

AI-MEDIATED LANGUAGE LEARNING: AN APPLIED LINGUISTICS ANALYSIS OF THE XEROPAN PLATFORM

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Abstract

In this quantitative research it is to explore the efficiency of an AI supported language learning platform, Xeropan operating under applied linguistic grounds supported by Sociocultural Theory. A real experimental pre-test-post experiment design was used in secondary education students, including control group with traditional instruction and experimental group learning on the Xeropan platform. Statistical analysis included descriptive analyses and independent samples t-tests to compare group performance, as well Levene's test for equality of variances. There was no significant pretest score difference between the ESMS and control groups (ESMS group $M = 21.90$; control group $M = 26.52$), providing support for initial group equivalence. Post-test analysis demonstrated that there was a statistically significant difference in favour of the experimental group with experimental group gaining much more ($M = 44.00$) than their counterparts in the control group ($M = 25.75$), $t(38) = -17.93$, $p < .001$. The variance of scores in the experimental condition was also less, meaning more uniform learning outcomes. These results provide strong empirical evidence that AI-based learning with Xeropan notably increases learners' language proficiency, especially in performance related to reading. "Artificially intelligent language tutors: How tutoring can support language learning" finds that AI-guided online sessions for developing both the spoken and written word can be used as educational tools in a scalable yet felt, human-like way.

Keywords: AI-Mediated Language Learning, Applied Linguistics, Sociocultural Theory, Xeropan, Computer-Assisted Language Learning

Introduction

The incorporation of AI in educational technology is considered as a trend that revolutionizes traditional language teaching from static digital resources to individualized, adaptive learning platforms. In the domain of Applied Linguistics, this turn requires a critical reflection on how AI-led platforms determine instruction design and mediate learner interaction and thus the AcL process itself (Chapelle, 2019). They provide personalised learning pathways, instantaneous feedback and enhanced learner engagement through capitalization on such technologies as natural language processing and machine learning

(Godwin-Jones, 2021). Yet their pedagogical effectiveness, theoretical basis and sociocultural impact call for serious scrutiny from an applied linguistic point of view in which the relationship between technological artifact design, language use and learning is questioned.

One application that represents this new generation of AI-assisted language-learning apps is Xeropan. It is promoted as being an adaptive language learning app that uses AI to select lessons, simulate speaking and provide feedback on mistakes. As appealing as such features are from a user experience perspective, they pose significant issues for those working in the field of Applied Linguistics. How does the platform's algorithm categorise and represent linguistic competence? How much do its communicative practices resemble real/teachable communication patterns? What theoretical SLA models underlie its task design? Moreover, the platform's inherent structuring of the learning trajectory situates it less as a passive and more trivially tool-like and more of an active agent that mediates how learners are exposed to and engage with the target language, which is at the heart of normalisation in CALL.

The present study, therefore, aims to closely examine Xeropan as an Applied Linguistics perspective. It will analyze the platform's basic features – such as its curricular structure, feedback procedures, and conversational AI – by employing them to the principles of SLA (e.g., comprehensible input, output hypothesis and focus on form). In addition, it is addressed its effects on learner autonomy, motivation and pragmatic competence (Stockwell & Hubbard, 2013; Warschauer & Grimes, 2008). In analyzing such initiatives, the paper aims to add to current discussions of digital language learning by providing a data-informed assessment of how AI is defining new boundaries for language learning and thereby re-shaping applied linguistics practice.

Significance of Study

This study is novel in that it makes a valuable contribution to applied linguistics by providing the first linguistically informed case study of AI-mediated language learning with an immediate intelligent feedback system (the Xeropan platform); such research has become limited despite the fact that artificial intelligence technology is gradually being integrated into language learning practice. By addressing AI's ability to personalize input (linguistic and corrective), as well as learning paths, the research goes beyond technology-centered evaluations and foregrounds fundamental applied linguistic issues such as comprehensible input, noticing, and communicative competence (Krashen 1985; Schmidt 1990). It also adds to the research literature on CALL by bridging the divide between grandiose claims of AI-driven personalization and the underlying linguistic practices of adaptive learning environments (Tafazoli, 2024). Pedagogically, these findings have implications for teachers and students when deciding whether to engage AI-aided learning platforms by articulating the affordances and limitations of algorithm-mediated instruction (Kasneci et al., 2023). In addition, the research points to further ethical and sociolinguistic considerations around AI-mediated language learning, specifically concerning authenticity, representation and fairness; All these have implications for the continued role of Applied Linguistics in informing responsible design and evaluation of AI-enhanced Language Learning Technology.

