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Evaluating the Impact of Student-Created Digital Libraries Versus Teacher-Selected Resources on Enhancing L2 Learners' Reading Skills

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The current study inspected the effect of student-generated digital library versus teacher-selected material on Iranian EFL learners' reading skills. To this end, 50 Iranian high schoolers, aged between 15 and 18 years old, studying in Tehran, were nominated via convenience sampling. Before the study, the Oxford Placement Test (OPT) and a reading pretest were conducted to ensure that the participants were homogeneous before the treatment. The participants then assigned to the Student-generated Digital Libraries Group (SDLG n=25) and the Teacher-selected Materials Group (TMG n=25). The two intact classes met two sessions a week with a 90-minute over a period of 12 weeks. The students in experimental cluster were instructed reading skills via Student-generated Digital Libraries. In the control cluster, they were instructed reading skills via Teacher-selected Materials. After completing the treatment stage, the participants were given a reading posttest. The overall result indicated that the SDLG significantly outperformed the TMG in reading ability. The study has implications for English language instructors and EFL/ESL students. In terms of theoretical implications, this study can offer insights for researchers looking to develop a comprehensive model for the reading process. Considering the practical implications, all high school and language school teachers could employ digital libraries and student-selected materials in their reading classes. These strategies could effectively enhance self-regulation and decision-making skills among EFL students.

Introduction

Reading relies on two major cognitive processes. It focuses on understanding meaning for exchanging ideas and understanding form to restructure a linguistic system (Han & Liu, 2013; Sharwood-Smith, 1993). Thus, designing reading materials should align with the input provided for language learners to improve their comprehension (Park, 2011). According to Rockinson-Szapkiw et al. (2013), designing L2 digital reading materials may explain why

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learners do not exhibit better comprehension and retention of digital materials. To better understand the underlying input processing associated with L2, promoting and ensuring the learning of L2 digital language materials is necessary. In this respect, it requires the preparation of both meaning and frame. Compatible with VanPatten (2004), consecutive handling of meaning and frame is the ideal input for learners. When the readers perform sequential processing of meaning and form, they process language input for meaning.

VanPatten's (2004) synchronous use of meaning and frame highlights readers' endeavor to experience the semantic and formal approaches of examining the content at the same time. In this case, meaning or form depends on the readers' attentional capacity (Han & Liu, 2013; Overstreet, 1998). L2 learners, irrespective of their proficiency level, process language input mainly for meaning, whereas the formal aspect of language is only processed by L2 learners after comprehension of meaning (Han & Liu,2013; Park,2011). Besides, Van Patten (2008) believes that the meaning of L2 input needs to be clarified or prompted before L2 readers can employ available attentional resources to attend to the formal features of L2 input, which means that form-based processing and meaning-based processing are generally separate and sequential for L2 learners.

During the reading of L2 printed materials, L2 readers' attention can be directed to semantic cues to facilitate their understanding. In this case, teachers' guidance, typographic input enhancement, or typesetting arrangement prior to attending to the formal aspect of the text (e.g., orthographic features of novel words) may enhance comprehension. Additionally, L2 learners are more likely to go to the formal viewpoint of dialect without depleting their attentional assets. Consequently, sequential input presentation of meaning and form is more beneficial for L2 learners when reading printed materials. In this realm, student-generated digital libraries combine innovation and data assets to break the physical boundaries between assets. Besides, student-generated digital libraries permit the advantage of more extensive varieties of resources. Moreover, they permit students to share assets, time, and ability to their benefit (Schaffner,1994). Based on Zou and Wang (2024) digital literacy is vital to improving students' English proficiency. Nowadays, digital technologies are widely used in daily life and education. Therefore, increasing digital literacy not only helps people become familiar with digital tools and resources but also helps improve their language skills.

