

7 Mobile Application as a Learning Tool

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With advancements in computing and mobile technologies, mobile devices nowadays contain the processing power of a small computer. Accessibility and ease of interaction with mobile devices alongside their access to different online material and sources has made them a considerable tool for education. There have been different lines of research for development of mobile applications that are used for teaching/learning sports (Zhang et al. 2018), clinical nursing (O'Connor & Andrews, 2018), medicine (Bhatheja et al., 2018), ethics (Liu & Xu, 2021), etc. (Berger & Klímová, 2019; Dore et al., 2019; Pereira & Terra, 2018). This work presents a mobile application (LanGuide App) for learning/practicing different languages in the context of European mobility programs for academic institutions. The aim is to use this mobile application for the students and academic staff that move to another European country as part of different mobility programs. LanGuide App is built around a set of exercises developed by linguistic experts. The set of exercises can be expanded by the community and new experts who wish to join the project. LanGuide App supports Croatian, English, Spanish, Italian, Romanian, and Slovenian languages. It includes exercises specifically designed for students, teachers, and administrative staff in four distinct categories: Academic, Mobility, Secretarial & IT (Information Technology). In this paper we discuss the design and development process of the LanGuide App and its features. The tools and technologies used in the development are also discussed, and finally the path forward for development and improvements to the LanGuide App are explored.

Keywords: user interface, mobile application, language learning

Introduction

Widespread use of mobile devices makes them a viable tool for teaching different subjects. The ease of use and availability of these devices means

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that the learners can perform different learning tasks at various times and locations during the day as it does not require them to sit in a specific place (i.e., at their computer desk).

Mobile technologies have been used in teaching different subjects. Yingjie and Cuihua (2008) have used a mobile application for teaching basketball to the students of a Chinese university (Zhang et al. 2018), the design follows a flipped classroom approach. Their results show that using the mobile app has increased the students' learning quality and understanding. Similarly, Liu and colleagues (2021) have used a mobile app in teaching moral education. Their findings support the findings of Yingjie and Cuihua (2008), in which the students' learning efficiency has improved through the use of mobile apps.

The students' approach on learning through mobile applications in a nursing class has been the subject of research by O'Connor and Andrews (2018). They found out that only half of the students use these tools for their studies. They recommend deeper educational content and a personalized mobile app as ways to improve the student involvement with using the app.

Following O'Conner's advice on designing the app in a more personalized way, in this work we have designed the app in a way that the student has control over the topics, difficulty of the content and type of the exercises that they want to practice. They also can change different visual styles of the app to fit into their preferences. Finally, they can get personalized feedback on their progress through another tool in LanGuide project called the LanGuide Result Analysis Tool.

The rest of this document is organized as follows: in the second section the interface design for the mobile app is discussed. The third section focuses on the development process and the fourth section presents the final app. Finally, in the fifth section conclusion and discussions are presented.

User Interface Design for The Mobile Application

In order to design the User Interface, current commercial language learning applications (Duolingo, Babbel, Rosetta Stone) and the user feedback through comments on those apps were studied. Several meetings were also held with LanGuide linguistic experts to analyse the user needs. During the meetings Miro environment was used to gather the information and structure the design process. The features which were deemed necessary from the viewpoint of LanGuide linguistic experts were also discussed in these meetings. The studies and the meetings with experts were used to

generate a set of standalone features to be developed by the development team. The features were then organized in distinct categories, and a development time plan was generated. Figure 7.1 shows the Miro board generated through these meetings.

The feature set and the resulting development plan allowed us to divide the development into three distinct areas, where one partner would be responsible for developing the feature set. The feature sets and responsible teams are as follows:

- *LanGuide Content Manager Application*. This is a web-based application that can be used by language experts to add new exercises to the system. The team is managed by UCLM, Spain. The content manager is discussed in a separate document.
- *LanGuide Mobile Application*. This is a mobile application for Android devices that allows the learners to view and practice the exercises on their mobile devices. This team is managed by MDU, Sweden.
- *LanGuide User Manager*. This application analyses a user's progress through a period of time. The responsible team is managed by UNIRI, Croatia.

Development of The Mobile Application

An agile development strategy was employed in the development of the LanGuide Mobile Application. At each stint, a set of features were selected and developed. The result would then be shared with the LanGuide partners for performing initial tests and reporting feedback to the development team.

The LanGuide mobile application is developed on Flutter¹ Development Kit. The database is developed on MySQL Server hosted by MDU and Firebase² is used for error reporting and App distribution among partners. Through the internal testing and feedback from partners, the user interface has gone under some revisions and small bugs have been eliminated to provide a good User eXperience (UX) to the learners.

LanGuide Mobile Application

Upon running the mobile application, a login screen is presented to the user (Figure 7.2). The user can login with an existing account or register a

¹ <https://flutter.dev>.

² <https://firebase.google.com>.