Theoretical Framework

The following chapter draws on Sociocultural Theory (SCT) situated for views of language learning as a social and mediational activity made possible by interaction, cultural tools, and guided participation as opposed to an isolated cognitive pursuit. SCT, which originated from the work of Vygotsky; note that learning takes place through mediation where tools, signs and social contact are instrumental to cognitive development (Vygotsky, 1978). In the case of AI-assisted language learning, digital environments like Xeropan can be conceived as mediational tools that affect how learners engage with language, tasks and feedback.

An eternal issue in SCT is the ZPD, which refers to the proximity between what learners can do by themselves and with support (Vygotsky, 1978). The AI-driven personalization in Xeropan can be interpreted under this light if we analyze how the platform tailors' task difficulty, input and feedback to learner performance. In terms of applied linguistics, the study seeks to answer whether Xeropan's adaptive components provide effective scaffolding for learners' ZPD, or personalization is still essentially algorithmic use devoid of pedagogical support. Another key SCT principle pertinent to the present study is scaffolding that constitutes a temporary form of support to learners in order for them to perform tasks that exceed their current capabilities (Lantolf & Thorne, 2006). In the case of an AI-enabled environments, scaffolding is implemented with "automated hints," feedback, practice and task sequencing. This paper examines how Xeropan's AI gives this kind of support and also if it fades, so as to help students make the language their own.

SCT also emphasizes the role of interaction and discourse in L2 learning, claiming that linguistic competence is derived from socially mediated communication. By focusing on the human-to-human interaction-based approach in traditional SCT, some applied linguistics studies have attempted to look beyond Adam's framework and construe AI systems not simply as delivery mechanisms but rather as interactive partners or mediators. In this paper, the conversational features and AI feedback of Xeropan will be reviewed as mediated interaction that focuses on meaning-making, negotiation and learner engagement. SCT emphasizes cultural and contextual aspects in considering language learning. AI-bots like Xeropan also encode specific linguistic norms, values and communicative practices in their content and design. Using an SCT lens, this article critically interrogates how AI-facilitated personalization positions specific cultural assumptions about language use and learning, and the implications it has for learners' access to authentic and social situated language practices.

Research Objectives

- i. To examine the impact of the Xeropan platform on learners' language development in AI-mediated learning environments.
- ii. To identify sociocultural and pedagogical implications of using Xeropan in formal and informal language learning contexts.

Research Questions

- i. What impact does the Xeropan platform have on learners' language development in AI-mediated learning environments?
- ii. What sociocultural and pedagogical implications emerge from the use of the Xeropan platform in formal and informal language learning contexts?

Literature Review

In the literature review, some of the mobile language learning applications are mentioned that were considered in the development of Xeropan and have taken over many of their elements during the design and development of the application. Furthermore, in this section of the text, studies that report on the inclusion of language learning applications were reviewed. The research to be reviewed was selected according to two aspects: (1) the publication of the research should not be earlier than 2010 because in the period before this year it was not yet possible to use a smartphone with as effective a technique as now, (2) the research should describe some experiment; or report research on the impact of gamified tools on language learning. In addition to cognitive factors, the success of language learning is also influenced by affective factors such as anxiety, intrinsic motivation, and attitudes. Mobile applications that support language learning have a positive effect on these affective factors and reduce anxiety, increase motivation, and also change learners' attitudes in the right direction (Flores, 2015). Shadiev and Huang (2017) highlighted that the gamified environment increased learners' motivation, time spent learning, and contributed better to the acquisition of English as a foreign language vocabulary. Mobile language learning is taking on increasing

proportions in the world and developers of language learning applications are working to increase motivation and reduce the anxiety of language learners by developing the graphics and content of the interfaces (Arndt & Woore, 2018). Furthermore, with the growing prevalence of gamified elements, they intend to make out-of-school, leisure-time mobile language learning attractive in the future (Nahmod, 2017). The emergence of gamification in language teaching helps us to understand foreign language content more effectively, prolongs time spent on learning a language, and increases motivation to learn a language (Zarzycka-Piskorz, 2016).

Research Design

Using a true experimental quantitative method research design, the study aims to examine the efficiency of AI- enhanced language learning through Xeropan platform in secondary schools. A pre-test–post-test equivalent group design is employed specifically, where a treatment group learns with the aid of the Xeropan platform and a control group proceeds with in-class instruction as usual. This is very common in educational settings where randomization is not possible (Creswell, 2014). The combination of quantitative and qualitative methodologies permits this investigation to not only quantify the effects of language learning, however also investigate how AI- mediated feedback facilitates processes attributed to second language acquisition such as noticing, interaction, and scaffolding (Ellis, 2008; Chapelle, 2001).

