

DEVELOPMENT AND EVALUATION OF GLOSSMIND GLOSSARY: AN INTERACTIVE E-GLOSSARY FOR CONSUMER BEHAVIOR COURSE

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Abstract: *In technical and vocational education, vocabulary learning continues to be a challenge. The increasing complexity of academic content at the tertiary level poses great difficulties for students to understand and remember important terms. According to needs analysis conducted at Politeknik Kuching, Sarawak, 73.3% of students taking the Consumer Behavior course (DPM40113) had trouble understanding discipline-specific terms. GlossMind Glossary, a mobile interactive glossary with more than 120 terms backed by contextual examples, visual aids, and self-assessment tests, was created using the ADDIE instructional design methodology to address this. It was assessed using a mixed-method quasi-experimental approach. The Technology Acceptance Model guided usability evaluation of the mobile application. A total of 102 students participated in a user satisfaction survey and pre- and post-test vocabulary assessment. After the three-week intervention, the average vocabulary score increased significantly from 13.42 to 19.35, while the standard deviation of the score decreased by 83.6%, indicating a significant reduction in performance variation. The percentage of students in the good to excellent category increased significantly from 51.0% to 92.2%, while the percentage of students in the failing category decreased from 39.2% to zero. On a five-point scale, the user satisfaction level for all parameters averaged 4.31, and 89.2% of users stated that they would recommend the tool to a friend. These findings indicate that a well-designed mobile glossary can improve vocabulary performance.*

Keywords: *consumer behavior, interactive glossary, mobile learning, ADDIE model*

Introduction

Technical and Vocational Education and Training (TVET) institutions in Malaysia are important for developing a skilled national workforce (Abd Rahman et al., 2025; Olabiyi et al., 2025; Paryono et al., 2017). This is in line with the aspirations of the Civil Economy Framework and the Digital Economy Blueprint (Ministry of Education Malaysia, 2015). In Consumer Behavior (DPM40113) course, students are required to concurrently learn terms from marketing, psychology, and sociology. Conventional resources, like class notes and textbook glossaries, are frequently seen as uninteresting, ineffectual, and challenging to comprehend. These restrictions make it difficult for students to understand, remember, and use important terms, which causes problems when they are revising and applying them in the real world. The increasing ownership of smartphones among polytechnic students in Malaysia opens up a huge opportunity for mobile-based learning that has not been fully explored. However, despite high levels of digital literacy, the availability of pedagogically based interactive glossary applications for discipline-specific vocabulary is still limited (Van der Merwe, 2024). Electronic glossaries, especially those integrated with interactive features, are seen to improve students' memory and understanding of certain terms. Digital tools in learning are very important nowadays because they optimize memory and attention for students (Xodabande et al., 2025; Gu, 2025; Yang et al., 2025). Without specific interactive digital solutions that combine simple definitions, real-world examples, and engaging features such as quizzes and progress tracking, students continue to struggle with terminological mastery and exam preparation.

From a Human-Computer Interaction (HCI) perspective, the effectiveness of mobile learning tools depends on the balance between usability, perceived usefulness, and learning coherence. These dimensions are encapsulated in the Technology Acceptance Model (Davis, 1989; Venkatesh & Bala, 2008). Previous studies have shown that the acceptance of educational technology is significantly influenced by perceived ease of use and learning value, which are important design elements in the development of vocabulary tools in the TVET context (Hwang & Chang, 2011). In order to address vocabulary learning disparities, this study created and assessed GlossMind Glossary, a mobile interactive glossary created using the ADDIE instructional design model. This study developed and evaluated GlossMind Glossary, a mobile interactive glossary made with the ADDIE instructional design model, to address vocabulary acquisition disparities. The ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model provides a systematic framework for instructional design that can guide the process of needs analysis and design implications in the development of effective educational tools (Gagne et al., 2005). This study was guided by two objectives: (1) to evaluate the impact of the intervention on vocabulary performance and the reduction of achievement gaps based on pre-test and post-test scores; and (2) to assess the level of user satisfaction with the usability, engagement value, and learning effectiveness of the glossary.