On the other hand, teacher-selected materials might be textbooks and workbooks. Additionally, schools' policies affect teachers' decisions. It is worth noting that teachers should consider paper-based materials, online materials, and materials generated by students. Additionally, it is necessary to collect a wide range of sources for curriculum and educational planning (Stevens, 1993). Therefore, this study aimed to compare the effect of student-generated digital libraries and teacher-selected materials on the development of reading skills among EFL learners. By examining these two distinct instructional approaches, the study aimed to determine which method is more effective in enhancing L2 learners' reading comprehension, fluency, and overall engagement with the reading material. The research sought to provide insights into how active student involvement in selecting and organizing reading resources influences their motivation and learning outcomes compared to the traditional model where teachers provide the reading materials. Understanding these dynamics contribute to developing more effective teaching strategies that cater to the diverse needs and preferences of L2 learners.

Literature Review

Reading skill is one of the most central abilities in today's world (Hango, 2014; Hanushek et al., 2015) and it has been engaged with conceptualizing procedures in L2 classes. In todays' world digital literacy is an essential tool to facilitate autonomous English language learning. Digital education has evolved, delivering a significant transformation in traditional teaching and learning. It helps students achieve more success and continuous improvements in L2 classes (Silamut & Petsangsri, 2020; Zou &Wang, 2024). Besides, digital literacy is important in self-directed learning and requires a wide range of dimensions. In today's world, it has widely entered in the field of education and learning. Thus, learners who can effectively utilize technologies such as digital libraries have significant advantages in autonomous learning. These learners can learn English independently and self-taught and shape their learning path using digital educational resources (Silamut & Petsangsri, 2020). In this regard some studies (e.g., Al-Shaye, 2021; Nowrozi, 2022; Yang & Qian, 2022) have been directed to examine the effect of digital libraries and digital literacy and their effect on L2 learners' skills around the world and in the Iranian context. The findings showed that students use technology to access educational resources at any time and place, which can make the learning process much more flexible and effective. It has been highlighted that the virtual context and digital libraries play a crucial role in teaching. Furthermore, research by Chen (2022) emphasizes that teacher and student agency is significantly enhanced in digital learning environments, especially when learners can select or co-create materials relevant to their personal interests and proficiency levels. In this vein, current research efforts have aimed to develop reading skills through various methods, including extensive reading programs, digital technologies, and interactive activities (Zhang & Miao, 2025). However, there remains a gap regarding the integration of learner-centered digital tools like digital libraries, which can promote self-regulation, motivation, and personalized learning experiences. Several recent studies suggest that incorporating digital libraries and can significantly enhance reading engagement and comprehension (Yang & Qian, 2022). Given this context, our study is necessary because it addresses the gap by investigating the effectiveness of student-generated digital libraries a relatively underexplored area on EFL learners' reading development. It contributes to the literature by providing empirical evidence on how learner digital resources can positively influence reading skills, thereby offering practical implications for improving current educational practices. Despite the results obtained from the studies on digital literacy and digital library, the researchers of the current study believe that there is still a significant need for additional examination on the impact of student-generated digital library and teacher-selected material in L2 reading classes.

Therefore, the subsequent research question was developed to examine the issue.

RQ: Do student-generated digital library and teacher-selected material affect Iranian EFL learners' reading skills differently?

Research Methodology

Research Design

As the participants were selected from two intact classes, a quasi-experimental study with a non-equivalent control group pretest-posttest design was used to perform the current study. The design of the study was as follows:

O1 O3 X O5

O2 O4 C O6

O1 & O2 = Oxford Placement Test (OPT)

O3 & O4 = Pretest (Reading Comprehension Test)

O5 & O6 = Post-test (Reading Comprehension Test)

X = Experimental Group (Student-generated Digital Libraries Group)

C = Control Group (Teacher-selected Materials' Group)

