Developing mobile taxation accounting dictionary application: Augmenting speaking proficiency in project-based learning

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Abstract

This study aims to investigate and develop a mobile tax accounting dictionary that functions as a self-learning tool for improving speaking competence through project-based learning. The dictionary was created based on the ADDIE Model (analysis, design, development, implementation, and evaluation). The application was developed utilizing the Waterfall approach, PHP programming language, and the SLIM framework. The application covered a wide range of tax accounting terms with bilingual sample sentences, learning materials focusing on grammatical constructions utilized in business meeting presentations, an evaluation section featuring vocabulary placement tests, and exercises at varying difficulty levels. During the implementation phase, a quasi-experimental approach was employed using a pretest-posttest control group design with 52 participants from the Accounting Taxation Study Program. To evaluate the impact of the dictionary application on student learning achievement, the speaking scores of the students were analyzed using the Kolmogorov-Smirnov test and the SPSS Statistics 25 program. The data analysis, specifically the independent Samples Test output table, revealed a significant difference (Sig value < 0.05) between the results of the control and treatment classes. Consequently, the self-learning Taxation Accounting Dictionary application...
produced in this study was an excellent aid for boosting students’ speaking skills, as evidenced by improved performance after using the application.

**Keywords:** mobile application, project-based learning, speaking ability, tax accounting dictionary, technology-enhanced language learning


In recent years, the incorporation of mobile technology in educational settings has completely transformed traditional teaching and learning methods. With the proliferation of smartphones and tablets, students now have access to a wide range of educational apps that enrich their learning experiences (Khodabandeh et al., 2017; Massoud, 2021; Mengorio & Dumlao, 2019). With the advent of smartphones and mobile devices, learning has become more accessible and interactive. In the field of accounting, where accurate and precise communication is crucial, there is a growing need for tools that can enhance speaking proficiency specific to the domain. Mobile applications empower learners to assume control of their educational program, which can be especially beneficial for accounting students who could be restricted in terms of time for training (Marbun et al., 2023; Ma & Yodkamlue, 2019).

Tax accounting, being a complex and ever-evolving subject, requires students to possess not only theoretical knowledge but also practical skills. The ability to effectively communicate using tax-related terminology is crucial within the profession. The research emphasizes the relevance of English language competencies in supporting hard skills for communication at work and identifies the need for ESP courses that cater to learners' specific needs (Sukarni, 2020). However, many accounting students face challenges in acquiring this competence due to limited exposure and opportunities for practice (Kouti, 2022). These studies highlight the importance of identifying learners’ needs and designing courses that cater to their specific needs. The studies also emphasize the importance of effective ESP teaching strategies that support learners’ communication skills.

Previous studies have explored the use of mobile-based apps to support language acquisition or general vocabulary development in different classrooms.
(Basal et al., 2020; Massoud, 2021; Mutiaraningrum & Nugroho, 2021; Polakova & Klimova, 2022). The studies have revealed that the utilization of mobile applications could be a reliable aid in the development of language aptitudes, heightening scholarly outcomes, and amplifying vocabulary acquisitions. Mobile apps can be tailored to satisfy students' particular requirements and provide adaptability and expediency when it comes to learning. This study supports the findings of (Van & Thanh, 2022) study, which demonstrates that participants' vocabulary achievement was considerably enhanced in MALL-integrated classrooms and that MALL use encouraged participants to expand their vocabulary. Furthermore, according to (Dağdeler et al., 2020) using MALL through mobile applications was a successful strategy for enhancing vocabulary knowledge responsively for short-term memory alone. Additionally, (Frigolé et al., 2022) emphasize that using mobile applications for English language learning can help L2 learners improve their English proficiency and can also assist L2 learners in studying English as a foreign language in addition to a second language.