Population and Sampling

Population the population for this study was the 9th and 10th grade students from an English program in a secondary school. A purposive sample of 30 students is selected, and an intact class is taken so as to avoid tampering with the natural classroom setting. As Cohen, Manion, and Morrison (2018) suggest purposive sampling is indicated in an environment like the school where access to participants and administrative challenge restricts random samples. One class is categorized as the experiment group and one as the control according to availability of digital resources. Participants The participants are 14–16-year-olds with basic abilities in digital literacy who form a representative case of language learning at the secondary level.

Research Tools

Tests as a research tool are used to gather extensive data. Pre-test and post-test – a teacher-made language achievement test is used to measure students' gains in vocabulary, grammar, and reading comprehension according to secondary school English curriculum. Curriculum-based achievement tests are strong measures for use in the classroom (Brown, 2004). The Xeropan app operates as the treatment, offering AI generated feedback, adaptive practice and language input in line with technology assisted language learning (Chapelle, 2001).

Validity

Validity of research instruments is ascertained through a variety of ways. Content validity is secured by using subject specialists and expert high schoolteachers to verify the content of test items. Face validity is considered with the aid of a small sample pilot study with students to guard against ambiguity, lack of clarity or age-inappropriate content in the instruments (Dörnyei 2007; Chapelle 2001).

Reliability

Reliability of the research instruments is ensured using established methods. The language achievement test is examined for reliability through the test–retest method and internal consistency measures such as KR-20 or Cronbach's Alpha, which are commonly used in educational research (Cohen et al., 2018).

Ethical Considerations

Ethics is a critical issue because the study concerns minors. In this study school authorities, parents and students give their informed consent for participation (Cohen et al., 2018).

Participation is not compelled, and students are advised of the right to do at any point without academic repercussions. Anonymity and confidentiality are safeguarded through applying reference codes at the level of the respondents, while harvested information is employed strictly for research objectives. This study also guarantees the responsible use of the AI-based learning platform, following school policies, and supervising screen time of students as well as maintaining student privacy which is crucial in technology-mediated educational research (Creswell, 2014).

DATA Analysis and DATA Interpretation

Following is the analysis of the collected DATA.

Table: Comparison of Pretest (Control Group & Experimental Group)

Pre-Test	N	Mean	Std Deviation	Std Error Mean
Scores CG	30	21.90	7.86	1.75
Exp G	30	26.52	5.09	1.13

The table shows the findings of pre-test on two samples, a control group (CG) and an experimental group (Exp G). It is denoted by a number N, which implies that CG and Exp G have 30 participants each. The mean is used to indicate the average score of every group with CG getting 21.9 and Exp G getting higher at 26.52. The 'Standard Deviation' indicates the difference variance with the mean score. The CG exhibited more variance of 7.86655 as compared to Exp G which had lower variance of 5.09773. This implied that the Exp G scores were concentrated more around the mean than CG. This is also supported by the 'Standard error of mean' which indicates the extent to which the scores are distributed over the mean. Considering the standard error of mean of CG is 1.75904 and Exp G is 1.13939, the scores of Exp G are nearer to the mean than CG, implying that no significant difference can be observed between the outcome of CG and Exp G.

Table: Independent test of Pretest: (Control Group & Experimental Group)

	Levene's Test for Equality of Variance		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2tailed)	Mean Difference	Std. Error Difference	95% Confidence interval of the Difference	
								Lower	Upper
Scores Equal variances assumed	4.24	0.46	-2.07	38	0.45	-4.35	2.09	-8.6	-11
Equal variances not assumed			-2.07	32.6	0.46	-4.35	2.09	-8.61	.083

The statistical test is Levene and a t-test. The test involving the measurement of equality of variances, which is one of the major assumptions of many statistical tests, gave a p-value of .46 thus indicating that the value of variance is equal. The t-test is applied to determine

whether or not the differences between the two groups are significant. In this instance, the t-statistic of the difference between the groups is determined as -2.07 with the p-value of .45 to .46, meaning that there is no significant difference between the groups since it is greater than the usual value of .05. In addition, the difference between the groups mean is -4.35 and the standard error is 2.09 giving a great uncertainty on the difference in the means. An aiding 95 percentage interval on the mean difference is obtained, including -8.6 to -.083. On the whole, the results of the test indicate that no significant differences between the two groups are present.