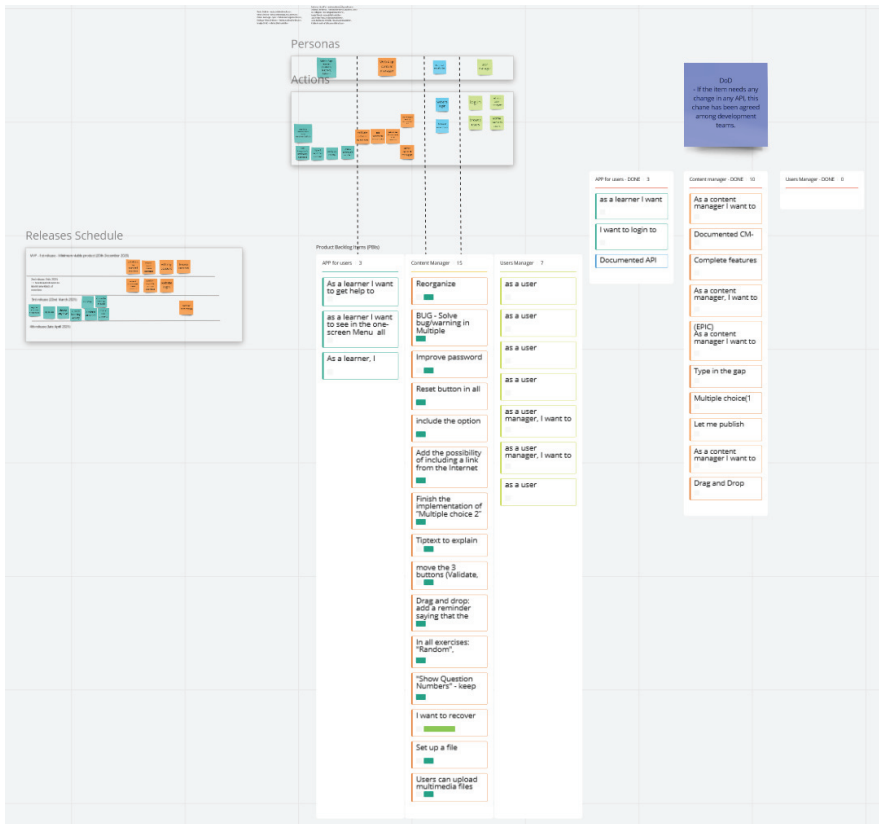


Figure 7.1 Miro Board with Application Feature Requirements Gathered from LanGuide Language Experts

new account. A valid email address, and a password are needed when registering a new account. The registration process requires the user to verify their email address. This means that the mobile app sends an email to the provided email and the user will need to click a link in the email to verify their account. After the user login, the application will remember the user and will login automatically in the future to make it more convenient.

The first time that a user logs in to the application, they are greeted with a welcome page. Through the welcome screen the user is asked to provide some initial settings for the application. These settings include: (1) the language to practice and the (2) learner's field of study, (Figure 7.3). These options can later be changed in the settings menu in the app if needed. After this step, a short tutorial will be presented to the user to teach them how to get started with the application (Figure 7.4).



Figure 7.2
Login Page for the
LanGuide App



Figure 7.3
Welcome Page for
the First Login

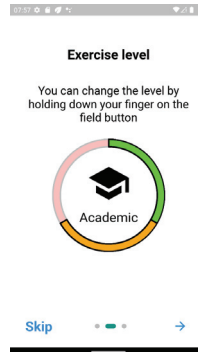


Figure 7.4
Tutorial Page



Figure 7.5
LanGuide App
Home Screen

The home screen (Figure 7.5), contains four different icons. Each of the icons represents a different set of exercises for different fields. These fields include Academic, Mobility, Secretarial and IT. With these fields the users can specify what kind of exercises they want to practice. The difficulty level of the exercises can also be set by doing a long press on the icon. This will change the coloured circle around the icon to indicate the difficulty level: Green (Basic), Orange (Intermediate) and Red (Advanced) (Figure 7.4 and Figure 7.5). This is used to teach the basics of using the application to the user.

Pressing on one of these icons means that the user wants to practice with exercises in that specific field. Upon choosing a field of study, the LanGuide App will fetch an exercise, based on the user's personal settings, from the LanGuide Content Manager Application. The LanGuide App supports three different kinds of learning activities: Multiple Choice (Figure 7.6), Type in the Gap (Figure 7.7) and Drag and Drop (Figure 7.8). When the user sees the learning activities for the first time, a short tutorial will explain how the specific type of exercise should be performed, (Figure 7.9). If the user exits an exercise before finishing it, the state of the exercise is saved and the option to continue the exercise at a later time is available to the user (Figure 7.10).

