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Development of Android-Based Application For Learning and Simulation of English Language Proficiency Test

Pengembangan Aplikasi Berbasis Android Untuk Pembelajaran Dan Simulasi *Test* Kemampuan Berbahasa Inggris

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Abstract* — *IELTS is an international test of English language skills that is used to measure the quality of the English of someone who will study abroad. However, there are still many students in Indonesia who wish to study abroad who have IELTS scores that are namely below 7. IELTS learning is still mostly done face-to-face through courses at very expensive fees. Following the development of this increasingly sophisticated era, there is a lot that can be done to simplify everything related to information. Therefore, an interactive learning application based an Android is created to enhance the understanding of students at the Golden Gate English Center regarding IELTS Band 7. This learning application is constructed using the Prototype method. Based on the result and testing conducted, 75% respondents who used the application, agreed that this learning and simulation application greatly assisted those studying IELTS. Around 66.7% of respondents agreed that the application enhanced their understanding of IELTS, and 83.3% showed significant interest in using this app compared to learning through books or textbooks. Additionally, 75% of students agreed that this application was more effective in increasing students' interest in learning IELTS.

***Key words*— Application; IELTS Band 7; Learning; Prototype Method; Simulation;**

Abstrak* — IELTS adalah ujian keterampilan bahasa Inggris internasional yang digunakan untuk mengukur kualitas bahasa Inggris seseorang yang akan menempuh pendidikan di luar negeri. Namun, masih banyak pelajar di Indonesia yang berkeinginan untuk belajar di luar negeri memiliki nilai IELTS yang masih di bawah 7. Seiring dengan perkembangan zaman yang semakin canggih, banyak hal yang dapat dilakukan untuk menyederhanakan segala sesuatu yang terkait dengan informasi, dengan tujuan membuat aplikasi ini sebagai media pembelajaran agar pelajar bisa dengan mudah belajar IELTS. Oleh karena itu, dibuatlah aplikasi pembelajaran interaktif berbasis Android untuk meningkatkan pemahaman siswa di *Golden Gate English Center* tentang IELTS Band 7. Aplikasi pembelajaran dan simulasi ini dibuat menggunakan metode Prototype. Berdasarkan hasil dan pengujian yang dilakukan, 75% responden yang menggunakan aplikasi setuju bahwa aplikasi pembelajaran ini sangat membantu mereka yang belajar IELTS. Sekitar 66,7% responden setuju bahwa aplikasi ini meningkatkan pemahaman mereka tentang IELTS, dan 83,3% menunjukkan minat yang signifikan untuk menggunakan aplikasi ini dibandingkan dengan belajar melalui buku atau buku teks. Selain itu, 75% pelajar setuju bahwa aplikasi ini lebih efektif dalam meningkatkan minat belajar IELTS.

***Kata kunci* — Aplikasi; IELTS Band 7; Metode *Prototype*; Pembelajaran; Simulasi;**

I. INTRODUCTION

In recent years, IELTS garners significant interest among students due to its status as a prerequisite for both employment opportunities and overseas education. For those aspiring to study abroad, achieving a Band 7 score in the IELTS exam is often imperative, as numerous foreign universities mandate a minimum score of 7 for admission.

However, IELTS learning generally still uses conventional methods, namely through face-to-face classes at English language courses such as Golden Gate Education, English First, and similar venues, which turns out to be less effective due to time constraints and requires expensive fees to attend classes. The lack of learning hours given by teachers to students is one of the factors that hinders the achievement of the material being taught, so that students cannot achieve the desired score of 7 in the IELTS exam. Moreover, traditional approaches are deemed inefficient as they continue to rely on Paper-Based Tests for evaluating student capabilities. This method remains less effective due to the necessity for teachers to print the IELTS exam questions and manually assess the exam results afterward.

Therefore, having an easily accessible platform that not only engages students but also makes learning enjoyable becomes crucial for their educational journey. This ensures not just access but also an interactive and enjoyable learning experience, optimizing their academic progress. With the vast advancements in technology developing very rapidly, the role of technology in the digital era is very important and cannot be ignored, especially in supporting the learning process. Android-based learning applications stand out as a prime instance of technology aiding users in comprehending and exploring diverse subjects. Android is a Linux-based operating

system that is open (open source) and designed for touch-screen mobile devices such as smartphones and tablet [1].

Within the educational realm, Android-based applications are used as a teaching medium, both in class and individually. The appeal of Android lies in its simplicity and enjoyable interface, making it a favored learning tool among students. From the description above, the author intends to design and develop an Android-based IELTS Band 7 learning application aimed at providing a platform accessible to all students anytime, anywhere. This platform will offer enjoyable and easily comprehensible study materials without the necessity of attending courses. With this IELTS learning application, it is hoped to establish an interactive and engaging learning system for students, thus enhancing the quality of learning and increasing the likelihood of achieving a Band 7 score in the IELTS exam.

