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Research Article

Investigating the Pedagogical Affordances of Digital Annotation in EFL Lexical Development: An Application of Laufer's Model

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ABSTRACT

In this qualitative study, the pedagogical affordances of digital annotation tools in lexical development among Iranian EFL learners are investigated based on Laufer's model. The data were collected through semi-structured interviews and learner diaries of fifteen intermediate-level university students who took part in vocabulary learning activities with a digital annotation tool for six weeks. Thematic analysis revealed that electronic annotation tools strongly support vocabulary acquisition by promoting focused attention to word forms, enhanced semantic understanding through the support of individualized notes, and contextualization of word use with meaning. Despite these benefits, students reported limitations such as early technical issues and cognitive overload brought about by excessive annotations. These findings highlight the potential of digital annotation tools as effective tools to enable interactive and meaningful vocabulary acquisition in EFL settings, while demanding adequate learner training and instructional guidance.

Keywords: Digital Annotation, EFL learners, Laufer's Model, Vocabulary Development

1. INTRODUCTION

Vocabulary acquisition is a fundamental component of English as a Foreign Language (EFL) acquisition, given its direct influence on the communicative ability of learners (Laufer, 2005). In spite of different instructional methods, numerous EFL students struggle with storing and utilizing new words in proper contexts (Schmitt, 2008). The emergence of digital technologies has brought about novel chances to support vocabulary acquisition, among which digital annotation tools have demonstrated potential. These tools permit learners to interact actively with texts by highlighting, commenting, and linking, which could deepen their interaction with words in context (Díaz & Fernández, 2021).

Laufer's model of vocabulary acquisition presents a comprehensive approach with attention to a number of dimensions of vocabulary learning, including form perception and recognition, semantic awareness, and integration into context (Laufer, 2005). The model is particularly relevant in an explanation of how digital annotation facilitates these dimensions through allowing learners to focus on vocabulary form and meaning in text negotiation with authentic texts.

Although the impact of technology on vocabulary learning has been largely investigated (Zhang & Hegelheimer, 2018; Cornillie, Clarebout, & Desmet, 2012), the specific pedagogical affordances of electronic annotation tools remain unexamined, especially from the perspective of EFL learners. How students perceive and utilize these tools can provide valuable insights for educators who aim to incorporate technology into vocabulary instruction.

Therefore, the current research investigates the pedagogical affordances of digital annotation in EFL vocabulary learning within the framework of Laufer's model from the viewpoints of Iranian EFL learners' perceptions and experiences.

In light of the significance of this issue, this research aims to answer the following question:

-To what degree do Iranian EFL learners perceive and experience the pedagogical affordances of digital annotation tools in vocabulary learning within the framework of Laufer's model?

2. LITRATURE REVIEW

2.1 The Centrality of Vocabulary Learning

Vocabulary learning occupies a central role in second language competence (Nation, 2013; Schmitt, 2008).

Vocabulary instruction has long relied on memorization and word lists. More recent research, however, emphasizes learning vocabulary in context and through meaningful use, allowing for richer lexical storage and use (Webb, 2020).

2.2 Laufer's Models for Vocabulary Learning

Laufer (2005) presented a triadic model of vocabulary learning consisting of:

Form (orthographic and phonological knowledge)

Meaning (semantic knowledge)

Use (contextual and syntactic use)

Laufer and Girsai (2008) emphasized that effective vocabulary learning is attained when learners are exposed actively to all three dimensions simultaneously.

Later, Laufer extended this model to a five-dimensional one by incorporating:

Involvement Load (Need, Search, Evaluation)

Input and Output modalities

Intentionality vs. Incidental Learning

This comprehensive model explains cognitive, motivational, and contextual dimensions of vocabulary learning (Laufer, 2010).

2.3 Digital Annotation and Vocabulary Learning

Digital annotation tools (e.g., Hypothes.is, Diigo) allow students to interact with texts through highlighting, commenting, and linking multimedia resources. These tools afford metacognitive engagement and contextual awareness.

Broussard and Fernández (2021) indicated that digital annotation supports focused attention and learner agency in vocabulary activities.

Zou and Xie (2021) indicated that learner-generated multimodal annotations (e.g., images, synonyms, usage examples) support vocabulary retention through personalization and elaboration.

2.4 Empirical Studies on Digital Affordances

A few studies have examined how digital affordances support vocabulary learning:

Özkan et al. (2021) discovered that annotations supported by multimedia (i.e., pictures, definitions, and translations) significantly improved incidental and intentional vocabulary learning outcomes.