In order to perform an exercise, the user has to finish all the tasks in the exercise. It is only then that the submit button is unlocked (presented in green colour). This is so that the user cannot submit an exercise before completing it, and to indicate that they have filled in all the required fields. After submitting the answer, the result screen is shown (Figure 7.11). The

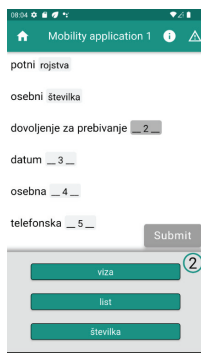


Figure 7.6
Multiple Choice
Exercise

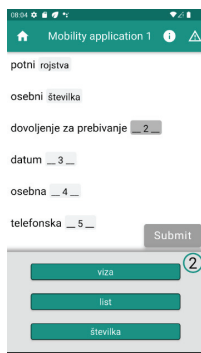


Figure 7.7
Type in the Gap
Exercise

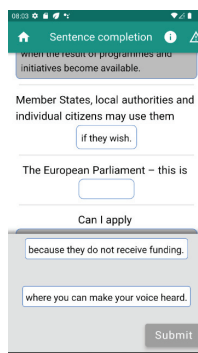


Figure 7.8
Drag and Drop
Exercise

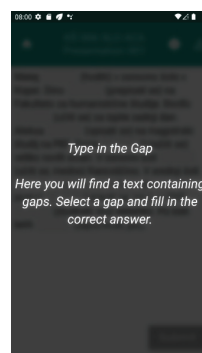


Figure 7.9
Activity Tutorial for
Type in the Gap
Exercise

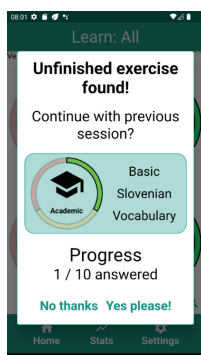


Figure 7.10
Screen for
Resuming
Unfinished
Exercises

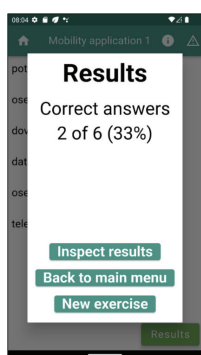


Figure 7.11
Results
ScreenExercise



Figure 7.12
Detailed Feedback
to the User on Their
Answers for Each
Exercise

result screen shows the number of correct answers and total number of tasks in the exercise; it also gives the option to see a detailed list of results for the exercise where each answer is marked as correct or incorrect. While viewing the detailed answers list, the user can toggle to the correct answer by pressing on an eye icon next to the answer (Figure 7.12).

Test Results

The mobile application was assessed with 181 participants which were instructed to download and use the app with one of the supported languages.



Figure 7.13 Age Distribution of the Participants

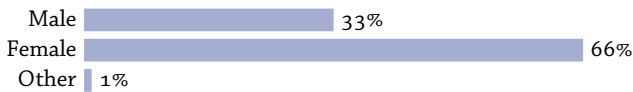


Figure 7.14 Participants' Gender

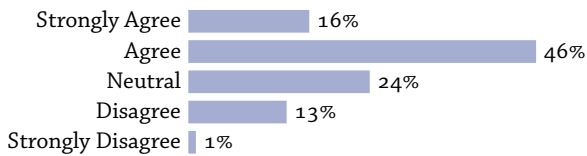


Figure 7.15 Navigation within the App

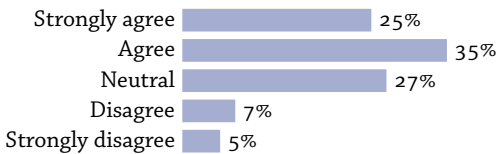


Figure 7.16 Using the Tutorial

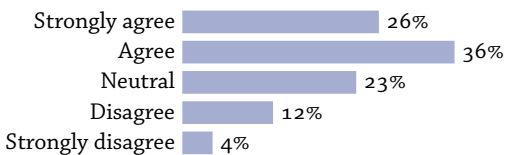


Figure 7.17 Usefulness of the App

The participants were from all ages, but mostly (82%) are between the ages of 18 and 24, and are female (Figure 7.13 and Figure 7.14). After using the app for several days, the participants are asked to fill-in a questionnaire which includes questions on the usability of the app.

Most of the participants find it easy to navigate through the app and can easily use its functionalities (Figure 7.15). They also think that the tutorials which are designed to teach them how to use the app were helpful and made it easy to understand how to use the application (Figure 7.16).

Finally, most of the participants (60%) have a positive view on the use-

fulness of the app as a learning tool, while 23% are neutral about this subject. There is only 14% negative feedback on this matter (Figure 7.17).

Conclusion and Discussion

Based on the test results we can argue that the design of the LanGuide mobile app is well perceived by the users and the built-in tutorial has helped them to understand the user interface and its functionalities to a level that allows them to easily use the application and its features. It should be noted that in line with O'Connor's and Andrew's findings (2018), the students' approach to learning also affects the results and therefore maybe a long-term study of the user's behaviour while using the app, can be done in future; where the student engagement and use of the app is studied in a 6- or 12-month period.

Based on the text feedback received from the participants, some minor graphical adjustments can help improve the visual appearance of the application. These visual improvements in conjunction with continuous addition of new exercises to the app, can make LanGuide a dynamic and useful tool for practicing language skills.

In conclusion we believe that LanGuide can be used as a learning tool that focuses on improving students' language skills by allowing them to learn through exercises and practicing their knowledge of the language. With this goal in mind, it is important to keep the development cycles of the application ongoing through adding new features and more importantly expanding the exercise database with new exercises from the community.

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