A. Related Research

1) "Perancangan Aplikasi Mobile Learning Test of English for International Communication (TOEIC) Simulation pada Smartphone Berbasis Android" conducted by Yayang Fitria Chandra.[2] The purpose of this research is to develop an Android-based TOEIC learning application which aims to compile various types of TOEIC questions from multiple books into a user-friendly app that can be accessed and used by individuals anywhere and anytime.
2) "Meningkatkan Kemampuan Bahasa Inggris Mahasiswa Universitas Satya Negara Indonesia melalui Pembelajaran IELTS dan TOEIC dengan Teknologi Aplikasi Android" conducted by Luluk Setyowati.[3] The purpose of this research findings is to design and develop an Android-based Learning Application for IELTS and TOEIC.
3) "Pengembangan Aplikasi *Listening Test* Berbasis Android" conducted by Rokhimatul Wakhidah.[4] The aim of this research is to develop an Android-based Listening Test Application to assess the extent of listening education in the English Language Study Program at the Madiun State Polytechnic.
4) "Designing Android-Based Mobile Application for Language Learning (MALL) for the the National Exam Simulation" conducted by Pikir Wisnu Wiyanto[5] which aims to design an Android-based application for simulating English subject exams at the junior high school level using the Software Development Life Cycle (SDLC) with the Waterfall model.
5) "Aplikasi Simulasi TOEFL ITP "TOEFL OS (Offline Simulation) Berbasis Android"[6] conducted by Umi Rizkiyah, Sri Sukamta. This research uses the linear sequential development method or waterfall in application development.
6) "Rancang Bangun Aplikasi Pembelajaran Bahasa Inggris Berbasis Android bagi Guru SDIT Anak Sholeh" conducted by Sardiarinto, A.B.P Sari.[7] This research produces an English learning application intended for teachers at the IT Elementary School Anak Sholeh to teach English to children with engaging, simple, and easily memorable teaching methods.
7) "Rancang Bangun Aplikasi Mobile Learning Tenses Bahasa Inggris" conducted by N.N. Kamala Sari.[8] The aim of this research is to design an Android-based application for learning Tenses using the waterfall method as the application development methodology.
8) "Aplikasi Simulasi dan Pembelajaran TOEFL Berbasis Android" conducted by D. Nurlaelasari.[9] This research aims to develop an Android-based TOEFL simulation and learning application using the ADDIE method.

B. Mobile Application

A mobile application is an application specifically designed for use on mobile platforms (such as iOS and Android).[10] From this definition, it can be concluded that mobile applications have user interface displays and interaction mechanisms that are tailored to be easily utilized on mobile devices, such as smartphones and tablets.

C. Android

Android is an operating system for Linux-based mobile devices that encompasses the operating system, middleware, and applications. Similar to Linux, Android also provides an open-source platform, commonly referred to as Open-Source, which developers can use to create their own applications

D. IELTS

The International English Language Testing System (IELTS) is an international test assessing English language proficiency for students aiming to enroll in universities and higher education institutions abroad. Test takers receive scores on a Band Scale from 1 (Non-User) to 9 (Expert User). Participants in the IELTS test receive scores for each testing component - listening, reading, writing, and speaking. These individual scores are then averaged and rounded to produce an Overall Band Score. In this learning application platform, the content delivered includes Academic IELTS material with a Band 7 score, marked by the use of advanced vocabulary and grammar.

E. The Use of Mobile Applications as a Learning Media

With the advancement of information and communication technology and the emergence of mobile devices such as smartphones and tablets, there has been a beneficial impact on the field of education through applications created as learning media. According to Kukulska-Hulme, Mobile Learning is the use of mobile technology for educational purposes. These mobile devices can provide different learning methods, are easily accessible everywhere, and are practical and pervasive.[11]

F. Android Studio

Android Studio is a fully integrated new development environment released by Google for the Android operating system. It's designed to be a new tool in application development and provides an alternative to Eclipse, which is currently a widely used Integrated Development Environment (IDE).[12] Android Studio is an Integrated Development Environment (IDE), or in other words, an official integrated development environment specifically designed for the development of the Google Android operating system.

G. Java

Java is an object-oriented programming language (OOP)that can run on various operating system platforms. The development of Java is not only focused on one operating system but is designed for

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multiple open-source operating systems. Java can create various types of applications, whether desktop, web, or others, similar to those made using other conventional programming languages.

H. XML

Extensible Markup Language or XML is a way to describe data using text-based documents. XML allows users to define and store data in a way that is shareable. [13]It supports the exchange of information between computer systems such as websites, databases, and third-party applications.

II. METHODS

A. Time and Place of Research

This research took place in Golden Gate Education Manado, North Sulawesi. With the research time starting from February until completion.

B. Software and Hardware

The software and hardware used in this research can be seen in Table 1.

C. Thinking Framework

The framework of thinking is the sequence in creating the IELTS Band 7 learning and simulation application, starting with defining the research title, the research background, problem formulation, and determination of the research objectives and benefits. Then, the research methodology used is the Prototype method, consisting of seven steps, as illustrated in Figure 1.

TABLE I
SOFTWARE AND HARDWARE

No.	Research Activities	Hardware and Software
1.	Application Design & Development	Laptop ASUS Device Specifications: -RAM 8 GB -OS Windows 10 64-Bit
2.	Application Development (software)	- Android Studio Version Electric Eel
3.	Output System	- Samsung A04e 64GB

D. Development Method

The method used in this research is the system development method using the prototype method which includes the following steps: Identifying requirements, Designing Prototype, Prototype Evaluation, System Coding, System Testing, System Evaluation and Finalization. [14] These steps can be seen in Figure 2.

1) Identifying Requirements

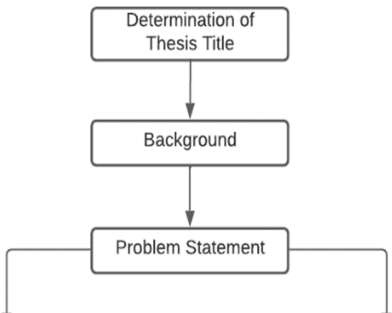

Figure 1. Thinking Framework

In this stage, software needs identification is carried out at Golden Gate Manado through data collection processes, namely literature review, interviews, and observations.

