investigate the impact of incorporating Telegram as a supplementary application within the pedagogical platform of SHAD on various aspects, including learners' enjoyment, technostress, autonomy, growth mindfulness, and resilience across both the CG and EG. Initially, Box's test of equality of covariance matrices was applied to assess the hypothesis that the observed covariance matrices of the dependent variables were equivalent for the groups. The significant value, as displayed in Table 1, fell below 0.05 ($p < 0.05$), leading to the rejection of the null hypothesis. This outcome was construed as indicative of a noteworthy disparity in the mean values of the dependent variables between the CG and EG.

Table 1. Box's test of equality of covariance matrices.

Box's Test of Equality of Covariance Matrices	
Box's M	203.173
F	3.233
df1	55
df2	23305.617
Sig.	.000

A multivariate analysis of variance (MANOVA) was performed to investigate the impact of incorporating Telegram as a supplementary application within the pedagogical platform of SHAD on various aspects, including learners' enjoyment, technostress, autonomy, growth mindfulness, and resilience across both the CG and EG. Initially, Box's test of equality of covariance matrices was applied to assess the hypothesis that the observed covariance matrices of the dependent variables were equivalent for the groups. The significant value, as displayed in Table 1, fell below 0.05 ($p < 0.05$), leading to the rejection of the null hypothesis. This outcome was construed as indicative of a noteworthy disparity in the mean values of the dependent variables between the CG and EG.

The analysis of the estimated marginal mean scores presented in Table 3 revealed a significant improvement in various aspects, including enjoyment, autonomy, growth mindfulness, technostress, and resilience among the EG participants following the implementation of the intervention. Specifically, the estimated marginal mean score for enjoyment exhibited a notable increase from 65.2 (pretest) to 93.9 (posttest) in the EG, indicating a substantial enhancement in the participants' enjoyment levels due to the



supplementary tasks facilitated through the Telegram platform. In contrast, there was a minimal change in the CG enjoyment scores from the pretest to the posttest.

Table 2. The results of the multivariate test.

Multivariate test							
	Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.998	3806.436 ^b	10.000	76.000	.000	.998
	Wilks' Lambda	.002	3806.436 ^b	10.000	76.000	.000	.998
	Hotelling's Trace	500.847	3806.436 ^b	10.000	76.000	.000	.998
	Roy's Largest Root	500.847	3806.436 ^b	10.000	76.000	.000	.998
Group	Pillai's Trace	.960	184.168 ^b	10.000	76.000	.000	.960
	Wilks' Lambda	.040	184.168 ^b	10.000	76.000	.000	.960
	Hotelling's Trace	24.233	184.168 ^b	10.000	76.000	.000	.960
	Roy's Largest Root	24.233	184.168 ^b	10.000	76.000	.000	.960

Similarly, the analysis of autonomy scores revealed a significant positive impact on the EG participants, with the estimated marginal mean score increasing from 27.8 (pretest) to 51.0 (posttest), while no significant change was observed in the CG. This difference underscored the beneficial effects of the supplementary tasks on enhancing autonomy within the EG cohort. Furthermore, comparing the resilience scores between the pretest and posttest assessments demonstrated a substantial improvement in the EG participants, with scores increasing from 40 to 109 following the intervention, whereas no notable change was observed in the CG. This indicates the effectiveness of the supplementary tasks in fostering resilience among the EG participants.

In the same way, the analysis of the growth mindfulness scores revealed a positive influence on the EG participants, with mean scores rising from 79.7 (pretest) to 93.86 (posttest), while no such increase was noted in the CG. This suggested that the supplementary tasks implemented via Telegram enhanced mindfulness levels among the EG participants.

Interestingly, a significant decrease of the technostress scores was observed among the EG participants, with scores decreasing from 31.6 (pretest) to 17.9 (posttest) after the intervention with the Telegram-supported tasks, indicating a reduction in technostress levels. In contrast, no notable change of the technostress scores was observed in the CG, highlighting the benefits derived from the supplementary tasks implemented through the Telegram app for the EG participants.

Table 3. Estimated marginal means.

Group					
Dependent variable	Group	Mean	Std. error	95% confidence interval	
				Lower bound	Upper bound
Pre-enjoyment	Control	65.279	1.870	61.561	68.997
	Experimental	65.455	1.849	61.779	69.130
Pre-technostress	Control	31.605	1.015	29.587	33.622
	Experimental	31.636	1.003	29.642	33.631
Pre-autonomy	Control	24.953	.889	23.186	26.721
	Experimental	27.864	.879	26.116	29.611
Pre-resilience	Control	39.535	1.426	36.701	42.369
	Experimental	40.023	1.409	37.221	42.825
Pre-mindfulness	Control	73.953	1.305	71.358	76.549
	Experimental	72.795	1.291	70.229	75.361
Post-enjoyment	Control	65.791	1.279	63.247	68.334
	Experimental	93.977	1.265	91.463	96.492



Post-technostress	Control	33.884	.640	32.611	35.157
	Experimental	17.909	.633	16.651	19.167
Post-autonomy	Control	27.116	.613	25.898	28.335
	Experimental	51.000	.606	49.796	52.204
Post-resilience	Control	38.884	1.766	35.373	42.395
	Experimental	109.682	1.746	106.211	113.153
Post-mindfulness	Control	75.093	1.025	73.056	77.130
	Experimental	93.864	1.013	91.850	95.877