In the above design, OPT (O1 & O2) was administered to homogenize the participants concerning their language proficiency level. The reading comprehension pretest (O3 & O4) was used to determine students' reading ability. In the experimental group (X), the learners experienced reading skills via student-generated digital libraries as a treatment. In contrast, the control group (C) experienced reading skills based on teacher-selected materials. After completing the treatment phase, both groups were given a reading comprehension post-test (O5 & O6), which attempted to assess the potential development of the learners concerning their reading ability.Recent studies in the last five years (2019-2023) were analyzed in the Web of Science and Scopus databases. The systematic review was conducted in accordance with the PRISMA guidelines (Haddaway et al., 2022). The database was queried with ["Mobile learning" OR "m-learning" OR "Mobile education" OR "Mobile devices in education" OR "tablet learning" OR "smartphone learning" OR "Mobile technology in education" OR "Mobile-assisted"] AND ["generative ai" OR "ai" OR "artificial intelligence"] to search the database by title, keyword and abstract. The searches were limited to open access, full-text articles in English between 2019-2023 (last five years). As a result of the database query, 21 articles were found in the Web of Science database and 38 articles in the Scopus database. The scheme for the selection and elimination process of the studies in accordance with the PRISMA guidelines.

Participants

Fifty Iranian EFL students at the intermediate level were nominated from a high school in Tehran. Students were designated based on convenience sampling. Their ages ranged from 15 to 18 years old. Students were selected from two intact classes. Each cluster included 25 members. The students were taught reading skills through various activities and

tasks that required students to examine and interact with reading different sources. The instructor asked the students to read the selected chapters of short stories and do the exercises in the experimental group, the Student-generated Digital Libraries Group (SDLG). In the control group, they were taught reading skills via Teacher-selected Material, which was named the Teacher-selected Material Group (TMG).

Instruments

The researchers used two instruments. The first data collection instrument was the Oxford Placement Test (OPT) (Allen, 2004) is a validated placement test published by Oxford University Press will be used to evaluate the participants' language proficiency level. The second instrument was a reading comprehension test which was selected from IELTS reading tests, lesson one of the third Book. It was applied as the pretest and post-test.

Procedure

This study investigated the effect of student-generated digital library and teacher-selected materials on developing the reading skills of a group of Iranian EFL students in a high school in Tehran. The two intact classes met one session a week with a 90-minute duration within 12 weeks. The participants studied "Top Notch" (Saslow & Ashcher, 2018), through which they learned about reading skills, grammar, vocabulary, and pronunciation exercises. To conduct the study, the researchers followed the following measures.

Placement test

At the beginning of the semester, the Oxford Placement Test (OPT) was directed, and 50 intermediate students were designated as the study contributors based on their scores (ranging from 40 to 47) on the OPT Because learners' communicative competence was important for group discussion, the investigation mainly focused on intermediate learners.

Pretest

In lesson one of the third book, IELT1S reading tests were used as a pretest. The reading comprehension questions were true/false and multiple-choice items. The IELT1S reading test was chosen because it is a standardized and reliable instrument widely used to assess reading comprehension and ability among English learners. Its alignment with international standards makes it suitable for accurately evaluating and ensuring the homogeneity of participants' reading skills at the outset of the study. Additionally, using a recognized test helps establish the validity and comparability of the pretest results, facilitating meaningful interpretation of the intervention's effects. The pretest allowed the researchers to ensure that both classes were homogeneous in reading ability.

Student-generated Digital Libraries Group (SDLG)

Twenty-five participants in the SDLG cluster experienced reading via the digital library. 12 interest-based short story e-books designed to promote autonomous reading. While the delivery mode differed between groups, digital vs. face-to-face, both groups were

provided with equivalent reading content aligned with students' interests prior to the treatment phase to control for material familiarity and relevance and the stories were available to all students in this cluster via digital library in WhatsApp. Moreover, the instructional time and reading tasks were matched as closely as possible between groups to minimize extraneous variation. The rationale for using WhatsApp for the experimental group was to simulate a realistic and accessible digital reading environment, reflecting ongoing shifts toward blended and distance learning modalities in education. This digital library was a collection based on students' interests before the treatment phase. Every week, students read a short story, did the related reading exercises, and sent the answers to the teacher before the class. The teacher investigated students' responses and provided feedback every session in class. The teacher shared his comments on various aspects of reading exercises. Additionally, students wrote the story summary and read it to the teacher in 5 to 10 minutes. They recorded their voice and sent it to the teacher via WhatsApp every week.