2) Designing Prototype & Evaluation

After analyzing the requirements, it is followed by creating a prototype or preliminary design using system modeling with an overview consisting of Use Case Diagrams and Activity Diagrams. Afterwards, an evaluation of the prototype is conducted. The prototype created has fulfilled the requirements, thus proceeding to the next stage.

3) System Coding & Testing

If the prototype is adequate, the next step involves using the Android Studio platform to begin coding the application. The prepared application will undergo testing, wherein the system functionality created will be tested with students to determine if the application is working properly and effectively.

4) System Evaluation

The system evaluation is conducted to determine whether the software system created meets the needs and desires of the institution. If there are expectations that are not met, re-coding will be performed. If it aligns with expectations, it proceeds to the final stage.

5) Finalization

After all stages are in accordance, it will be ready to be handed over to the institution for use.

III. RESULTS AND DISCUSSIONS

A. Identifying Requirements

At this stage, the identification of software needs is conducted at Golden Gate Education in Manado through data collection processes as discussed in the previous chapter. There are three categories of data collection conducted: interviews, observations, and literature review. The interviews are conducted at Golden Gate Education, specifically with employees and teachers who teach at the institution. The interview questions revolve around the IELTS learning process implemented at Golden Gate and the progress or advancements of the students in learning. Based on observations, the learning process remains hands-on, with students relying on books and using a tape recorder for listening tasks, yet the audio quality is poor, posing challenges for students in comprehending the audio material. The literature review is conducted by collecting data from sources such as scientific journals mentioned in the literature review. Additionally, IELTS learning materials are gathered from sources like the Cambridge IELTS books.

B. Designing Prototype and Evaluation

At this stage, the creation of a prototype design or preliminary design takes place. Use case diagrams, activity diagrams, and prototypes for the IELTS Band 7 learning and simulation application are designed in this phase.

1) Use Case Diagram

The use case diagram is one of the various types of UML (Unified Modeling Language) diagrams that depict the interaction relationships between the system and actors.[15] Use cases describe the types of interactions between the system user and the system itself. Use Case Diagram for the IELTS Band 7 learning and simulation application is shown in Figure 3.

2) Activity Diagram

An Activity Diagram is a type of UML (Unified Modeling Language) diagram that illustrates the activities occurring within a system. Generally, this diagram displays the system's process steps from start to finish. The Activity Diagram for the IELTS Band 7 learning and simulation application is shown in Figure 4, Figure 5, and Figure 6.

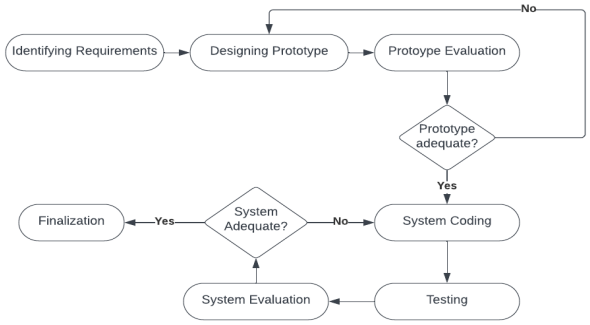

Figure 2. Prototype Method

Figure 3. Use Case Diagram

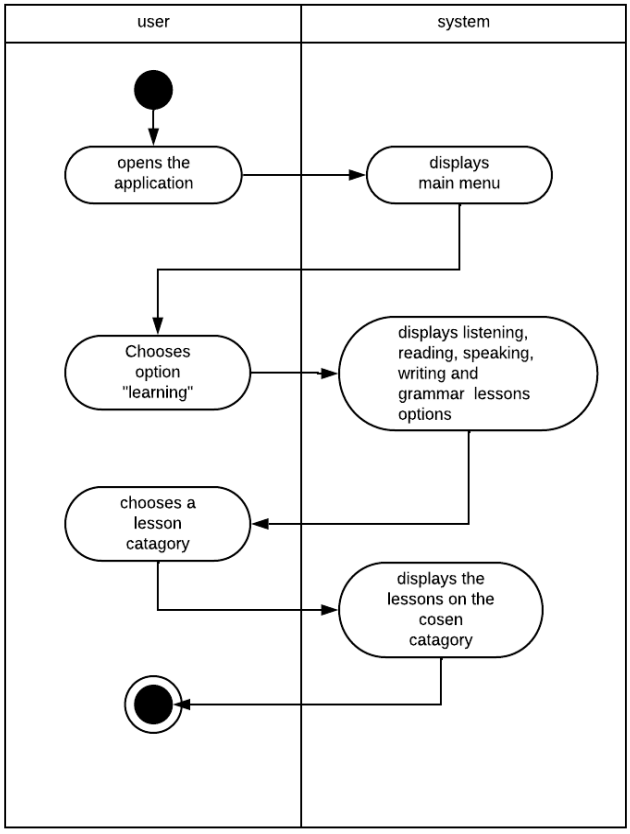

Figure 4. Activity Diagram Viewing Lessons

3) User Interface Design

User Interface (UI) design is the process used to create the appearance in software or computerized devices, focusing on the display or style. The purpose of UI design is to create an interface design that is easy and enjoyable for users to use. The user interface design for the IELTS Band 7 learning and simulation application is shown in Table 2.

