# Codes Unleash: A Skill Sharing Mobile Application for Learning Programming Languages (Kotlin)

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# ABSTRACT

Mobile learning development has had a lot of effect on education because it has improved its accessibility for all students being flexible such that they can access anything at any place without any limitations. The purpose of this paper is to analyze how effective mobile learning can be if it is used in programming language education with an emphasis on Kotlin for mobile application development. The study presents the mobile application “Codes Unleash” which is meant for skill sharing aimed at enhancing an individual's understanding on different coding background languages. During the exploratory survey that was done at Systems Plus

College Foundation creation, and usage application “Codes Unleash” became the focus. Its components such as content management system, badges, quizzes, web view compiler, multimedia materials were properly crafted alone with others that required design in an application decadently. During alpha testing, people gave positive reviews with respect to features, functionality, UI/UX as well as technical aspects which showed that it met user expectations. Consequently, the study suggests some areas for future improvement like adding advanced features and security controls. The success of Codes Unleash points out that technology works well with education leading to new possibilities for innovative teaching in programming language instruction.

**KEYWORDS**

*M-Learning, eLearning, ISO 25010, Android OS, CMS*

# INTRODUCTION

Learning enhances the capability of individuals through improvement for them to adapt and succeed in an environment that is constantly changing, such as in the case of adults with literacy difficulties. Its main sources include formal education systems; instances in daily life; friends, family members or networking opportunities; personal assessment through things such as keeping a growth diary or working towards specific goals and objectives; course works carried out either individually or partaken of communally within a community; as well as oral communication traditions inherited from previous generations among other things. Smartphone-based training programs have democratized access to knowledge, thus promoting inclusivity in the educational space. (Fastiggi, 2013).

Mobile learning is a continuation of traditional e-learning and is a response to its limitations as well as a combination of “mobile” and “learning”. It comprises viewing digital textbooks, interactive quizzes, group discussions, and personal feedback (Traxler & Crompton, 2015). Learning is a great revolution since it has enabled people to learn at their pace on mobiles anywhere and anytime. Every day, mobile devices are becoming more important which implies that the mode through which programming languages are learnt should match with changing requirements of students. Mobile-assisted language e-learning this appears as an opportunity for us to take it as seen through (Mengorio & Dumlao, 2019). For this reason, there needs to be an investigation on how mobile learning applications could be useful in teaching through Kotlin which is an increasing popular choice for mobile application languages.

In developing programming language skills like Kotlin, which is a modern language for mobile applications, mobile learning is indispensable. Nevertheless, the low uptake attributed to fears of displacing conventional ways of teaching and affecting learner interaction is a stumbling block. Bridging these gaps will go a long way in enhancing the efficiency of mobile learning and enlightening learners about modern technologies such as Kotlin that prove useful in the rapidly changing world we live in today.

Kotlin, the programming language, is great for writers because it is uncomplicated while still efficient and enjoyable to use. Kotlin is designed for both beginners and professionals because it has modern features and is also easy to use. It has less code compared to other languages hence more lines can be written by developers in less time. This is one of the reasons why functional programming in Kotlin has been well received by people who write code regularly. Java is instead too rigid meaning you can do almost anything with Kotlin which makes it flexible for software developers (Jalan, 2022).

Students in various schools employ different learning methods to enhance their skills. Studying for higher education in China is tough but studying in groups serves as a benefit (Ray, 2021). On the other hand, traditional classrooms in the Philippines forms the main learning environment. M-learning has become more popular due to applications such as Duolingo that offers a structured course and uses advanced teaching techniques. One of the ways to encourage students to study harder and fulfill their potential is through adding games and interactive tests (Sullivan, 2022).

The study's General Objective is to develop the mobile application - Codes Unleash: A Skill Sharing Mobile Application for Learning Programming Languages (Kotlin).