While those studies provide valuable insights into the benefits of utilizing such tools for language learning, there is a research gap that specifically addresses their effectiveness in enhancing speaking competence within project-based learning environments focused on specialized subjects like tax accounting. In other words, there has been a limited amount of research conducted on the development of mobile accounting dictionary applications specifically designed for English for Specific Purposes in project-based learning methods. To bridge this gap, the present research aims to develop a mobile accounting dictionary application that focuses on English for Specific Purposes and is implemented in a project-based learning method. This research article aims to explore the potential benefits and effectiveness of using a mobile accounting dictionary application to enhance speaking proficiency in project-based learning. Setting itself apart from previous studies, this application was developed exclusively for this research investigation. By integrating this application into project-based learning approaches using pre-test and post-test control group design, this study aims to examine its impact on student engagement levels and collaborative problem-solving skills while reinforcing their proficiency in speaking about tax-related concepts.

Additionally, this study emphasizes the significance of developing a specific dictionary application designed to list tax accounting terminologies instead of relying solely on existing generic language dictionaries available on popular platforms. This customization enables students to address linguistic needs related to tax vocabulary encountered by learners during discussions or presentations. Through conducting empirical research consisting of quantitative analysis among participating students using our self-developed mobile dictionary app, this study targeted to fill the research gap regarding the efficacy of mobile-based dictionaries in specialized speaking classrooms. The findings
from this study are expected to contribute to advancing pedagogical strategies by shedding light on how a custom-built mobile application can enhance speaking competence within project-based learning environments. Furthermore, this study highlights not only the importance of utilizing technology for language learning as suggested in (Alhafeez Ali Ta’amneh, 2021; Al-Shehab, 2020; Aratusa, 2022) but also the significance of designing subject-specific tools that cater to learners’ specific needs. By doing so, educators can effectively leverage such resources to empower students with enhanced speaking skills and proficiency in specialized subjects like tax accounting. In addition, accounting students can also have access to a comprehensive dictionary of taxation accounting terms and resources, allowing them to enhance their speaking proficiency in the specific context of accounting.

METHOD

The research methodology was structured around the ADDIE, which stands for Analysis, Design, Development, Implementation, and Evaluation, a proven instructional design framework, to systematically guide the process of developing a mobile dictionary application for accounting students in higher vocational education. Through extensive research, planning, development, implementation, and evaluation, this study aims to construct an effective self-learning tool that allows students to use their knowledge and practice their speaking abilities in real-life taxation accounting contexts.

Figure 1. ADDIE Model Diagram

Figure 1 depicts Forest's approach to building an educational module based on the ADDIE Model. It demonstrates that the ADDIE model specifies a thorough sequence of instructional design activities, which is an advantage of the ADDIE model over other models. The first step in the analytical phase was to identify the specific demands and requirements of students in terms of improving their speaking competence with the support of a mobile application. This process was accomplished using an online survey using a Google Form to collect information on students’ English learning needs and the development of a mobile application.
During the design process, researchers used the information gleaned from the analysis to construct the development plan for the mobile application. This blueprint highlighted the app’s features and functionalities that would help students improve their speaking skills in project-based learning. The mobile application was produced throughout the development phase based on the design blueprint, ensuring that it matches students’ needs and supports autonomy in their learning experience.

The PHP programming language and the SLIM framework were used to develop the backend or Web Services, while the programming language JavaScript, as well as the frameworks Vue.js and Capacitor.js, were applied to create the frontend or interface apps. The software contains a system database (MySQL), a backend server (Apache), a text editor (Visual Studio Code), and an Integrated Development Environment (IDE) (Android Studio). The hardware includes a Backend Server, using Cloud VPS with 1 GB RAM, CPU 2 Core, and 20 GB Disk Space, and the client, using a mobile phone with Android OS version 6. Following the development of the mobile application, it was tested in a controlled environment, namely the classroom meeting. This blueprint highlighted the app's features and functionalities that would help students improve their speaking skills in project-based learning. The mobile application was produced throughout the development phase based on the design blueprint, ensuring that it matches students’ needs and supports autonomy in their learning experience.