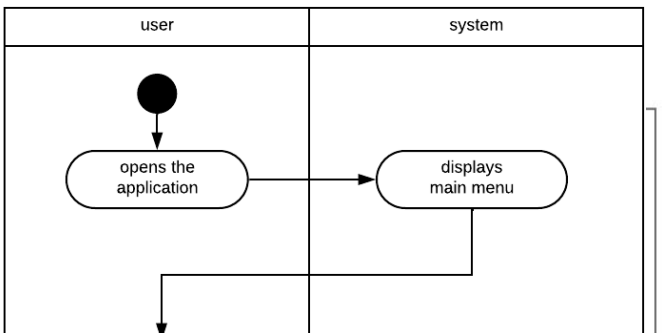

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Figure 5. Activity Diagram Test Simulation

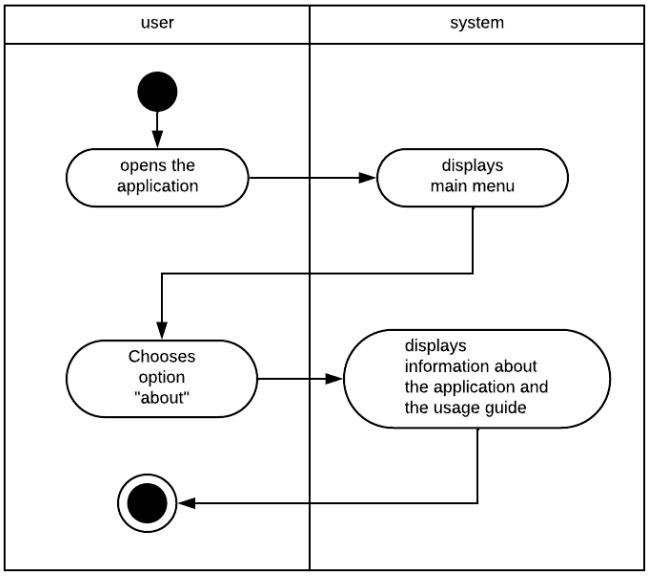
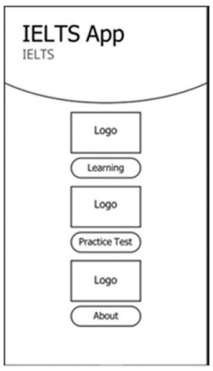
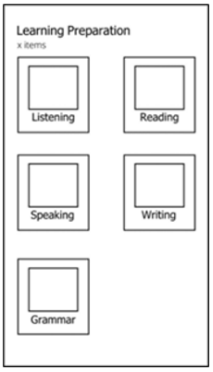
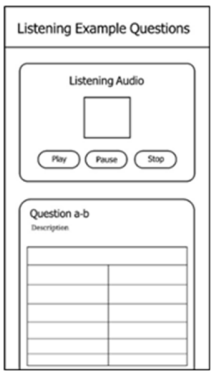


Figure 6. Activity Diagram About Menu

TABLE II
USER INTERFACE OF THE IELTS LEARNING APPLICATION

No.	Display	Description
1.		1. Main Menu of the Application 2. The Learning Button will give users access to the learning materials 3. The Practice Test Button allows users to do a Practice Test. 4. The About Button will give users information about the app.
2.		1. Learning Main Page 2.Listening Button for Listening lessons 3.Reading Button for Reading Lessons 4.Speaking Button for Speaking Lessons 5.Writing Button for Writing Lessons 6.Grammar Button for Grammar Lessons.
3.		1. Listening Lesson Page 2. Listening Audio lets user play a recording of an IELTS listening question
4.		1. Writing Lesson Page 2. In the Writing Lesson Page, the app gives examples of IELTS writing lessons.

C. *System Coding and Testing*

In this step, we will proceed by using the programming language platform, Java, managed within Android Studio. The System

Coding is shown from Figure 7, which shows the coding system for the Main Menu Page. The coding system is shown from Figure 7 to Figure14.

1) Alpha Testing

Alpha testing is conducted by directly testing the application running on the Android platform. In this process, buttons, functions, and features in augmented reality are tested. Shown in Figure 15 is the Main Menu of this application where there are three options including learning, practice test and about. The learning preparation page is shown in Figure 16 with lessons that include listening, reading, speaking, writing and grammar for the IELTS. Figure 17 to Figure 21 shows the lesson preparation for IELTS listening, reading, speaking, writing and IELTS grammar respectively. The Practice Test for this application applies for Listening and Reading, which can be seen in Figure 22 and Figure 23. Upon completion of the Practice Test simulation, users will be presented with their scores by the application. The application will show users the scores they have achieved, along with a message if they pass the simulation or not.