Teacher-selected Materials Group (TMG)

Twenty-five participants in TMG experienced teacher-selected materials for reading. This cluster's interaction was chiefly between the teacher and students in a class setting. Every week, the teacher introduced a short storybook, and he explained the main theme of the story in class. Then, students read the whole story at home and answered the reading exercises as an assignment. The teacher randomly called students' names in class, and they shared the answers. In the case of erroneous responses, the teacher provided the right answers. Besides, the teacher randomly called some students' names, and they explained the gist of the story within 5 to 10 minutes of every session.

Posttest

After the treatment phase, the SDLG and TMG members were re-tested to examine whether the treatment had any effect on the contributor's reading comprehension ability. The instructor selected a sample of reading tests from IELTS reading tests, lesson one of the third Book. The students in both groups answered the reading comprehension test in 40 minutes.

Results

This study was undertaken in order to probe to what extent student-generated digital library and teacher-selected material differently affected Iranian EFL learners' reading skills. The data were analyzed through Independent-Samples t-test and One-Way ANCOVA, which, besides their own specific assumptions, consider the normality of the data.

Table 1 shows the skewness and kurtosis indices of normality and their ratios over the standard error for the Oxford Placement Test (OPT) and pretests and posttests of reading. The researchers relied on the assessment of skewness and kurtosis ratios over their standard errors, following the guidelines outlined by Field (2018). These indices provide a visual and quantitative indication of normality that is suitable when the sample size is moderate.

Since the ratios of skewness and kurtosis over their standard errors were lower than ±1.96 (Field, 2018), it was concluded that the present data met the assumption of normality

Table 1: Skewness and Kurtosis Indices of Normality (Main Study)

Group		N	Skewness		Kurtosis		Ratios	
		Statistic	Statistic	Std. Error	Statistic	Std. Error	Skewness	Kurtosis
Students' generated	OPT	25	.118	.464	-.929	.902	0.25	-1.03
	Pretest	25	.286	.464	-.160	.902	0.62	-0.18
	Posttest	25	-.597	.464	-.793	.902	-1.29	-0.88
Teacher selected	OPT	25	-.538	.464	-.730	.902	-1.16	-0.81
	Pretest	25	-.185	.464	-.564	.902	-0.40	-0.63
	Posttest	25	-.517	.464	-.096	.902	-1.11	-0.11

Table 2 shows the descriptive statistics and KR-21 reliability indices for the OPT test, as well as the pretest and posttest of reading. The results indicated that OPT, pretest, and posttest of reading enjoyed KR-21 reliability indices of .85, .70, and .79, respectively. Since this reliability index was higher than .70 (Fulcher & Davidson, 2007), it was concluded the instruments employed in this study enjoyed appropriate reliability indices.

Table 2: Descriptive Statistics and KR-21 Reliability Indices

	N	Mean	Std. Deviation	Variance	KR-21
OPT	50	36.22	9.475	89.767	.85
Pretest	50	10.80	3.828	14.653	.70
Posttest	50	14.48	3.971	15.765	.79

An independent samples t-test was used to compare the groups' means on the OPT to observe whether they were homogenous in terms of their general language proficiency before directing the treatments.

Table 3 shows the results of the descriptive statistics for the two groups on the OPT. The results showed that the teacher-selected (M = 35.32, SD = 8.50) and student-generated (M = 37.12, SD = 10.45) groups had roughly equal means on the OPT test.

Table 3: Descriptive Statistics for Oxford Placement Test by Groups

Group	N	Mean	Std. Deviation	Std. Error Mean
Teacher-Selected	25	35.32	8.508	1.702
Student-Generated	25	37.12	10.450	2.090

Before discussing the results of the independent-sample t-test, it should be stated that the assumption of homogeneity of variances was reserved on the OPT. As shown in Table 4, the non-significant results of Levene's test ($F = .001$, $p > .05$) indicated that the two groups were homogenous in terms of their variances on OPT. That was why the first row of Table 4, "Equal variances assumed," was reported.