Kaplan-Rakowski et al. (2024) applied dual coding theory to illustrate that lexical retention is improved by multimedia input, provided that cognitive load is managed appropriately.

These findings validate the use of digital technology in vocabulary instruction, specifically in EFL/ESL contexts where learners are supported by scaffolding and multimodal input.

2.5 Affordances and Limitations of Digital Affordances

Digital annotation tools can:

Increase awareness of word form through visual feedback,

Support meaning-making through context-sensitive explication,

Encourage use by having learners consider word choice and syntax.

However, without specific instructions, students may be cognitively overloaded or distracted (Sweller et al., 2011).

Research emphasizes the importance of instructional design, teacher support, and appropriate scaffolding in implementing digital technology for vocabulary learning (Özkan et al., 2021; Kaplan-Rakowski et al., 2024).

3. METHODOLOGY

3.1. Research Design

This qualitative study aims to explore Iranian EFL learners' perceptions and experiences of the pedagogical affordances of digital annotation tools in vocabulary learning, framed by Laufer's model. A qualitative approach offers an in-depth understanding of learners' subjective perception and experience (Creswell & Poth, 2018).

3.2. Participants

Fifteen Iranian university students at the intermediate level who were taking an EFL course took part in the study. The participants were selected purposively due to their previous experience with using digital annotation tools in vocabulary learning tasks. There were 9 female and 6 male students, aged between 19 and 24.

3.3. Data Collection

Data were gathered through semi-structured interviews and learner journals. Interviews were designed to draw out learners' detailed perceptions and experiences of digital annotation tools, and journals recorded learners' reflections during vocabulary activities conducted over six weeks on a digital annotation platform (e.g., Hypothesis).

3.4. Procedure

Participants engaged in vocabulary learning activities with digital annotation tasks integrated into their course curriculum. After completing the intervention, semi-structured interviews, and learner journal collection, all interviews were tape-recorded and transcribed verbatim for subsequent analysis.

3.5. Data Analysis

Thematic analysis was carried out following Braun and Clarke's (2006) procedures. Coding was aimed at themes aligned with Laufer's dimensions of vocabulary acquisition—form recognition, semantic meaning, and contextual use—and at emergent themes for learner perceptions of affordances and challenges.

4. RESULTS AND DISCUSSIONS

There were four overarching themes that emerged from the thematic analysis of the interview transcripts and learner journals for the pedagogical affordances of digital annotation tools in EFL vocabulary acquisition, positioned within Laufer's framework:

1.Enhanced Form Recognition

Participants reported that electronic annotation caused them to pay closer attention to the form of new words. The ability to highlight and label words in texts made word form awareness more overt. As one student commented, "Using the annotation tool made me pay more attention to spelling and structure of new words, which I normally neglect when I read."

2.Increased Semantic Understanding

Students described that adding notes and comments to annotated words facilitated deeper semantic processing. They could add definitions, synonyms, or personal connections, which made them comprehend better. For example, one of the participants noted, "Writing my own explanations next to difficult words helped me remember their meanings more than reading a dictionary."

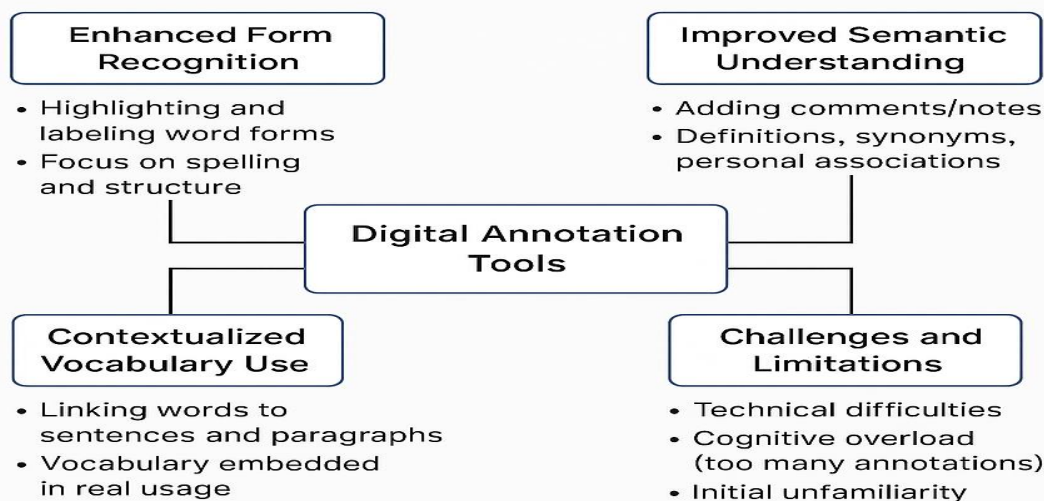
3.Contextualized Vocabulary Use

Electronic annotation permitted students to see and interact with vocabulary in context. By tying annotations to specific sentences and paragraphs, students saw vocabulary as part of real use, which aided recall and daily usability. "Seeing the word in context and adding notes about how it was used helped me understand how to use it myself," said one student.