2) Beta Testing

The main objective of the beta testing phase is to gather feedback from users regarding the performance, functionality, and usability of the application before its official release. [16] This Beta testing was conducted by distributing simulations to 24 respondents at the Golden Gate Education Manado. In the initial stage, participants were divided into two groups: a control group and an experimental group. The control group did not use the IELTS Band 7 application, whereas the experimental group utilized the application. Over the course of one week, the experimental group engaged in learning using the application, while the control group followed conventional learning methods. After one week, both groups underwent simulations with identical questions. Table 3 and 4 displays the results obtained by participants at the Golden Gate Education Manado.

a) Calculating the Value of Distribution Normality Test

The Distribution Normality Test is a statistical test used to determine whether a sample of data or data distribution follows a normal distribution pattern. There are several methods to test the normality of data distribution, but in this study, the Shapiro-Wilk method was utilized. If the data adheres to a normal distribution, several parametric statistical analysis techniques can be applied. After using the Shapiro-Wilk Method Formula via Excel, the calculation of the normality of the data distribution for both sets of data is categorized as normal, as both p-values exceed 0.05. Because both data sets follow a normal distribution, several parametric statistical analysis techniques can be applied. This can be seen in Figure 24 and 25. In this study, the parametric method of unpaired T-test is used.

b) T-test Unpaired

The unpaired T-test is a type of statistical test used to compare the means of two statistically independent groups. These groups are termed "unpaired" as there is no direct relationship between members of one group and another. The unpaired T-test examines whether there is a significant difference between the means of two tested groups based on samples taken from each group. It yields a t-statistic value and p-value, which are used to determine if the difference between the two means is significantly different or not. The results can be seen in Figure 26, where it shows there is not much significance between the experiment and control group.

c) The Student Survey Questionnaire Responses After Using the Application

After using the application, students at Golden Gate filled out a questionnaire regarding their feedback and experience using the app. Figure 27 represents the questionnaire response from the first stage, 'Do you consider this app highly beneficial for those learning IELTS?' where 75% of students answered 'Yes,' and 25% answered 'No'.

Figure 28 depicts the questionnaire responses to the second question, 'Does this app contribute to enhancing your understanding of IELTS?' In this second question, 66.7% answered 'Yes' while 33.3% of students answered 'No'. Figure 29 represents the responses to the third questionnaire question, 'Is learning from this app easier and more interesting compared to studying through books?' For this question, 83.3% answered 'Yes,' agreeing that learning through the app is more engaging than conventional or book-based learning, while 16.7% answered 'No'.

Figure 30 represents the responses to the fourth and final questionnaire question, 'Is the IELTS Band 7 application effective in attracting students' interest in learning IELTS?' For this question, 75% answered 'Yes,' while the remaining 25% answered 'No'.

$$W = \frac{\left(\sum_{i=1}^{n} a_i x_{(i)}\right)^2}{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2} \quad (1)$$

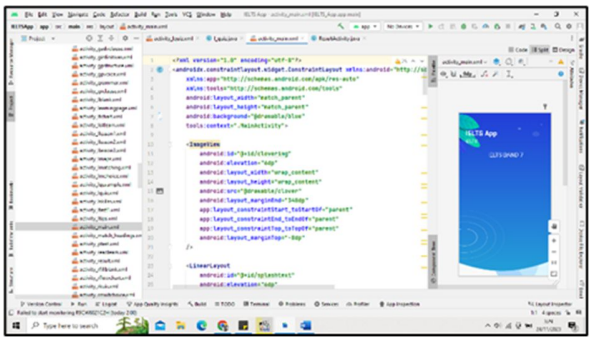


Figure 7. Main Menu Coding

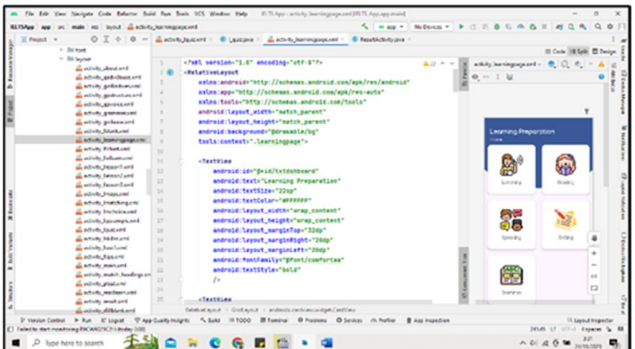


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Figure 8. Learning Preparation Page Coding

