

Using mobile application in foreign language learning: a case study

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Research paper

Abstract

The Department of English Language and Literature and the Department of Information Sciences cooperatively, for the purpose of providing additional foreign language training for their students, developed application FFOS Test Your Knowledge (FFOS TYK). TYK was realized as a mobile application for the hybrid development model which allows deployment on multiple platforms. The application is intended primarily for the students of the English language and literature, but it can also be used by other students. The application is available on mobile devices, tablets, laptops and personal computers, and via wireless internet at the faculty students have the free access to it. Each user is given the option for registration and login so that their work can be statistically monitored and ranked. Research data shows that students choose the tests dealing with problem areas, but they prefer shorter tasks when it comes to typing the words. We can conclude that the overall success is rather well distributed with the majority of students scoring around 50% or above with just a few being excellent, and also not many failing to solve the tasks well. The application gives feedback to students and ranks them anonymously. It also offers teachers the possibility to increase the number of questions in the tests and to create the new tests and monitor the success of their students.

KEYWORDS: foreign language learning, e-learning, m-learning, hybrid mobile application development

Introduction

As a part of a pilot programme contract: Digitization of teaching materials, creating e-courses, development of the e-learning concept, the Department of English Language and Literature and the Department of Information Science cooperatively, for the purpose of providing additional foreign language training for students, developed the application FFOS Test Your Knowledge (TYK).

We wanted to tackle the problem of developing our own e-course and e-learning concept keeping in mind that few schools or school systems have integrated the Web into schools in a way that makes real changes in teaching and learning (March 2006). We were aware of the fact that new generations are increasingly acquiring important life competences through informal learning, and therefore educationalists should introduce more radical changes to the school curriculum, particularly in terms of didactic strategies and methods (Matijević 2014).

The application FFOS TYK is intended mainly for the students of the English language and literature, providing them with the additional teaching and studying material that is closely connected with the study programme of the Department of English at the Faculty of Humanities and Social Sciences in Osijek. While deciding on the topics and areas that were going to be covered we tried to keep in mind the key educational questions: what should one learn; how should one learn; where should one learn; why should one learn; and how do these answers relate to the new learning environment (Matijević 2014).

The application is created as a source of exercises in the various fields of grammar, vocabulary and common errors that occur (i.e. remedial grammar) with the special emphasis on the observed errors students repeatedly make while studying at the Department. Since such linguistic problems should be preferably dealt with shortly, but continuously (literally 'five to ten minutes a day'), the form of a mobile application seemed very suitable for the purpose. We took into consideration that using cell phones as a learning device, whether in or out of school, requires a good deal of rethinking and flexibility on the part of educators. But we also knew that young generations are ready to quickly embrace and use the tool and make it their own in various unexpected ways (Prensky 2004).

Our formal university lectures and exercises with the groups of students do not fit to that purpose completely, because they occur once or twice a week with a larger group of students (10-20 students in a group) having different previous knowledge and different needs regarding the remedial grammar problems. The obvious lack of time for individual students' requirements and needs regarding various gaps in their previous knowledge lead to the idea of developing the tool for our students to help them tackle personally their individual weaknesses in this area. More to it, moving this part of exercises to individual studying gives more freedom and time to teachers to do more demanding and creative work with their students in groups and teams that is preferably done during direct interaction of students and teachers (discussions, critical thinking tasks, projects, presentations, creative writing, group work, pair work etc.).

So the basic idea for the application was to help students to do their additional homework tasks whenever they are free and to collect their points for the final exam throughout the whole semester, because of the expectations of the new generations to have the opportunity to learn every day when they want to because educators have to prepare them for lifelong learning with the aid of the new media (March 2006).

We found the idea given by March (2006) rather crucial in the development of the application and we tried to meet the requirements "*that the new e-environment allows for the learning of allkinds of contents (Whatever), at any time of day (Whenever), and in any place (Wherever), thus not only at school or in class.*" We also tried to include the other important moment as well and that is enabling our students (future teachers of English language) to acquire techniques of learning with the aid of new media (Matijević 2014).

March's idea of WWW is also supported in the statement that today learning takes place at any time and at any place because of the rapid advancement in mobile technologies. And thanks to their mobile devices, learners learn as if they are in a real classroom environment (Vinu, Sherimon and Krishnanc 2011).

