MOBILE ENGLISH FOR STEM

(ME4STEM)

An English Vocabulary Mobile Application for STEM Learners

KARMILA RAFIQAH M. RAFIQ
HARWATI HASHIM
MELOR MD YUNUS

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Preface

The Twelfth Malaysia Plan (2021-2025) and Malaysian Education Blueprint highlight Science, Technology, Engineering, and Mathematics (STEM) education, yet STEM pursuers in higher institutions are less than 60%. This is because STEM subjects in high schools are not in English, causing learners to lack vocabulary related to STEM. Although the importance of STEM has been recognised, studies pertinent to STEM and the English language are still scarce, leaving a gap to be addressed. However, STEM vocabulary is specific, focusing more on English for Specific Purposes, giving more authenticity to learning. This book designed and developed a Mobile English for STEM (ME4STEM) for Science, Technology, Engineering, and Mathematics (STEM) learners to enhance their English vocabulary competency based on the ADDIE instructional design model. English for Specific Purposes (ESP) pioneered the direction of this research. The development of the module was to provide a new approach to learning English for STEM education based on mastery learning theory and intended for upper secondary STEM learners. The ADDIE model was used as the instructional design. There were three phases in this study; 1) Analysis, 2) Design and Development, and 3) Implementation and Evaluation. In the first phase, 64 STEM learners participated in a survey to identify their needs regarding important English language skills, learners' problems, learning preferences, and mobile learning readiness. Findings from the analysis phase showed that learners know the importance of English for academic and future careers. Their major problem was in vocabulary. They also preferred to learn via games or quizzes, audio-visual materials, and problem-solving tasks. They also prefer activities such as multiple-choice questions, gap-fillings, and discussions, aside from being ready to learn via a mobile app. Findings from the analysis phase were used to develop the module. The module was designed based on the learning needs and learning theories in the design and development phase. The module's design was underpinned by ESP functional language, mastery learning, cognitive constructivism, social constructivism, problem-based learning, and the cognitive theory of multimedia learning. Once the pre-prototype was ready, six experts (two

ESL, two STEM, and two mobile learning experts) evaluated the app. The modifications were made based on experts' evaluations and piloted on 47 STEM learners. After pilot testing, the final phase commenced with the finalised version of the mobile app. In the implementation and evaluation phase, 523 STEM learners used ME4STEM. A survey consisting of the usability aspects and learners' acceptance was distributed. Findings from this phase showed high usability and learners' acceptance of ME4STEM. This book adds value to the teaching and learning of STEM vocabulary in English. At the same time, this book contributes to the theoretical and practical aspects of mobile learning, which encourages learning at learners' own pace. This book implied that learning English for STEM via mobile learning is feasible and provided a new perspective for policymakers to look into introducing English for STEM as a subject in secondary school.

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Karmila Rafiqah M. Rafiq
Harwati Hashim
Melor Md Yunus