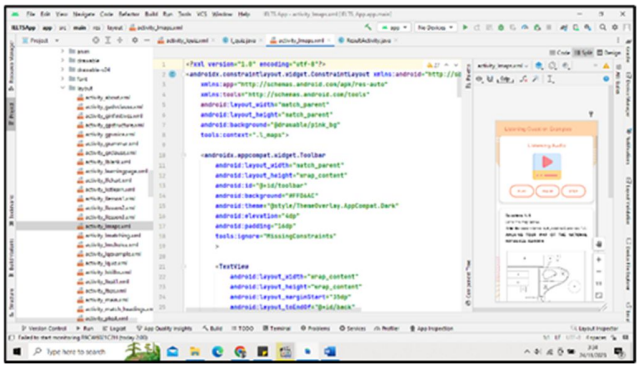


Figure 9. Listening Lesson Page Coding

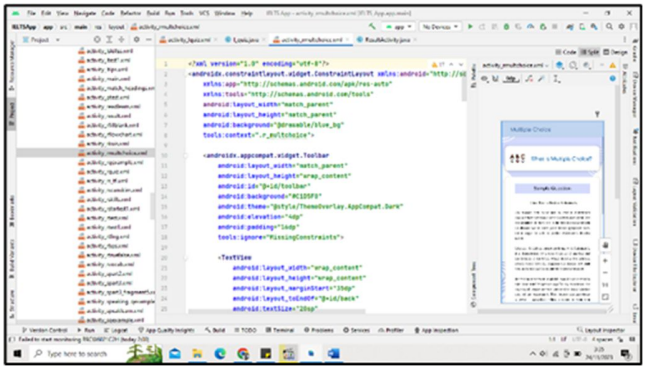


Figure 10. Reading Lesson Page Coding

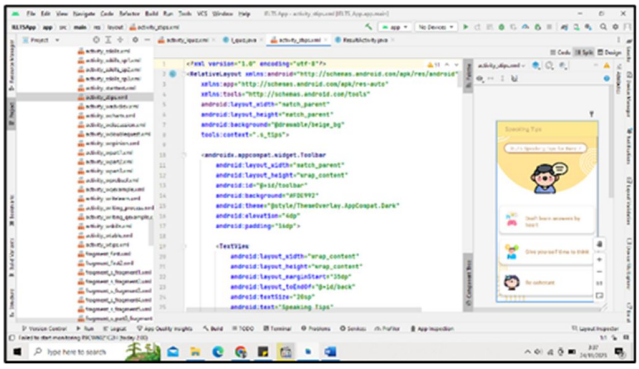


Figure 11. Speaking Lesson Page Coding

Figure 12. Writing Lesson Page Coding

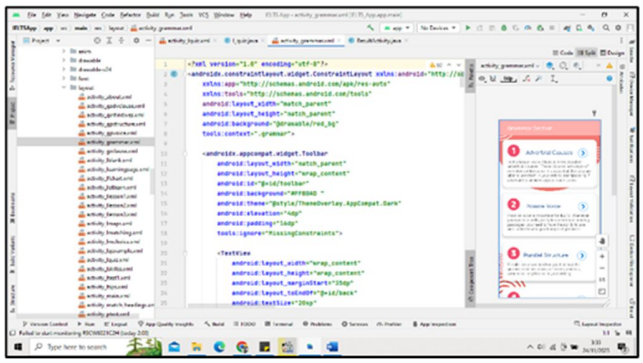


Figure 13. Grammar Lesson Page Coding

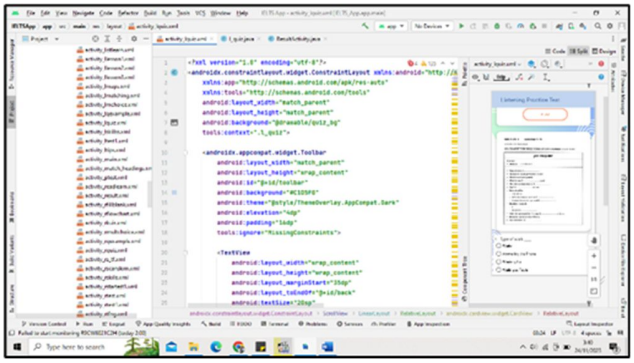


Figure 14. Listening Practice Test Page Coding

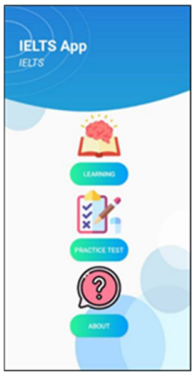


Figure 15. Main Menu Page

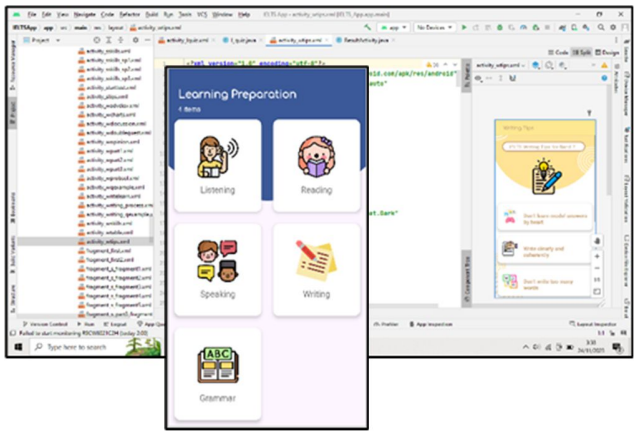


Figure 16. Learning Preparation Page

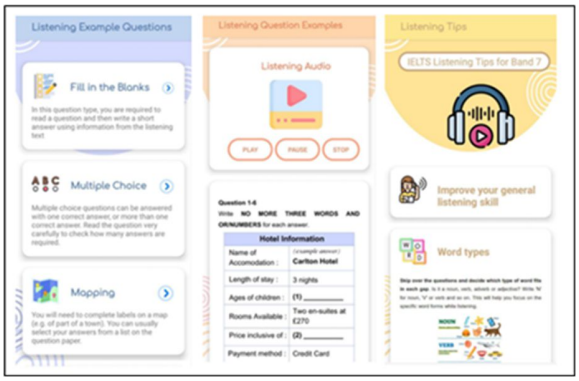


Figure 17. Listening Lessons Page

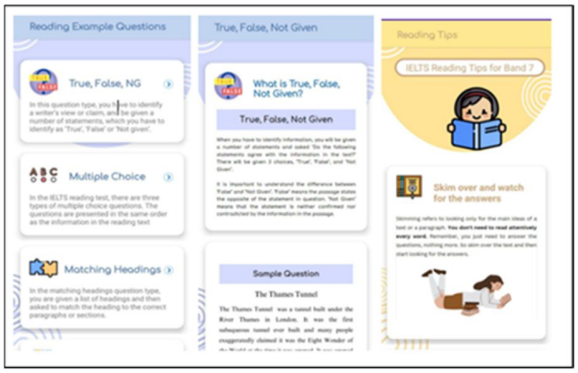


Figure 18. Reading Lessons Page

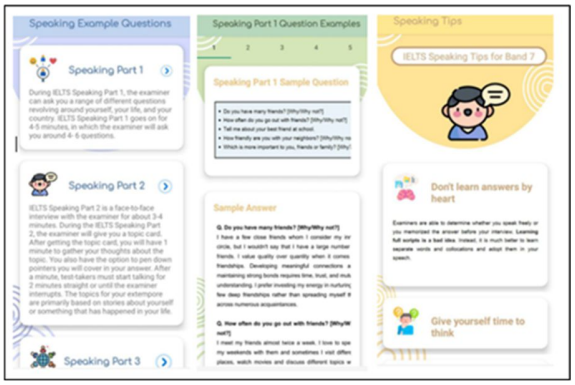


Figure 19. Speaking Lessons Page

Figure 20. Writing Lessons Page

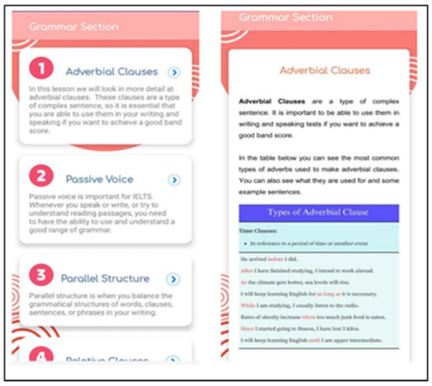


Figure 21. Grammar Lessons Page

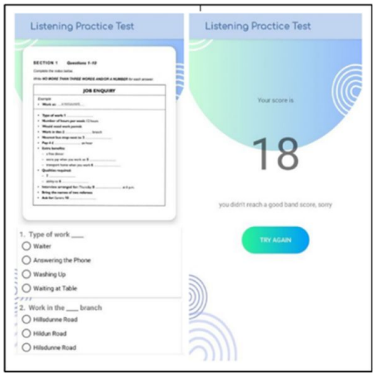


Figure 22. Listening Practice Test

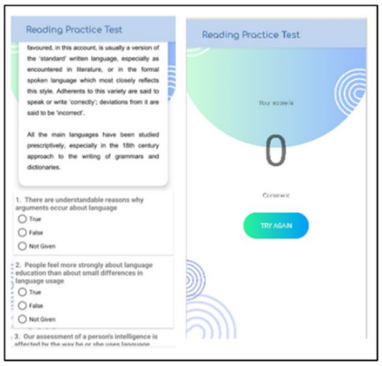