4.Challenges and Limitations

Despite positive feedback, some participants indicated challenges such as technical problems, distraction due to many annotations, and unfamiliarity with the tool interface initially. One learner mentioned, "Initially, it was difficult to adapt to the digital tool, and sometimes too many notes confused the text."

Pedagogical Affordances of Digital Annotation in EFL Vocabulary Learning Based on Laufer's Model



Adequate training and support needed

Findings in this study indicate that digital annotation tools offer significant pedagogical affordances that support EFL vocabulary learning, as encapsulated in Laufer's model.

To begin with, the issue of heightened form awareness aligns with Laufer's emphasis on learners' attention to the formal aspects of lexis (Laufer, 2005). Electronic annotation's interactive highlighting and labeling features enabled learners to devote more deliberate attention to word forms, a requirement for accurate vocabulary acquisition (Schmitt, 2008).

Second, improved semantic understanding through note-taking and personalized explanations supports the semantic mapping component of Laufer's model. The ability of learners to create their own meanings and links aligns with research by Díaz and Fernández (2021), who stressed that active engagement with

vocabulary through digital technology facilitates deeper cognitive processing.

Third, the theme of contextualized vocabulary use resonates with Laufer's contention that vocabulary learning is best achieved in contexts of meaningful use (Laufer, 2005). Digital annotation allowed students to connect words with actual language use, which facilitated recall and usage, in accordance with Cornillie et al. (2012) and Zhang and Hegelheimer (2018).

Despite these strengths, the drawbacks and limitations that students identified point to the need for careful implementation and training in the incorporation of digital annotation tools in language teaching. The technical glitches at the beginning and the cognitive overload from over-annotations suggest that teachers should scaffold the use of such tools to attain maximum effectiveness (Díaz & Fernández, 2021).

Overall, this study contributes to the literature by reporting qualitative results of learners' perceptions, corroborating the applicability of Laufer's model as a theoretical basis for investigating technology-mediated vocabulary development. It also offers practical recommendations for EFL instructors wishing to use digital annotation for vocabulary learning support.

5. CONCLUSION

This study explored Iranian EFL learners' perceptions of the pedagogical affordances of digital annotation tools for vocabulary learning from the vantage point of Laufer's model. The findings revealed that digital annotation facilitates vocabulary learning through attracting learners' attention to word forms, developing semantic knowledge, and contextualizing word use. These affordances aligned exactly with the core dimensions of Laufer's model, confirming its relevance to the investigation of technology-mediated vocabulary learning.

However, concerns of technical issues and cognitive overload highlight the necessity to provide adequate training and support in introducing digital annotation tools to EFL instruction. Follow-up studies can augment these findings by examining the long-term effects of digital annotation on vocabulary retention and gathering teachers' perspectives on pedagogical integration.

Overall, this study offers revealing qualitative results capable of informing the effective integration of digital annotation in EFL vocabulary learning with a view to promoting more interactive and meaningful learning experiences.

The findings of this study have several pedagogical implications for online EFL instruction. Instructors can utilize electronic annotation tools in vocabulary learning tasks to foster learner interaction, independence, and deeper processing of words. The implementation of such tools, however, should be complemented with explicit instructions, scaffolding techniques, and ongoing technical support to cushion learners' initial challenges.

Curriculum designers and teacher trainers are also urged to integrate digital literacy and annotation strategies into teacher preparation programs so that teachers are ready to instruct learners in maximizing the benefits of these tools. Additionally, pairing annotation with collaborative learning activities—such as peer review of annotations—has the potential to contribute to vocabulary retention and critical thinking.

In summary, this study demonstrates the virtues of online annotation tools as valuable pedagogical instruments that align neatly with established vocabulary acquisition frameworks like Laufer's model. As EFL instruction becomes more commonplace in online environments, accepting learner-centered, interactive instruments like annotation software offers promising opportunities for vocabulary development and more engaging language learning experiences.

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