During the implementation phase, researchers introduced the mobile application to the students and gave them training and instruction on using it effectively in the project-based learning approach. Finally, during the evaluation phase, researchers collected data on students' speaking abilities using the purposive sampling method by involving students from two classes majoring in the Taxation Study Program taught in the odd semester. The purposive sampling approach was utilized, specifically the crucial case sampling strategy, which involved selecting a sample of students who were significant or central to the research subject or population under study. This sort of sampling was utilized to learn about the important experiences of students enrolled in the Taxation Accounting study program as they implemented the mobile taxation accounting dictionary into their learning process. During the evaluation phase, a pre-test and post-test control group technique was used on a sample of fifty-two Tax Accounting students. Quantitative data were gathered from the students’ pre-test and post-test assignments, which were completed both before and after the program was integrated. To measure the impact of this application on students' competence, pre-test and post-test scores were calculated using the SPSS Statistics 25 software. A paired-sample t-test was also utilized to see whether there were any significant discrepancies in the students’ competence before and after using the program.
FINDINGS

The perplexing observations indicate significant difficulties in students’ comprehension and utilization of English tax accounting terminology. Numerous factors contribute to this predicament, such as the curriculum’s limited emphasis on accounting jargon and the absence of opportunities for students to delve into English language studies. Consequently, an urgent need arises for students to independently acquire and grasp these terms to elevate their classroom learning experience. To facilitate self-directed learning, an easily accessible and all-encompassing digital learning package should be provided, catering to students’ familiarization and dependence on technological resources. As (Balouchi & Samad, 2021) mentioned, the utilization of diverse and multifaceted educational resources represents an extraordinary and boundless potential, capable of invigorating and propelling the seamless dissemination of a vast array of knowledge among eager and inquisitive learners. In line with this statement, the current study endeavors involved the development of an innovative mobile application—a dictionary of accounting terms—that was consequently implemented in the learning process. Pre- and post-test scores were calculated using the SPSS Statistics 25 software to assess the application’s impact on student competence, with a specific emphasis on the improvement of English proficiency, especially in terms of speaking competence. The mobile application ‘Taxation Accounting Dictionary’ developed in this study was granted intellectual property rights by the Directorate General of Intellectual Property Rights on 25th September 2023, with the number EC00202385269. The steps of developing the application are described based on the stages in the ADDIE model as follows.

Analysis

At this point, the students were given access to an online survey to gather the prerequisites for software development. The students' opinions on a variety of topics related to learning English, including vocabulary acquisition, autonomous learning, and self-learning, are included in the discussion and findings. Additionally, the students' expectations and views regarding using mobile-based accounting term dictionary applications and self-learning are covered. Apart from the 5-point Likelihood Scale questions, students also provided brief statements describing their predictions. They also expressed their aspirations in the form of brief statements. The study's findings serve as the foundation for both evaluating students' present learning and compiling data for the SLK's requirements analysis. Drawing from the concise statement responses, it can be inferred that students, as potential users, anticipate an SLK with an appealing layout, a straightforward design that incorporates all necessary functions, ease of comprehension, and comprehensive terminology. Additionally, the accompanying data contains a summary of the answers.
provided by students to the online survey, which was administered via a Google form with Likert scale questions.

**Design**

The three different forms of design that made up the design phase of this application development were the application interface, application database, and application flow design. Database modeling and entity relationship diagrams (ERDs) were used in the design phase of software development. The process of producing the application’s content was also carried out at this stage based on the conclusions from the needs analysis and previous research. This application’s user has only one role: user guest. A user guest is someone who directly uses the application's services. In this context, the role of user guest is a student who uses this dictionary application as a medium for independent learning.