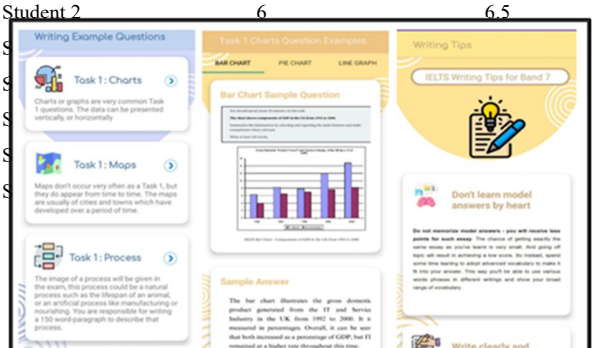


Figure 23. Reading Practice Test

TABLE III
LISTENING SIMULATION SCORE

Participants	Control Group	Experiment Group
Student 1	6.5	7
Student 2	6	6.5



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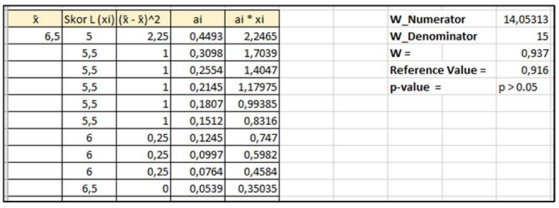
Student 8	7	7
Student 9	6.5	5
Student 10	6.5	6.5
Student 11	7	7.5
Student 12	7.5	7

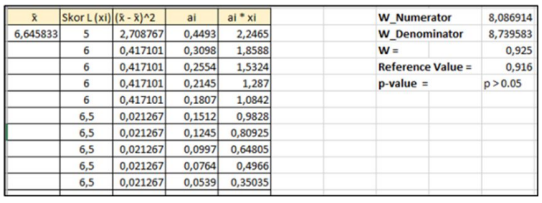
TABLE IV
READING SIMULATION SCORE

Participants	Control Group	Experiment Group
Student 1	5.5	6
Student 2	7	7.5
Student 3	5.5	7
Student 4	6.5	7
Student 5	6.5	6.5
Student 6	7.5	6.5
Student 7	7.5	6
Student 8	5.5	7.5
Student 9	5	5.5
Student 10	7	6
Student 11	7	7.5
Student 12	5.5	8



x̄	Skor L (xi)	(x̄ - x̄)^2	ai	ai * xi		
6,5	5	2,25	0,4493	2,2465	W_Numerator	14,05313
	5,5	1	0,3098	1,7039	W_Denominator	15
	5,5	1	0,2554	1,4047	W =	0,937
	5,5	1	0,2145	1,17975	Reference Value =	0,916
	5,5	1	0,1807	0,99385	p-value =	p > 0.05
	5,5	1	0,1512	0,8316		
	6	0,25	0,1245	0,747		
	6	0,25	0,0997	0,5982		
	6	0,25	0,0764	0,4584		
	6,5	0	0,0539	0,35035		