This study has the following specific objectives:

1.To design a system with the following features:

1.1. To have Multimedia Content

1.2. To have a compiler

1.3. Exam to obtain badge

1.4. To have a chapter assessment

1.5. To have a content management system

# METHODS

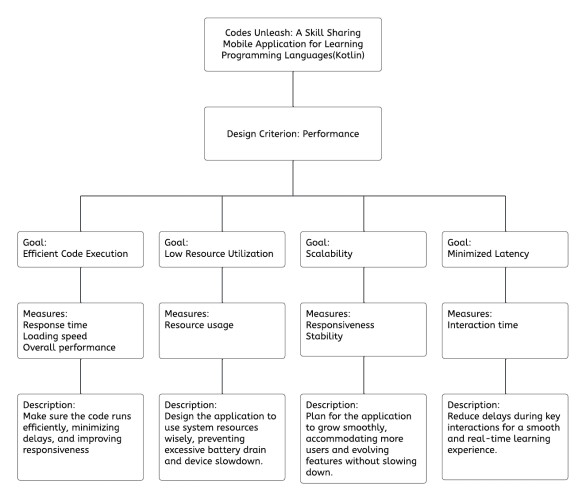
## Study Location

Systems Plus College Foundation was the site for the research where learners majoring in Computing and Information Sciences were chosen. This choice was informed by the fact that the school’s area is one that allows a lot of room to test how effective the Codes Unleash application can be as a tutorial for a programming language.

**Experiment Design**

An exploratory research design was utilized in the study of the Codes Unleash application development and implementation. This enabled an exhaustive analysis of the application functionalities and how it helps to learn programming languages with Kotlin being the main focus. This design allowed for multiple options in the exploration of different aspects of application development as well as user experience.

Figure 1, the application starts by signing up or logging in. After logging in it will proceed to the home page, which shows badges and brief parts of navigation. Next is the lessons with a quiz. For badges, the evaluation step includes exam and exercise. Completed lessons and quiz scores are shown in progress. The profile page has settings, feedback, and information about the user.



**Figure 1. Design Criterion for Codes Unleash Materials Used:**

The primary materials used in this study included:

* Operating System - Android OS
* Development Software - Android Studio
* Programming Language - Kotlin as primary programming language
* Design Software - Figma
* Database – MySQL

The technical requirements and all necessary amounts were met as specified by the project development team, whereas the project’s source code and development tools were extracted from the project repository maintained by the research group.

## Assumptions Made

It was assumed that the participants know how to program and use the Codes Unleash application. During the research phase and usability tests, individuals would only give truthful information.

## Statistical and Mathematical Procedures

Data analysis mostly entailed qualitative methodologies, for example thematic analysis of survey responses and usability test feedback which were used. Thematic analysis was used to make it possible to recognize and construe patterns and themes in collected data. To validate the findings, member checking was done as an assurance of the correctness and reliability of the interpretations made.

## Ethical Considerations

The well-being and privacy of the participants were protected by this study by strictly adhering to ethical guidelines. Before participating in this research, every participant gave their consent. To preserve user privacy and ensure anonymity during data collection, stringent security measures were put in place. In handling feedback from users, the emphasis was on respectfulness, continuous betterment as well as customer contentment.

## System Development Methodology

The method for development of the Codes Unleash application was systematic; consequently, it was begun by defining the requirements and analyzing them before getting to database design, working on algorithms, and developing functions which led it into testing and debugging stages aimed at ensuring its reliability in operation. It was then rolled out into deployment whereupon it was officially launched into existence and thereafter so that as time went by through monitoring continuously alongside collecting feedback from users as well which came in handy especially when looking at what would be improved on later while maintaining this order.

## Logical Specification

Coding lessens program was developed as a tool to aid in learning programming languages with concentration on offering the students’ friendly useful interactions. Words symbols, numbers and video tutorials are some of the learning materials that were utilized.

## Physical Specification

During the phase of Physical Specification, this project included broadly defined program structures, database systems and technology development plans. The outputs of this phase served as a complete blueprint for the implementation of Codes Unleash, by which the development team was guided to build an application that was both powerful and technologically advanced.