Table 4: Independent-Samples t-test for Oxford Placement Test by Groups

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	1.554	.219	.668	48	.507	1.800	2.695	-3.619	7.219
Equal variances not assumed			.668	46.106	.508	1.800	2.695	-3.625	7.225

The results of the independent samples t-test (t (48) = .668, p > .05, r = .096 representing a weak effect size; 95% CI [-3.61, 7.21]) specified that there was not any significant difference between the two groups' means on the OPT. Thus, it can be concluded that the two groups were homogeneous in terms of their general language proficiency before administering the treatments. Figure 1 shows the students' generated and teacher-selected groups' means on the OPT. As discussed, the two clusters had almost equal means on the OPT.

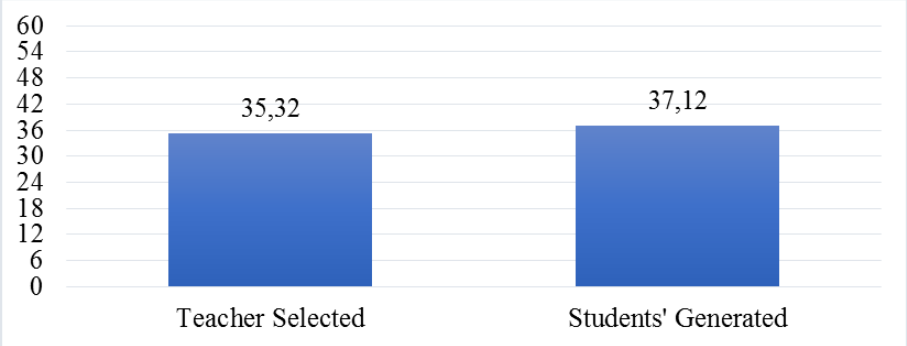

Figure 1: Means on Oxford Placement Test by Groups

Exploring Null-Hypothesis

First, one-way ANCOVA assumes homogeneity of variances of the groups. The non-significant results of the Levene's tests (F (1, 48) = .236, p > .05) indicated that the assumption of homogeneity of variances was retained on the posttest of reading after controlling for the effect of the pretest (Table 5).

Table 5: Levene's Test of Homogeneity of Variances for Posttest of Reading by Groups with Pretest

F	df1	df2	Sig.
.236	1	48	.629

Second, one-way ANCOVA requires a linear relationship between the pretest and posttest of reading. The significant results of the linearity test (F (1, 49) = 24.81, p < .05, eta squared = .548 representing a large effect size) (Table 6) rejected the statistical null-hypothesis that the relationship between the posttest of reading and pretest was not linear.

Table 6: Testing Assumption of Linearity of Relationship between Pretest and Posttest of Reading

			Sum of Squares	df	Mean Square	F	Sig.
Posttest * Pretest	Between Groups	(Combined)	422.963	14	30.212	3.025	.004
		Linearity	247.793	1	247.793	24.814	.000
		Deviation from Linearity	175.171	13	13.475	1.349	.233
	Within Groups		349.517	35	9.986		
	Total		772.480	49			
	Eta Squared		.548				

Finally, one-way ANCOVA requires linear relationships between the pretest and posttest of reading across the two groups' regression slopes (Table 7). The non-significant interaction between the covariate (pretest) and the independent variable ($F(1, 46) = 2.51$, $p > .05$, partial eta squared = .052 representing a weak effect size) indicated that that the statistical assumption that the relationships between pretest and posttest of reading were linear across the two groups was supported. In other words, there were linear relationships between pretest and posttest of reading across the students' generated and teacher-selected groups

Table 7: Testing Homogeneity of Regression Slopes Posttest of Reading by Groups with Pretest

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Group	.130	1	.130	.016	.899	.000
Pretest	305.969	1	305.969	38.260	.000	.454
Group * Pretest	20.145	1	20.145	2.519	.119	.052
Error	367.866	46	7.997			
Total	11256.000	50				

Table 8 shows the student-generated and teacher-selected groups' means on the reading post-test after controlling for the effect of the pretest. The results showed that the students' generated group ($M = 16.15$, $SE = 2.89$) had a higher mean than the teacher-selected group ($M = 12.80$, $SE = 2.89$) on the posttest of reading after controlling for the effect of the pretest.