The primary dataset offered by this dictionary program featured a lexicon list of 730 words, 103 captivating snippets of trivia, 141 compilations comprising abbreviations or acronyms, 28 compilations of trivia statements, 50 pre-test and post-test queries, 125 exercises encompassing five sets, 75 quizzes spanning basic intermediate, and advanced levels, and a tax procedures examination consisting of 50 questions according to its implementation in Indonesia. The features or services available in this application include displaying a list of tax accounting terms in English, details or descriptions of the selected term, Word of the Day and marking terms as favorite terms for easy searching, a list of terms that are user favorites, a history of terms that have been seen in detail, a list of Acronyms of accounting terms, Fun Fact about taxation accounting terms, a list of terms sorted from the most searched/viewed ones, a list of Trivia Question and Answer, grammar, and business presentation material and providing test features with and without scores for students to measure their understanding of certain materials. An application mockup was developed specifically for each pre-planned feature to complete the program's interface design.

**Development**

At this step, the design was put into action, yielding computer-readable software code. The PHP programming language was used to create the Slim Framework's online services. The Vue.js Framework functioned as the Javascript language's front end. The mobile app development framework was Capacitor.js, and the database was MySQL. Throughout development, each aspect was put to the test simultaneously. This test validated that the application operates following a predefined design. An initial user acceptability test was performed in addition to analyzing the program’s functionality, in which the application was developed and then users provided comments.
Implementation

Every feature or function in the program was tested using the predefined design before moving on to the implementation stage. The application’s necessary data transfer procedure, which included the migration of accounting terms, acronyms, fun facts, and Q&A trivia, was completed at this deployment stage. In addition to data migration, the setup or installation procedure of the application web service was carried out at this step, after which the web service reached the deployment stage on hosting and could be accessible via the internet. After the data and web service applications were ready, the dictionary application was deployed, and the result of this process was a dictionary application that was ready for release. The release-ready dictionary application was then distributed to application users. The .apk (Android PacKage) file for this English-Indonesian dictionary application can be downloaded and installed on an Android smartphone. The following figures describe the Taxation Accounting Dictionary that was created for this study.

![Figure 2. Front page display and sample data](image)

Figure 2 presents a preliminary view of the front page and an example of the data. In this section, users have access to an alphabetical list of words, including a randomly selected “word of the day” from the list. There are a total of 730 entries available, each containing translations to Indonesian, word types, and explanations in both English and Indonesian. In addition, the frequency of occurrence for each entry is displayed, and users can add words to their favorites list by clicking the “heart” icon. Furthermore, the front page highlights special...
features such as favorites, recent entries, acronyms, interesting facts, trends, and engaging trivia questions with corresponding answers.

Figure 3. Acronym and trivia question and answers page display

Figure 3 illustrates the acronym and fun fact pages that learners can scrutinize to augment their understanding of accounting. The list of acronyms consists of 141 entries, tailored to helping learners extend their inventory of technical terms when they are creating text. The “trivia question and answer” page with 28 entries, all designed to arouse students’ curiosity and encourage them to answer the questions on their own before checking the right response. This tool facilitates a step-by-step process whereby the user clicks a query, and then a pop-up window offers the opportunity to revisit the question before accessing the correct answer, along with any additional pertinent facts. Another feature of this application is the learning material and related expressions on business presentation. Apart from the characteristics that have been articulated, there are also components in the guise of drilling questions and examinations that can be utilized by students.

In addition, the fun fact component carries 103 entries, principally intended to provide exposure to students with added comprehension of tax accounting in a more recreational atmosphere, and features a range of statements, from past occurrences to the function of accounting in modern business. Other features include the trend and recent feature was designed to monitor user engagement within the platform. The trend feature serves to emphasize a compilation of words that are frequently searched by users, denoted by their respective data.
access frequencies enclosed in parentheses. On the other hand, the recent feature provides individual users with the ability to monitor their activity by presenting a list of words that have been recently searched within the application.

![Figure 4](image)

Figure 4. Exercise and test page display

Figure 4 features a pre-test and post-test which together compose a total of 50 inquiries, alongside 5 packages of exercises that make up a total of 125 questions. In addition, students can also access some tests divided into basic, intermediate, and advanced level tests with a total of 75 queries, together with a test on Indonesia’s levies policy concluding the set at 50 questions.