## Implementation

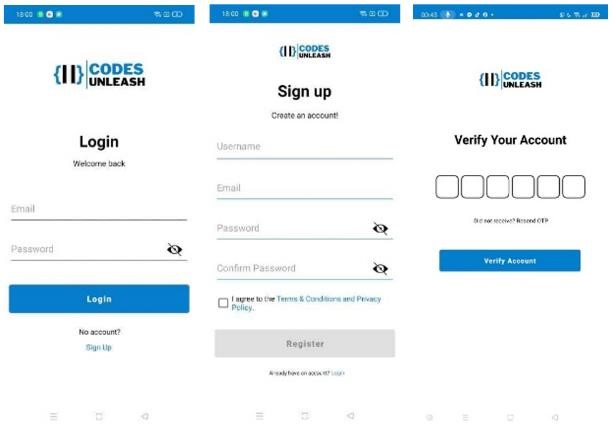
Programming the system, creating data files, conducting thorough tests on the newly developed application and installing it on users' devices were all activities done in the implementation stage. The application was interacted with by the end-users through an APK file after which any worries met were addressed by collecting feedback.

## Testing and Evaluation

The testing process consisted of testing the alpha by developers in order to identify, remove important bugs or problems. It was also based on ISO 25010 standards on quality assurance, which evaluate the application’s performance, ease of use among other security protocols.

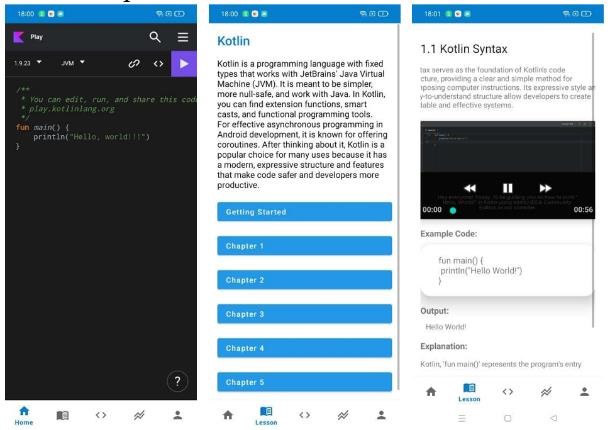
# RESULT

Figure 2 illustrates the registration process is demonstrated in the following illustration where users must read the terms and conditions and the privacy policy prior to proceeding. By clicking the “Register” button, they are taken to a verification page in which an OTP (One-Time Password) code is issued in order to verify that an e-mail was actually given. Consequently, during login phase, people must use these e-mail logins and passwords configured for registration purposes.



## Figure 2. Authentication for Codes Unleash

Figure 3 depicts the homepage which has a compiler feature that allows users to test example code right within the browser window. In addition, under lesson navigation area you will find it breaking lessons into chapters where each chapter consist of many lessons with every lesson being just enough self-contained so as not to make one confused when reading next chapters. This is an assortment of lessons meant to provide extensive explanation about related topics with lessons offered in as simple language as possible. For a more thorough understanding of each lesson and its corresponding output, instructional videos and detailed textual explanations were incorporated.

**Figure 3. Authentication Codes Unleash**

The results from the beta testing phase underscored various aspects of the application, ranging from user interface and experience (UI/UX) to functionality, features, and technical elements. Beta testers collectively agreed that the application's UI/UX met their expectations, evidenced by a mean score of 4. Additionally, the functionality aspect received a commendable mean score of 4.25, indicating testers' satisfaction with its performance, aligning with the verbal interpretation of "Agree." Similarly, the features criterion garnered a mean score of 4.25, reflecting testers' contentment with the features' scope and execution, also categorized as "Agree." The technical aspect of the application was well-received, with a mean score of 4.25, indicating strong execution and garnering agreement among testers. This consensus was echoed by the overall mean score of 4.25, suggesting a high level of satisfaction across all evaluated criteria, consistently interpreted as "Agree." It's noteworthy that these evaluations stem from beta testers with expertise in mobile development, ensuring a thorough and informed assessment process.

In Table 1, the beta testing results showcase a positive evaluation across various criteria. The criteria for UI/UX achieved a mean score of 4, indicating agreement among testers, which corresponds to a verbal interpretation of "Agree." Similarly, the functionality criteria attained a mean score of 4.25, with testers also expressing agreement, leading to a verbal interpretation of "Agree." Furthermore, the features criterion scored 4.25, with testers concurring on its execution and scope, resulting in a verbal interpretation of "Agree" as well. The technicality aspect received a mean score of 4.25, indicating satisfaction among testers, and was interpreted verbally as "Agree." Lastly, the overall mean score, calculated as 4.25, signifies a high level of satisfaction across all evaluated criteria, consistently interpreted as "Agree."