Methodology

A mixed-method quasi-experimental design was employed, combining quantitative pre-test and post-test vocabulary assessment with a TAM-informed user satisfaction survey. The study was conducted during academic session I 2025/2026 at Politeknik Kuching in Sarawak, Malaysia. A total of 102 students enrolled in Consumer Behavior (DPM40113) completed the user satisfaction

survey and participated in vocabulary tests before and after the test. For research instruments, in the Vocabulary Knowledge Test, a 20-question multiple-choice test assessed understanding of consumer behaviour terms at four cognitive levels: (i) definition of the term, (ii) contextual application, (iii) concept differentiation, and (iv) application to new scenarios. The same instrument was used as a pre-test (administered before accessing the GlossMind dictionary in week 1) and a post-test (administered after the intervention period at the end of week 3). Meanwhile, for the User Satisfaction Questionnaire, the instrument used a mixed-methods approach and included: (a) demographic questions covering gender, age, and experience with digital learning; (b) ten Likert-scale questions rated on a five-point scale (1 = Strongly Disagree to 5 = Strongly Agree) that evaluated factors such as ease of understanding, support for retention, usefulness of examples, interface usability, confidence enhancement, engagement, satisfaction with content, performance improvement, willingness to recommend, and intention to continue using; and (c) two open-ended questions requesting qualitative feedback on the strengths and areas needing improvement. The items were adapted from established and validated Technology Acceptance Model (TAM) and mobile learning satisfaction questionnaires (Davis, 1989; Hwang & Chang, 2011).

GlossMind Glossary Development: ADDIE Framework

The GlossMind Glossary was developed systematically across all five ADDIE phases. 73.3% of students reported having vocabulary problems, according to a needs assessment survey (n = 90) conducted during the Analysis Phase. Over 120 key terms related to Consumer Behavior were found in the course syllabus, and platform design was informed by the documentation of student device ownership, connectivity patterns, and learning preferences.

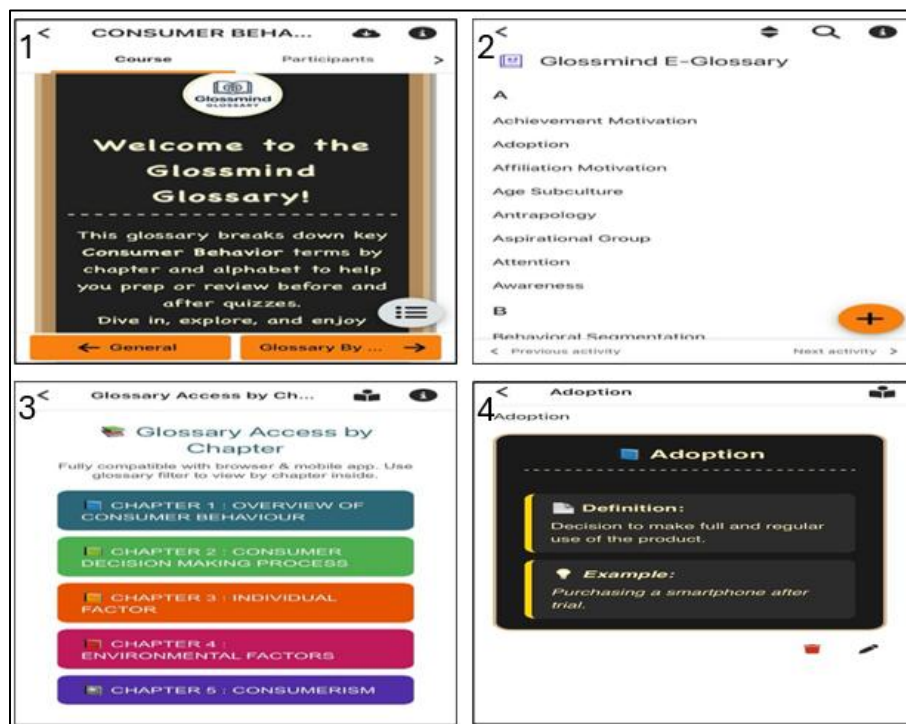


Figure 1: GlossMind Glossary Development

During the Design Phase, learning objectives were set in accordance with the Course Learning Outcome (CLO), an information architecture featuring alphabetical navigation and keyword search was built, and interactive features such as scenario-based multiple-choice tests with instantaneous corrective feedback were specified. Before full implementation, usability testing with a pilot group (n = 20) found and fixed navigation difficulties. During the development phase, all 120+ phrases were authored with definitions, contextual Malaysian business examples, and visual explanations. Figure 1 shows content delivery, interface and features of GlossMind Glossary, which starts from 1-GlossMind Glossary Interface; 2-List of Terms by Alphabet; 3-List of Terms by Chapter; 4-Definitions of Terms. During the Implementation Phase, all enrolled students received GlossMind Glossary, an orientation was held, and three weeks of unrestricted access were given in addition to normal education. Both quantitative and qualitative assessments, which are detailed in the following sections, were part of the Evaluation Phase.