**Evaluation**

The evaluation stage is a vital component of the ADDIE model, which is widely used in the development of educational applications. This stage focuses on assessing the effectiveness and efficiency of the mobile dictionary application developed for accounting students. The mobile dictionary application was implemented using a quasi-experimental method using a pretest-posttest control group design involving two groups: the control group, which was given the standard learning process, and the treatment group, which received the intervention. To assess the impact of the Taxation Accounting Dictionary, this study evaluated the speaking tasks to gather quantitative data using a comprehensive evaluation rubric, derived from the TFU Foreign Language Assessment Rubric to ensure accuracy. The treatment group students were
provided with exclusive barcodes to access the mobile-based tax accounting dictionary application, elevating their learning experience with the support of the digital learning platform. During the completion of the project-based learning session, students were assigned to compose and deliver a business meeting presentation on the intriguing topic of 'eCommerce Tax Planning: 5 Astonishing Ways Your Online Store Might Affect Your Taxes'. Collaborating in small groups, students engaged in thought-provoking discussions. These discussions were meticulously assessed using four distinct criteria: content (exquisite further information on the subject), organization (meticulous introduction, body, and summary), terminology (skillful usage of relevant words and terms), and language usage (flawless grammar and pronunciation). Additionally, their performance in terms of intonation, eye contact, and gestures was observed with utmost scrutiny.

The outcomes of the pre-test and post-test evaluations demonstrated a significant difference in scores for the treatment group. The post-test results revealed a positive transformation, characterized by superior organization, detailed explanations, and the adept use of appropriate words and expressions. To further explore the profound impact of the Taxation Accounting Dictionary application on students’ speaking proficiency, this research employed SPSS Statistics 25 to analyze the results. Paired sample calculations were conducted, enabling the determination of average scores in the pre-test and post-test, as well as recognizing the magnitude of improvement (gain score). The correlation coefficient (R) was measured to assess the strength of the relationship between the pre-test and post-test when the Taxation Accounting Dictionary application was seamlessly integrated into the self-learning program. Finally, the paired sample t-test, a tried-and-tested statistical method, was utilized to meticulously examine the significance of the transformation in students’ speaking competence before and after the dictionary integration.

<table>
<thead>
<tr>
<th></th>
<th>Pre_Test_C</th>
<th>Post_Test_C</th>
<th>Pre_Test_T</th>
<th>Post_Test_T</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Normal Parameters&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>75.3846</td>
<td>75.3077</td>
<td>75.4231</td>
<td>80.0385</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>2.21046</td>
<td>2.42931</td>
<td>2.78816</td>
<td>2.87723</td>
</tr>
<tr>
<td>Absolute</td>
<td>.196</td>
<td>.166</td>
<td>.120</td>
<td>.145</td>
</tr>
<tr>
<td>Positive</td>
<td>.196</td>
<td>.166</td>
<td>.110</td>
<td>.145</td>
</tr>
<tr>
<td>Negative</td>
<td>-.148</td>
<td>-.103</td>
<td>-.120</td>
<td>-.098</td>
</tr>
<tr>
<td>Kolmogorov-Smirnov Z</td>
<td>.999</td>
<td>.848</td>
<td>.614</td>
<td>.741</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.271</td>
<td>.468</td>
<td>.845</td>
<td>.643</td>
</tr>
</tbody>
</table>

Figure 5. One-Sample Kolmogorov-Smirnov test

According to the findings presented in Figure 5, the significance value of Asymp. Sig (2-tailed) is greater than 0.05. Therefore, it can be inferred that the data follows a normal distribution. Since the normality test confirms the normal distribution of the data, a difference test, specifically the paired sample t-test, is
conducted. The outcomes of the dependent t-test of the control class are illustrated in Figures 6, 7, and 8.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre_Test_C</td>
<td>75.3846</td>
<td>26</td>
<td>2.21046</td>
<td>.43351</td>
</tr>
<tr>
<td>Post_Test_C</td>
<td>75.3077</td>
<td>26</td>
<td>2.42931</td>
<td>.47643</td>
</tr>
</tbody>
</table>