|  |  |  |
| --- | --- | --- |
| Criteria | Mean | Verbal Interpretation |
| UI/UX | 4 | Agree |
| Functionality | 4. 25 | Agree |
| Features | 4.25 | Agree |
| Technicality | 4.25 | Agree |
| Mean | 4.25 | Agree |

**Table 1. Beta Testing Result**

The alpha testing phase findings were presented with more emphasis on the standards of user interface and user experience (UI/UX) measurements, characteristics, functions, technological details, and a general appraisal. The alpha administrators agreed that the application’s interface and user experience were as expected based on their own benchmarks for UI/UX which obtained an average rating of four. Additionally, the functionality criterion yielded a mean score of 4.25, indicating that the testers were satisfied with the application's functionality and that this resulted in a verbal interpretation of "agree." Lastly, the features criterion also received a mean score of 4.25, indicating that the testers were satisfied with the scope and execution of the features in the application, which corresponded with the verbal interpretation of "agree." The application scored a mean score of 4.25 on the technical aspect, which shows that the alpha testers had executed the technical elements excellently and strongly. The verbal interpretation “agree” agrees with this finding. Lastly, the entire mean score of 4.19 implies that the application was very satisfactory in all aspects taken together; hence, “agree” was consistently interpreted verbally. It is significant that the alpha testers who provided these ratings and interpretations are mobile development experts, so the evaluation was thorough and well-informed.

In Table 2, the results of the alpha testing indicate that the criteria for UI/UX achieved a mean score of 4, corresponding to a verbal interpretation of "agree". The grade for performance criteria was 4.25 and was verbalized as ‘agree’. Similarly, the grade of performance criterion was 4.25 and also fell under ‘agree’. Metaphorically both satisfaction level was so high and recorded an identical grade of 4.25 which was agreed upon. Eventually the total mean mark obtained was 4.19 and this was also agreed upon verbally.

|  |  |  |
| --- | --- | --- |
| Criteria | Mean | Verbal Interpretation |
| UI/UX | 4 | Agree |
| Functionality | 4.25 | Agree |
| Features | 4.25 | Agree |
| Technicality | 4.25 | Agree |
| Mean | 4.19 | Agree |

**Table 2. Alpha Testing Result**

# DISCUSSION

This chapter intends to lay out the alpha test findings comprehensively so that the application’s usability and user response can be made clear. The table below summarizes the ratings and interpretations by alpha testers regarding a number of factors, pointing out the good points as well as the weak aspects of the program. In particular, the UI/UX criteria received a mean score of 4, meaning that the user would verbally interpret this as "agree." Likewise, the functionality criteria received a mean score of 4.25, meaning that the user would verbally interpret this as "agree." In addition, add features criteria scored a mean of 4.25 since a user is likely to say agreed. On the other hand, technicality aspect scored a mean of 4.25 since a user is likely to say agreed. For example, by comparing the criteria with the lowest ratings among those who reviewed our app with those who were most satisfied during this survey period you can learn more about what might be affecting its development path Examining the features with the lowest ratings, however, offers opportunities for instant fixing and multiple improvements. Alternatively, the analysis of top scorers provides useful data about pros and cons of the application that can be turned into suggestions for further improvements and enhancements. By recognizing the nuances defining either end of the rating spectrum, developers together with interest groups could operationalize development and boost overall app performance and user satisfaction through informed choices as well as efficient prioritization of efforts.

# CONCLUSIONS

To sum up, good results have turned out from alpha testing of Applications – Codes Unleash mobile what demonstrates its high effectiveness in achievement of defined goals and specifications. The program through led design and development has skillfully integrated quizzes for sections, tests for badges, an advanced content management system, strong web view compiler and multimedia data. The app has received positive reviews in multiple segments including interface design, user experience, functions, attributes, and technical components. These affirm that it meets the needs of learners and improves the manner in which programming languages are coached through mobile phones.

To have more enhance abilities of the applications, consider these specific ideas:

* Keep the ability for instructional videos to automatically play in order to guarantee easy access without human intervention.
* To add features like time limits with learning management systems like Moodle.
* Give top priority to putting security measures like single sign-on (SSO) and two-factor authentication (2FA) in place to protect user data and improve account security.

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