Mobile devices are gaining importance and popularity in educational realm because there are 5 to 10 times more mobile phones than PC's in the world (Prensky 2004). And more importantly these devices are predominantly used by young people. Our students have these practical devices during the whole school day, using them almost exclusively for personal purposes (Prensky 2004). It is a pure waste of opportunity not to use such an available and resourceful device for some other purpose as well because Prensky (2004) states further that "*mobile phones are no longer just a means of communication. Mobile phones can significantly enhance communication in the classroom, making learning in all fields more effective, interesting and attractive... Cell phones are not just communications devices sparking new modalities of interacting between people, they are also particularly useful computers that fit in your pocket, are always with you, and are always on. Like all communication and computing devices, cell phones, can be used to learn. So rather than fight the trend for kids to come to school carrying their own powerful learning devices – which they have already paid for! – why not use the opportunity to our advantage?*"

Therefore, we took the chance and created the application that is available to students primarily on their mobile devices to be used "*whatever, whenever, wherever*" (March 2006), but taking the other sources and preferences into consideration, it was also made suitable for tablets, laptops and personal computers.

Via wireless internet at the faculty and computers available in the faculty's library our students are provided with the free access to the application. It was also intended to give the students opportunity to spend some 'quality time' in-between lectures, since their timetable is not always ideal due to their various other study programmes and many elective courses offered.

Choosing the media for our project was one of the problems we had to decide upon. But then we faced the new challenge of adapting and changing the existent teaching methodology to fit the new media. The new research area is called the mobile learning.

According to Ktoridou and Eteokleous (2005) mobile learning is e-learning by mobile devices and handheld IT devices, such as PDAs (Personal Digital Assistants), mobile phones, laptops and tablet PCs. Grosso (2003) defines mobile learning as a way of obtaining every kind of information and ability by using mobile technologies. Harris (2001) emphasises the feature of mobile learning to be 'everytime, everywhere' learning experience. Using mobile device in a learning context allows a learner to learn anywhere, anytime (Sandberg, Maris and Geus 2011). And Evans (2008) adds that the key benefit of these devices is that they allow learners to vary their study location and to study "on the move". Inceoglu (2006) points out another opportunity the mobile learning provides for education and that is to fill the deficiency of former distance learning systems with mobile technologies. And Uzunboylu and Ozdamli (2011) emphasise the social aspect of mobile learning by stating that handheld devices eradicated geographical borders, enabling co-operative learning environments which have individual and group interaction.

The basic definitions of mobile learning do not uncover the key points of teaching methodology we have to adapt or alter in order to use the new media properly. As pedagogues and methodologists we have to find ways how mobile tools can be appropriately integrated into learning and teaching activities (Ozdamli 2012). Although cost, adaptability and scalability of new technologies are often emphasised, we have to put pedagogical considerations first before financial, logistical or technical reasons (Patten et al. 2006).

But still, no matter how challenging and unexplored the new field of mobile learning is, we have to adapt to the fact that it brings significant changes in learning environment, with the opportunity of learning independent of time and location (Korucu and Alkan 2011). And above all, we have to accept the fact that the mobile learning is the type of learning in the future (Keegan 2002).

Before we started developing our application we set some research questions in order to find the appropriate solution for them.

1. How can we monitor that all our students are actively and gradually involved in doing their homework?
2. How can we provide immediate feedback to our students when they work on their own?
3. How can we introduce a gaming practice /competition to motivate our students?

Development of the application

For the purpose of this project we decided to develop custom web and mobile application. Reason for doing this is because the available applications didn't meet the required user specification:

- Adjusted content to meet curriculum requirements
- Login only for the students of FFOS
- Track students' results by tests and in general
- Web and mobile access to the same materials.

Web and mobile applications we considered were the following:

Web

- Learn English Online¹
- Learn English Free²
- ALISON³
- LearnEnglish | British Council⁴
- Learn English Speaking and Improve your Spoken English⁵

Mobile

- Memrise Learn Languages Free⁶
- Duolingo: Learn Languages Free⁷
- Learn English By Conversation⁸
- Learn Languages: Rosetta Stone⁹
- 50 jezika¹⁰

All the applications either on the web or mobile platform offer language learning through lessons, checking skills through different types of questions. They are