Figure 6. Paired samples statistics of control class

Upon analyzing SPSS statistics, it was observed that the mean pre-test score was 75.3846, while the average post-test score was 75.3077. This discrepancy clearly indicates that the pre-test and post-test groups produced significantly different average results.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre_Test_T</td>
<td>75.4231</td>
<td>26</td>
<td>2.78816</td>
<td>.54680</td>
</tr>
<tr>
<td>Post_Test_T</td>
<td>80.0385</td>
<td>26</td>
<td>2.87723</td>
<td>.56427</td>
</tr>
</tbody>
</table>

Figure 7. Paired sample statistics of treatment class

The statistical analysis conducted using SPSS revealed an average pre-test score of 75.4231 and an average post-test score of 80.0385. The difference between the pre-test and post-test scores demonstrates a noticeable increase in mean results.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Correlation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre_Test_T &amp; Post_Test_T</td>
<td>26</td>
<td>.771</td>
<td>.000</td>
</tr>
</tbody>
</table>

Figure 8. Paired samples correlation of treatment class

Research conducted on this class revealed a correlation coefficient (R) of 0.771, which aligns with (Asuero et al., 2007) classification of a strong correlation (0.700 to 0.900). Furthermore, the probability value associated with this coefficient was less than 0.05, indicating statistical importance. This implies that students consistently experienced a distinct positive relationship between using the app and assignment performance. As a result, it appears that the more students effectively engaged with the app, the more their assignment scores improved.

<table>
<thead>
<tr>
<th></th>
<th>Paired Differences</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Std. Deviation</td>
<td>Std. Error Mean</td>
<td>95% Confidence Interval of the Difference</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Pair 1</td>
<td></td>
<td></td>
<td>-5.39086</td>
<td>-3.83991</td>
</tr>
<tr>
<td>Pre_Test_T</td>
<td>Post_Test_T</td>
<td>-4.61538</td>
<td>1.91994</td>
<td>.37653</td>
</tr>
</tbody>
</table>

Figure 9. Paired sample test of treatment class
At the significant level of 0.001, which is below the threshold of 0.05, the \( t \) count result of our data analysis was -12,975. The result shows that the \( t \) count is less than the \( t \) table (-12,975 < -4.39930), which implies that we reject the null hypothesis and accept the alternate hypothesis that is, the integration of taxation accounting dictionary application has a positive effect on students’ accomplishments regarding speaking proficiency.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Class</td>
<td>26</td>
<td>75.3077</td>
<td>2.42931</td>
<td>.47643</td>
</tr>
<tr>
<td>Treatment Class</td>
<td>26</td>
<td>80.0385</td>
<td>2.87723</td>
<td>.56427</td>
</tr>
</tbody>
</table>

**Figure 10. Group statistics analysis**

The statistics examination produced a compelling result from its comprehensive statistical examination - the control group’s average post-test score was 75.3077, whilst the treatment group, which had been given additional assistance during the studying, garnered an even higher average post-test score of 80.0385. This noteworthy distinction between the two cohorts’ outcomes reflects the effectiveness of the intervention strategies that were employed.

<table>
<thead>
<tr>
<th>Post_Test</th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>.519</td>
<td>.475</td>
</tr>
</tbody>
</table>

**Figure 11. T-test for equality of means**

The Sig. value in Levene’s Test for Variance Equality suggests that the variability between the treatment group and the control group is indistinguishable, with a Sig. value of 0.475, Independent Samples Test, it becomes apparent that the two-tailed significance level (Sig.) is 0.00, below the threshold of 0.05. This finding suggests a substantial disparity in the post-test outcomes between the control and treatment groups.