Table 8: Tests of Between-Subjects Effects for Posttest of Reading by Groups with Pretest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pretest	302.549	1	302.549	36.648	.000	.438
Group	136.676	1	136.676	16.556	.000	.260
Error	388.011	47	8.256			
Total	11256.000	50				

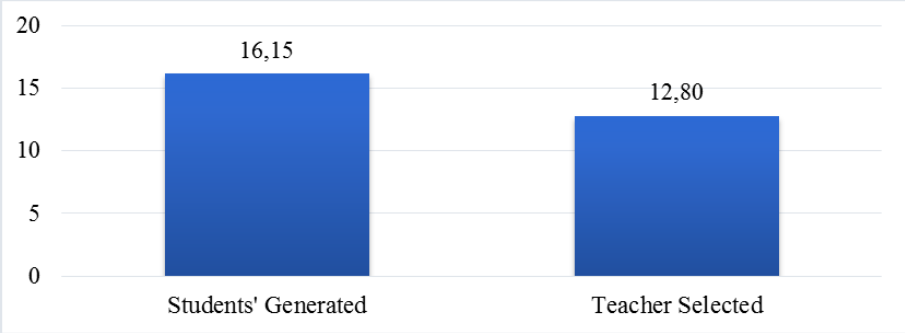

Figure 2: Means On Posttest of Reading by Groups with Pretest

Table 9: Descriptive Statistics for Posttest of Reading by Group with Pretest

			95% Confidence Interval	
Group	Mean	SD	Lower Bound	Upper Bound
Students' Generated	16.154[a]	2.89	14.991	17.318
Teacher Selected	12.806[a]	2.89	11.642	13.969

a. Covariates appearing in the model are evaluated at the following values: Pretest = 10.80.

The above tables show the main results of one-way ANCOVA. The results ($F(1, 47) = 16.55$, $p < .05$, partial $\eta^2 = .260$ representing a moderate effect size) indicated that the students' generated group had a significantly higher mean than the teacher-selected group on the posttest of reading after controlling for the effect of pretest. Thus, the null hypothesis, "there is no statistically significant difference between the reading ability of Iranian EFL learners who employ student-generated digital library and those who employ teacher-selected materials" was rejected. Figure 2 shows the two groups' means on the reading post-test after controlling for the effect of the pretest.

Discussion

The findings of this study revealed that the Student-generated Digital Library (SDL) approach was effective in enhancing students' reading fluency and overall engagement with texts. This aligns with the research goal of examining how learner-centered digital content creation, in contrast to traditional teacher-selected printed resources, can influence reading development within an EFL context. Rooted in a constructivist paradigm, the methodology emphasized learner active participation, allowing students to create and interact with digital content tailored to their interests and proficiency levels. In addition, the findings highlighted that SDL is a practical alternative to the traditional classroom. It can be seen that the reading activities with digital texts developed fluent reading skills. Unlike printed texts, digital texts have a different view, color, feature, font, etc., which attract the readers' attention and encourage them to delve more into reading and make them more interested in reading. In addition, digital texts offer flexibility and convenience. Students can access them anytime and anywhere on smartphones or tablets, which motivates them to learn independently as they do not need to wait for their teachers to give them materials. Thus, digital resources offer distinctive features such as adjustable fonts, embedded media, hyperlinks, and vibrant layouts which capture students' attention, foster curiosity, and sustain motivation (Mangen & Van der Weel, 2016; Mayer, 2021). Additionally, digital texts present a level of flexibility and accessibility that printed materials cannot match. Students can access content anytime via

smartphones or tablets, encouraging independent learning behaviors and reducing reliance on teacher-provided materials. Besides, Students' literacy in digital tools contributed substantially to the development of students' cognitive and critical thinking skills. (Farid et al, 2022; Zhang & Miao, 2025). This approach also promotes self-directed learning and ownership, as students become both consumers and producers of content a pedagogical shift supported by Blackmon & Major (2023), who emphasized learner empowerment in mobile and digital literacy contexts.