Figure 24. Distribution Normality Test for listening simulation



x̄	Skor L (xi)	(x̄ - x̄)^2	ai	ai * xi		
6,645833	5	2,708767	0,4493	2,2465	W_Numerator	8,086914
	6	0,417101	0,3098	1,8588	W_Denominator	8,739583
	6	0,417101	0,2554	1,5324	W =	0,925
	6	0,417101	0,2145	1,287	Reference Value =	0,916
	6	0,417101	0,1807	1,0842	p-value =	p > 0.05
	6,5	0,021267	0,1512	0,9828		
	6,5	0,021267	0,1245	0,80925		
	6,5	0,021267	0,0997	0,64805		
	6,5	0,021267	0,0764	0,4966		
	6,5	0,021267	0,0539	0,35035		

Figure 25. Distribution Normality Test for reading simulation

Figure 26. T-test Listening and Reading Simulation

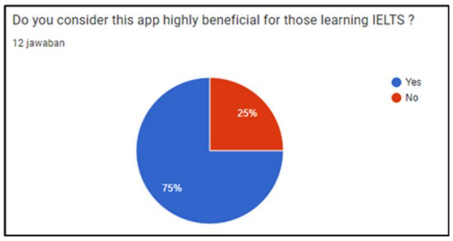


Figure 27. Responses to the first questionnaire question

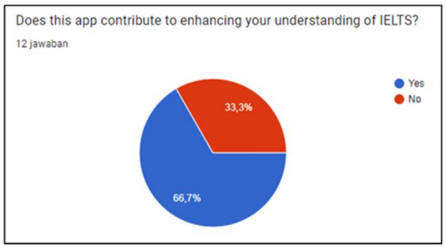
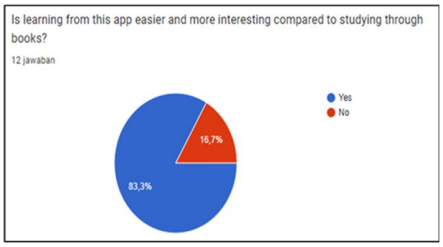
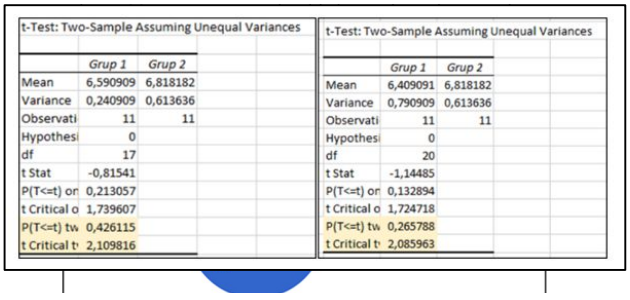


Figure 28. Responses to the second questionnaire question





t-Test: Two-Sample Assuming Unequal Variances

	Grup 1	Grup 2
Mean	6,590909	6,818182
Variance	0,240909	0,613636
Observati	11	11
Hypothesi	0	
df	17	
t Stat	-0,81541	
P(T<=t) on	0,213057	
t Critical o	1,739607	
P(T<=t) tw	0,426115	
t Critical t	2,109816	

t-Test: Two-Sample Assuming Unequal Variances

	Grup 1	Grup 2
Mean	6,409091	6,818182
Variance	0,790909	0,613636
Observati	11	11
Hypothesi	0	
df	20	
t Stat	-1,14485	
P(T<=t) on	0,132894	
t Critical o	1,724718	
P(T<=t) tw	0,265788	
t Critical t	2,085963	

Figure 30. Responses to the fourth questionnaire question

D. System Evaluation

System evaluation aims to ascertain if the developed software system aligns with the institution's requirements and preferences. If the expectations are unmet, reconsidering a re-evaluation won't be necessary. Because the application already meets the needs of the institution, there is no need to conduct system evaluations anymore.

E. Finalization

After the application is completed and tested, the next stage is to distribute the application to users, namely to the Golden Gate Institution. The application can be downloaded from the following link:

https://drive.google.com/drive/u/0/folders/1Qc6ZaeDcRfQHWv-Pv3gO5ja_bHeizFtt

IV. CONCLUSIONS AND SUGGESTIONS

A. Conclusions

Based on the research conducted on the IELTS Band 7 learning and simulation application, the following conclusions can be drawn: The IELTS Band 7 Learning and Simulation Application has been successfully developed using the prototype software development method. From the test results involving 24 respondents at Golden Gate Education Manado, the normal distribution value of the data was categorized as normal. Hence, the parametric method of unpaired T-test was utilized to compare the means of two statistically independent groups and examine whether there was a significant difference between the means of the tested groups. Based on the test results, the experimental group had a higher average, but it did not significantly differ compared to the average of the control group.

According to the questionnaire filled out by 12 respondents who used the application, 75% of students agreed that this learning and simulation application greatly assisted those studying IELTS. Around 66.7% of respondents agreed that the application enhanced their understanding of IELTS, and 83.3% showed significant interest in using this app compared to learning through books or textbooks. Additionally, 75% of students agreed that this application was more effective in increasing students' interest in learning IELTS.

B. Suggestions

The suggestion put forth for further development is to make the application compatible with other platforms since it currently runs only on the Android platform. Within this application, there are simulation and learning menus, and for future development, it's hoped that additional materials or simulations can be added or enhanced to make the application even more engaging.

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