**DISCUSSION**

The dictionary application, meticulously designed and developed throughout this study, is a testament to its extensive and multifaceted content. At its core, it comprises a robust vocabulary list, encompassing a remarkable 730 distinct tax-related terms, providing learners with a wealth of essential
terminology vital in comprehending the intricate landscape of tax accounting. This lexicon is further enriched by the inclusion of 103 engaging fun fact statements, shedding light on intriguing aspects of tax accounting, which not only inform but also captivate learners’ curiosity. Moreover, the application incorporates 141 lists of abbreviations or acronyms, essential for demystifying the complex jargon prevalent in tax accounting. Beyond mere terminology, this dictionary application promotes active learning through 28 lists of trivia Q and A statements, fostering an interactive and engaging environment for learners.

Furthermore, to gauge and enhance learners’ comprehension and mastery, the application features a comprehensive set of assessment tools. These encompass pre-test and post-test questions totaling 50 inquiries, which allow learners to evaluate their progress and grasp of tax accounting concepts. To deepen understanding and reinforce learning, the application offers 5 diverse exercise packages, comprising an impressive total of 125 thought-provoking questions. For learners at different proficiency levels, the inclusion of basic, intermediate, and advanced level tests totaling 75 questions ensures a tailored learning experience. Lastly, recognizing the importance of contextual knowledge, a test on tax policy in Indonesia, consisting of 50 questions, equips learners with insights into the specific nuances of tax regulations in this region. In sum, this self-learning kit, born from rigorous development and design processes, stands as a comprehensive and invaluable resource poised to empower learners and educators in the intricate realm of tax accounting.

Given that the learners belong to a generation that was raised with technology, they could also use it more effectively and find it convenient to use. This nature of technology-enhanced language learning was confirmed by previous research (Ningrum & Arrasyid, 2021) which reported that studying using mobile applications is more enjoyable, fascinating, and convenient. Another study found that students believe it is easier to use mobile apps to aid their learning since they use them frequently (Darsih & Asikin, 2020). Regarding the ADDIE model used in developing the application in this present study, researchers could promote a systematic and thorough approach to the development of a mobile application that promotes student autonomy. The analysis stage done in this study also helped to ensure careful planning as confirmed by (Adijaya et al., 2023) that thorough preparation and analysis of learning objectives and student needs are necessary when adopting mobile-assisted language learning to ensure that the resulting model is appropriate for use in education. Choosing the suitable application will result in a more exciting and successful learning experience. Furthermore, the evaluation phase of the ADDIE model allowed for the collection of data that could be analyzed to analyze the effectiveness of the mobile application in enhancing student autonomy. Therefore, the use of mobile applications developed using the ADDIE model can be a valuable tool in promoting students’ autonomy and enhancing their learning experience. In short, the use of the ADDIE model in developing mobile
applications can provide a systematic and effective approach to boosting students' autonomy in their education.

Moreover, the findings of this study underscore a noticeable and discernible effect resulting from the integration of the Taxation Accounting Dictionary application within the learning process. This significant revelation suggests a compelling conclusion: the self-learning kit, meticulously crafted in the form of this tax accounting dictionary, emerges as a potent and invaluable resource poised to elevate students' speaking proficiency within the distinctive context of project-based learning. A remarkable transformation in students' competence levels was observed, marking a pivotal shift towards enhanced language proficiency after they engaged with the application. This observed outcome aligns harmoniously with the body of research conducted within the realm of integrating mobile applications to bolster students' vocabulary competence.

These prior studies, including works by (Massoud, 2021; Okumuş Dağdeler, 2023; Yarahmadzehi & Goodarzi, 2020), share a consistent thread of corroborative evidence, highlighting the efficacy of mobile applications in elevating students' language skills, particularly in the aspect of vocabulary acquisition.