The findings of this study are at odds with those of Ziegler (2019), who found that all students, regardless of their initial reading abilities, performed better on comprehension tests when taught and assessed using print materials. While some studies, such as Ziegler (2019), reported that print materials led to better comprehension regardless of initial reading ability, our findings indicate that digital texts can surpass printed materials in promoting reading fluency, especially when learners are actively engaged in digital content creation and interaction. However, these discrepancies may be attributable to differences in methodological focus, while those studies assessed reading comprehension using static, teacher-distributed content, the current study concentrated on digital content based on students' interest as part of the learning process. This difference is important because the cognitive demands of comprehension is distinct, more sensitive to repeated exposure, engagement, and multimodal reinforcement (Rice et al, 2024; Zhang & Miao, 2025). This study also is incompatible with the work of Hussain et al. (2015), which showed that participants reading from printed documents retained more information and understood the text better than those reading from screens. However, the results are consistent with Medjahed's (2023) research, which indicated that both teachers and students had positive attitudes toward the use of e-books. Additionally, the findings align with those of Sidabutar et al. (2022), who discovered that both digital and printed texts enhanced reading comprehension, with digital texts proving to be more effective than their printed counterparts. In conclusion, the effectiveness of student-generated digital libraries observed in this study underscores the importance of integrating digital literacy tools into language instruction. Digital texts provide a flexible, engaging, and accessible medium that can complement or even replace traditional printed materials, particularly in contexts aiming to foster autonomous learning and fluency. Moving forward, educators should consider leveraging digital texts to diversify reading instruction and better meet the needs of modern learners, fostering both motivation and skill development in EFL contexts.

Conclusion

The objective of the present study was to examine the effect of Student-generated Digital Library versus Teacher-selected Material on Iranian EFL learners' reading skills. The overall results indicated that the experimental group, which used a Student-generated Digital Library, outperformed the control group significantly. This suggests that the digital library was effective in enhancing students' reading skills. The findings of this study could also benefit EFL students by improving their self-regulation and decision-making abilities. While not all learning goals may be equally served by digital texts, particularly those related to deep analytical comprehension, their role in fostering accessible, engaging, and personalized learning environments is undeniable. Educators are encouraged to integrate SDLs into language instruction as a means of diversifying pedagogy and empowering learners.

Additionally, the study holds relevance for English language teachers and EFL/ESL students. From a theoretical standpoint, it offers insights for researchers looking to develop a comprehensive model of the reading process. Regarding the practical implications, all high school and language school teachers could employ digital libraries and student-selected materials in their reading classes. These strategies may effectively improve the decision-making skills of EFL students. Therefore, this could represent a revised approach to teaching reading skills to high school students. In designing courses for language learners, integrating digital texts and activities into the curriculum gives students more variety in learning and access to different resources. Future studies should examine the longitudinal impact of such libraries on reading comprehension and investigate their adaptability for students with varied digital access and learning preferences. Besides, researchers of current study recognize that differences in delivery mode could contribute to the variance in outcomes and may interact with the independent variable. Future research could include an additional control group receiving digital reading materials with face-to-face support or a hybrid delivery mode to isolate the effects of instructional format. It is worth noting that, this study had some limitations because the researchers could not control participants' motivation, age, and IQ, which could potentially influence the results.

Declaration of Interest

Conflict of Interest: The authors of this publication declares there is no conflict of interest.

Knowledgements

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