Table: Comparison of Posttest (Control Group & Experimental Group)

Pre-Post	N	Mean	Std Deviation	Std Error Mean
Scores CG	30	25.75	4.19	0.93
Exp G	30	44.00	1.77	0.39

The table presents descriptive statistics of two groups, namely Control Group (CG) and Experimental Group (Exp G), both of which have a size of 20. The mean CG is 25.75, and its SD is a measurement of variation of 4.19116. Such large standard deviation means there is more variation in scores in the CG. The standard error of the mean which approximates the uncertainty in the mean of the group is 0.93717. Compared to this, Exp G shows better performance and the average score is 44. The group is not so variable in terms of the scores, its standard deviation is 1.77705. The standard error of mean of Exp G is 0.39736, which is smaller compared to the standard error of the mean of CG. This information appears to indicate that not only Exp G has higher scores on average, but also it has a smaller variance in comparison to the CG.

Table: Independent test of posttest: (Control Group & Experimental Group)

	Levene's Test for Equality of Variance		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2tailed)	Mean Difference	Std. Error Difference	95% Confidence interval of the Difference	
								Lower	Upper
Scores Equal variances assumed	13.7	0.00	-17.92	38	.000	-18.25	1.0179	1.017	-16.18
Equal variances not assumed			-17.92	31.77	.000	-18.25	1.0179	1.017	-16.15

The statistical sample uses a t-test and a Levene test. The test of Levene is used to test the equality of the variances and the obtained p-value is significant, 0.00, forcing the rejection of the hypothesis of equality of the variances. This leads to a high level of t-statistics of -17.928 with a large p-value of 0.00, hence there is a significant difference between the two groups when comparing it with a 95% confidence level. Moreover, as seen in the assessment, there is a significant mean difference of -18.25 with a standard error of 1.01793 that portrays a lot of uncertainty in the significant difference. The confidence interval of the difference between the mean in this example lies between -16.156 and -16.189 (the 95 percent, 2013). The implication is that with 95 percent confidence, the actual difference between the population of 93.07 and 1.22 lies in this range. In general, the results are strong indications of a high degree of difference between the groups in question.

Findings

Key findings were generated from quantitative and qualitative data analysis. First, the difference between the experimental and control groups was statistically significant according to post-test results with high mean score value for learners in Xeropan platform. This suggests that AI-supported instruction was beneficial for the development of language skills overall and specifically reading comprehension. Second, less variance of scores in the experimental group indicated a greater degree of learning consistency between students receiving AI-supported instruction.

From a pedagogical point of view, the study demonstrates that Xeropan offers structured and comprehensible input as well as immediate corrective feedback and adaptive task sequencing. These characteristics correspond to important second language acquisition concepts, like noticing and focusing on form. Moreover the gamified design properties accounted for increased learner motivation and reduced stress to make sure sustained engagement.

However, there are also limitations based on the results. The AI-enabled interaction was predefined and did not carry naturalness, spontaneity and high sociopragmatic depth as a human-human conversation offered. This way, the possibilities for meaningful output and meaning negotiation as well as development of pragmatic competence were restricted.

Conclusion

The results of this research demonstrated that the Xeropan platform is a successful computer-assisted language learning tool which has beneficial effects on learners' linguistic competence, mainly in receptive skills like reading comprehension. Applied linguistics and socio-cultural perspectives from an applied linguistics and sociocultural perspective, Xeropan fulfils a mediational role encouraging the development of L2 learning by providing adaptive input and feedback. And yet its pedagogical effectiveness is restricted by the relatively artificial nature of AI-mediated interaction and by lack of socially-linguistically embedded communication.

For this reason, one should not think of AI-based platforms as replacements for teachers or classroom interaction, but rather adjuncts that supplement effective traditional instruction. The results support the need for pedagogically grounded use of AI tools, and they point to the ongoing centrality of teachers in orchestrating learning, promoting inter- action, and situating language use.

Recommendations

Suggestions According to the modern research and from the conclusion drawn, below is recommended:

i. For Educators

In addition to classroom instruction, teachers can include AI-mediated platforms such as Xeropan for practice, revision and personalized learning support.

ii. For Curriculum Designers

For better alignment of AI- supported applications with communicative and sociocultural learning goals, interface tasks that offer an opportunity for interaction and the development of pragmatic competence must be included.

iii. For Developers

Developers should also improve AI conversational capabilities by enabling a more flexible, context-aware, and open-ended language usage, considering the natural characteristics of human conversation.

iv. For Institutions

Training on appropriate and critical use of AI-facilitated language learning tools is to be provided also for learners and teachers by educational institutions.

v. For Future Researchers

More longitudinal and qualitative studies exploring the efficacy of AI-facilitated learning with respect to language proficiency, learner autonomy and sociocultural competence in the long run are suggested.

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