Further strengthening this assertion, studies by (Haryono, 2022; Sutami, 2021; Polakova & Klimova, 2022; (Dağdeler, 2020) stands as a testament to the potential of tailored mobile applications when thoughtfully facilitated by educators. Their research emphasizes that a mobile app, customized to meet the specific needs of learners and subject to continuous guidance and monitoring by their instructors, emerges as a highly efficient instrument not only for enhancing student vocabulary but also for fostering its retention. The synergy between these findings and the outcomes of the present study underscores the transformative potential inherent in mobile applications, particularly when they are thoughtfully designed, curated to address specific learning needs, and seamlessly integrated into the pedagogical framework. Collectively, these insights reaffirm the robust and transformative nature of the self-learning kit developed in this research, positioning it as a dynamic and indispensable tool for educators and learners seeking to elevate speaking competence within the context of project-based learning.

A comprehensive assessment was taken to scrutinize the fruitfulness of a mobile application in elevating students’ lexicons. The investigation revealed that the software was prodigious in augmenting the students’ general scores and had a positive repercussion on their instruction (Gou, 2023). In summary, prior research indicates that mobile applications have shown promise as valuable tools for bolstering students’ vocabulary acquisition and speaking proficiency, although these studies were predominantly conducted outside the specific framework of project-based learning. The versatility of mobile apps allows for tailored design, catering to the unique needs of individual learners, and affords opportunities for ongoing facilitation by educators to maximize students’
academic performance and engender favorable learning outcomes. This adaptability in mobile app design can be particularly advantageous in the context of language education, where students’ linguistic needs can vary widely. Mobile apps have exhibited exceptional efficacy in two key aspects: first, in the retention and reinforcement of newly acquired vocabulary, and second, in the honing of students’ oral communication skills, especially when English is the target language.

To elaborate further, the effectiveness of mobile apps in enhancing vocabulary retention cannot be overstated. A study on Quizlet done by (Avisteva & Halimi, 2021) discovered that using the Quizlet application to implement MALL was effective in expanding students’ vocabulary. This study backs up the findings of (Van & Thanh, 2022) study, which found that participants’ vocabulary achievement was significantly improved in MALL-integrated classes and that MALL use encouraged participants to broaden their vocabulary. Furthermore, employing MALL through mobile applications was a successful technique for boosting vocabulary knowledge responsively for short-term memory alone, according to a study by (Dağdeler, 2020). Furthermore, (Gael & Elmiana, 2021) also underline that adopting mobile applications for English language learning can help L2 learners increase their English competence and can also help L2 learners study English as a foreign language as well as a second language. These applications provide an engaging and interactive platform through which learners can consistently and conveniently engage with words, phrases, and expressions. This repeated exposure to vocabulary items, often accompanied by multimedia elements, aids in memory consolidation and facilitates the transfer of these words from passive knowledge to active usage in spoken and written contexts. Mobile apps also offer the advantage of flexibility, allowing learners to tailor their vocabulary learning experiences according to their individual preferences and pace. Moreover, educators can harness these tools to track students’ progress, identify areas of difficulty, and provide timely support, thereby enhancing the overall learning process (Fitri et al., 2022) and teachers believed that incorporating digital media into their lessons could improve student learning results (Salam, et al., 2023).

CONCLUSION AND SUGGESTION

Innovatively, the outcome of this research endeavor has materialized into a mobile-based application on accounting terminologies. The development of this app meticulously adhered to the ADDIE methodology, encompassing the phases of analysis, design, development, implementation, and evaluation. The dictionary developed in this study boasts a truly exhaustive lexicon consisting of 730 words. It is equipped with 103 fun fact statements, 141 lists of abbreviations or acronyms, 28 lists of trivia Q and A statements, pre-test and post-test questions totaling 50 questions, 5 exercise packages with a total of 125 questions, basic,
intermediate and advanced level tests totaling 75 and a test on tax policy in Indonesia totaling 50 questions.

The findings in this study emphasized the potential of mobile-based taxation accounting dictionaries to enhance speaking competence in project-based learning. The statistics investigation leveraged to evaluate the impact of the application on student learning results additionally suggested its viability. Mobile applications have the propensity to provide students with additional materials and opportunities to practice speaking, leading to fruitful results. The necessity of building applications that are in line with students’ requirements and continually guided by an instructor to optimize progress was highlighted in the research.

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