VI. DISCUSSION

The primary aim of this study was to explore the potential impact of integrating Telegram as a supportive tool to the pedagogical application of SHAD on EFL learners' technostress, autonomy, enjoyment, mindfulness, and resilience. The results revealed that the EFL students using both SHAD and Telegram applications exhibited higher levels of autonomy, mindfulness, enjoyment, and resilience while reporting lower levels of technostress. Incorporating Telegram alongside SHAD fostered increased engagement in peer interactions and enhanced participation in the language learning process through virtual peer gatherings. This observation aligns with the results gained by [Zheng et al. \(2023\)](#). As they asserted, when students feel comfortable in their educational experiences and are motivated to collaborate on tasks, they are less likely to experience stress during instructional sessions. Additionally, given Telegram's diverse functionalities, including elements of enjoyment and amusement, the findings of this study support the conclusions of [Ingusci et al. \(2023\)](#), suggesting that the Telegram app may assist students in managing anxiety during virtual language learning classes. This discovery is also consistent with previous studies by [Abu-Ayfah \(2020\)](#), [Zheng et al. \(2023\)](#), and [Esmailzade Ashini et al. \(2022\)](#), emphasizing Telegram's role in making positive connections between teachers and students both inside and outside the classroom, ultimately reducing students' anxiety during language learning sessions.

Moreover, the results of this study indicated that students in the EG had greater autonomy than their CG counterparts due to the supportive features of the Telegram app. In contrast to SHAD, Telegram offers various advantages, such as a user-friendly interface, facilitating peer feedback exchange, and enabling instructors to provide personalized guidance to each student individually. Given these benefits of Telegram, the findings of this research corroborate the conclusions of [Ritonga et al. \(2023\)](#), who found that learners in online language learning platforms with interactive and engaging features tend to exhibit higher levels of autonomy. Another significant finding of this research was the higher levels of growth mindfulness observed among the participants in the EG compared to those in the CG. This outcome aligns with the conclusions drawn by [Berdida & Grande \(2023\)](#), who emphasized the benefits of online platforms that facilitate dynamic interactions and offer diverse forms of content, including images, audio files, texts, videos, and interactive features. Such platforms have been shown to improve learners' concentration, reduce distractions, and cultivate a tranquil and attentive mindset conducive to active participation in the educational process.

Concerning the impact of Telegram supportive tasks on students' resilience, the findings of this study indicated that the students in the EG exhibited higher levels of resilience compared to those in the CG. This discovery is consistent with the scholarly discussions on motivation and resilience theory, highlighting that language learners with heightened resilience are more inclined to respond constructively to challenges by formulating effective strategies to integrate into new contexts and adapt to unfamiliar social norms and interpersonal dynamics ([Alam, 2022](#)). Moreover, this part of the present study is substantiated by the



findings of Çakmak et al. (2023); they concluded that the students utilizing Telegram for English language learning exhibited elevated levels of resilience.

It should also be noted that the results of this study concur with the perspectives of Niaghi (2022) and Ghobadi & Taki (2018), indicating that integrating the Telegram app in educational settings could introduce novel opportunities for language educators and, thus, lead to enhancing students' enjoyment in virtual settings. Notably, this study demonstrated a significant difference between the EG and CG regarding the students' enjoyment after implementing supplementary Telegram tasks. This observation aligns with the research by Landrum et al. (2021), emphasizing the crucial role of active instructor-student interactions in shaping students' enjoyment of online courses. Additionally, the study by Golding & Jackson (2021), on high school students' satisfaction with online learning during the pandemic, underscored the significance of teachers' responsive feedback via online platforms. Our findings corroborate this perspective by illustrating that students' enjoyment increased notably when Telegram was integrated into the learning process, fostering student-instructor interactions and feedback support. Consequently, this study posits Telegram as a valuable instrument for promoting a peaceful e-learning atmosphere, enriching students' resilience, mindfulness, enjoyment, and autonomy while concurrently mitigating their technostress within educational environments.

VII. CONCLUSIONS AND IMPLICATIONS

The main aim of this study was to investigate the effects of incorporating Telegram as a supportive tool to the pedagogical application of SHAD on EFL learners' technostress, autonomy, enjoyment, mindfulness, and resilience. Through a randomized subject, pretest-posttest, control group experimental research design, the outcomes of this study provided compelling evidence that integrating Telegram as a supplementary tool with SHAD significantly and positively impacted learners' experiences. This integration led to the increased levels of enjoyment, autonomy, mindfulness, and resilience while reducing technostress. These findings underscore the potential advantages of this combined approach for educators and learners, emphasizing its importance in enriching the learning environment.

The implications of these results are two-fold. Firstly, incorporating supportive tasks via Telegram can enhance the SHAD platform, offering a more comprehensive learning experience to promote students' emotional well-being. This aligns with the growing recognition of the significance of social-emotional learning in educational contexts. Secondly, the findings suggest that strategically integrating complementary technological tools can effectively mitigate the potential negative effects of educational technology, such as technostress, while amplifying its positive impacts on learners' psychological well-being. These insights help to develop and implement future educational technology initiatives, fostering a supportive learning environment for students.

While this research significantly contributes to the existing literature, it is essential to acknowledge its limitations. The homogeneity of the participant sample constrained the study, as all the participants were male. Given the examination of factors like happiness, technostress, autonomy, mindfulness, and resilience, the role of gender could be a crucial consideration for further investigations. Additionally, considering the potential influence of participants' demographic information (such as age, ethnicity, and family status) on their psychological traits, future research should incorporate such details to better explore their impacts.



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