Results

Pre-test and Post-test Performance (Vocabulary Knowledge Test)

Table 1: Performance Category Distribution: Pre-test and Post-test (n = 102)

Category	Score Range	Pre-test n (%)	Post-test n (%)	Change
Failing/Poor	0-14	40 (39.2%)	0 (0.0%)	-39.2 pp
Average	15-17	10 (9.8%)	8 (7.8%)	-2.0 pp
Good/Excellent	18-20	52 (51.0%)	94 (92.2%)	+41.2 pp

Table 1 shows that 92.2% of students performed well to excellently after the intervention, whereas none of the students who had previously been in the failing category (39.2%) stayed in that category. Closing the accomplishment gap is clearly seen by the 39.2% of students who moved up the academic ladder after performing below average. These findings are consistent with the Cognitive Load Theory (Sweller et al., 2011): interactive quizzes enhanced Germane load while GlossMind's structured navigation decreased unnecessary cognitive load, improving vocabulary acquisition conditions. This trend explains that by giving TVET students self-directed and on-demand access to previously unavailable instructional support, mobile glossary applications reduce performance variance.

User Satisfaction

Table 2: User Satisfaction Survey Results (n = 102)

Statement	Mean	SD	Agreement (%)
1. I can easily understand terms through GlossMind	4.26	0.79	80.6%
2. GlossMind helps me remember concepts better	4.32	0.68	88.2%
3. The examples help me understand term meanings	4.32	0.69	87.3%
4. The GlossMind interface is easy to use	4.28	0.69	86.3%
5. I feel more confident with terminology	4.33	0.71	86.3%
6. GlossMind makes learning more interesting	4.31	0.72	85.3%

7. I am satisfied with GlossMind content	4.27	0.68	87.3%
8. I can answer quizzes better after using GlossMind	4.30	0.70	86.3%
9. I would recommend GlossMind to peers	4.36	0.67	89.2%
10. I intend to continue using GlossMind	4.32	0.68	88.2%
Overall Average	4.31	0.70	86.8%

Note. Agreement (%) = combined Agree (4) and Strongly Agree (5) responses. Five-point scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

Overall, the analysis data in Table 2 shows that the GlossMind application has received very positive feedback from users with an overall mean score of 4.31 and an agreement level of 86.8%. This finding proves that the majority of respondents are satisfied with the quality of the content, learning effectiveness, and the application interface provided. The effectiveness of GlossMind is also clearly visible when users feel more confident with terminology and admit that this application helps them answer quizzes better and makes the learning process more interesting. The item that obtained the highest mean is item 2, which is the user's willingness to recommend GlossMind to peers (mean 4.36). Followed by item 5, where users show increased self-confidence in terminology after using this application (mean 4.33). Overall, this application helps users remember concepts better, helping to understand the meaning of terms.

Conclusion

This study shows that among polytechnic students, a well-designed mobile interactive dictionary can enhance vocabulary performance and close achievement gaps. After a three-week intervention, GlossMind Glossary, which was created using the ADDIE instructional design methodology and assessed using a TAM-informed satisfaction instrument, resulted in an 83.6% decrease in score standard deviation and a 44.2% increase in mean score. While the percentage of students in the good-to-excellent category rose from 51.0% to 92.2%, the percentage of students in the failing category fell from 39.2% to zero, indicating that the intervention disproportionately helped struggling learners while preserving high performance among advanced students. The tool's usability and perceived learning value were validated by the average user satisfaction score of 4.31 on a five-point scale and the 89.2% willingness to recommend it.

Several limitations that need to be acknowledged. First, the lack of a randomized control group in the quasi-experimental design limits the ability to draw conclusions about causality; concurrent learning activities, instructor delivery, and the motivational impacts of novelty may have all played a role in the reported increases. Second, most students scored close to the maximum on the 20-item vocabulary test, which showed a ceiling effect at post-test. Future research could employ more discriminating tools or longer item pools. Third, the same tool was used for both pre and post assessment. Fourth, generalizability across Malaysian polytechnics with varying student profiles, course contexts, and digital infrastructure is limited by single-institution sample. Future research should employ randomised controlled designs with active control groups, look at retention at three and six month follow-up assessments, replicate across different disciplines and investigate specific moderators such as prior knowledge, learning style, and digital literacy.

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Author Contributions: The research study was carried out successfully with contributions from all authors.

Conflicts of Interest: The authors declare no conflict of interest.

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