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- 1 Learn English Online - English learning online with free English lessons for beginners , accessed July 12, 2016, <http://www.learn-english-online.org/>
 - 2 Learn English Free - English Learning Online , accessed July 12, 2016, <http://www.learnenglish.de/>
 - 3 Online English Language Skills Training Courses and Certification | ALISON | ALISON , accessed July 12, 2016, <https://alison.com/subjects/11/English-Language-Skills>
 - 4 LearnEnglish | British Council , accessed July 12, 2016, <http://learnenglish.britishcouncil.org/en/>
 - 5 Learn English Speaking and Improve your Spoken English with Free English Speaking Lessons Online!, accessed July 12, 2016, <http://www.talkenglish.com/>
 - 6 Google Play, accessed July 15, <https://play.google.com/store/apps/details?id=com.memrise.android.memrisecompanion>
 - 7 Google Play, accessed July 15, <https://play.google.com/store/apps/details?id=com.duolingo>
 - 8 Google Play, accessed July 15, <https://play.google.com/store/apps/details?id=vnsdgroup.bbclearningenglish>
 - 9 Google Play, accessed July 15, <https://play.google.com/store/apps/details?id=air.com.rosettastone.mobile.CoursePlayer>
 - 10 Google Play, accessed July 15, <https://play.google.com/store/apps/details?id=com.goethe.f50languages>

connected to social networks for the automatic publication of the achievements. The content and the questions they test is specific for each application and it cannot be influenced. The inability to change the content and questions in existing applications is the cause for the development of our own one.

Architecture of the designed system is shown in Figure 1.

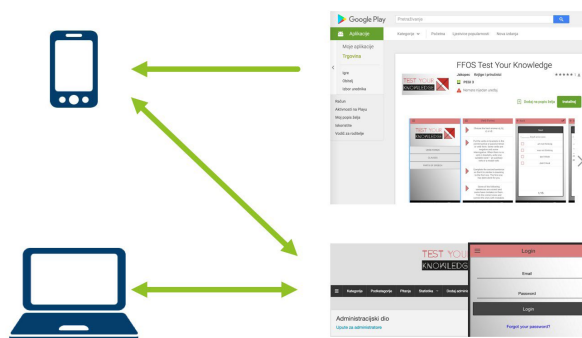


Figure 1. Architecture of the designed system

System consists of the following parts:

- Web application for administration and student testing
- Mobile application for student testing

Administrator can login to web application¹¹ and create categories, tests and questions. Each category can contain more tests and each test consists of more questions. There are three types of questions:

1. single/multiple choice
2. insert one or more words in the text
3. matching

Each question can be put in multiple tests. Web application runs on Linux server, distribution Ubuntu¹². Administration app is realised by PHP programming language¹³ using Foundation¹⁴ responsive web design framework. Data is stored in MySQL database¹⁵.

Students login to web application¹⁶. Students first choose the category and then available tests in the chosen category. Students' web application is realised by

11 <http://web.ffos.hr/testyourknowledgev1/administracija>

12 <http://www.ubuntu.com/>

13 <http://php.net/>

14 <http://foundation.zurb.com/>

15 <https://www.mysql.com/>

16 <http://web.ffos.hr/testyourknowledgev1/>

Ionic¹⁷ framework. The same Framework is used for developing mobile app. The reason for developing also a web application for students rather than just mobile one is possible lack of quality mobile devices within students, and possible practicality since it is easier for some students to type words on a keyboard.

The mobile application is published on Android store¹⁸ and it uses API¹⁹ to communicate with server and read/write data to the same database as the web applications. Since there are some students who do not own an Android mobile phone, we also created the web interface for the same purpose.

Preparation of the tasks

In the first phase the application is developed as a part of the course Contemporary English Language 1 and 2 (in the first year of the undergraduate study programme), but it covers the other linguistic courses in this study programme with different topics offered to the students. To meet the needs of the various courses, the initial version of the application was divided into three categories: Verb forms, Clauses, Parts of Speech. Initially, these three areas were chosen to comprise majority of the grammar structures taught in the first year, but it is planned to further develop the other important topics in English in Use section, such as vocabulary and frequent mistakes of the Croatian speakers. This way many areas of English grammar have been covered and they are in line with the English language and literature study programme. Within each category there are several types of tasks suitable for certain grammar areas, including 'find the mistakes and correct it' tasks that are based exclusively on our students' typical mistakes observed and collected in their tests and writings. It serves the purpose of raising students' awareness and polishing their language performance.

For students it is important that the application provides the ability to interact - each individual opens the task as desired, solves it, and then submits it. The user receives the feedback on the accuracy of the task submitted, the correct solution in case the answer was incorrect and the area of language in which the error occurred as a suggestion for further studying and research.

The second version has further developed the service provided as it gives a personalized approach. Each user can register via @ ffos.hr account and be statistically monitored. After submitting the task the user sees the personal statistics for each task. The amount of time spent is measured and together with the correct answers is shown to the user, so they can see their success in relation to the other users who have solved the same task. The user can also check their overall performance, all the tasks that are solved in relation

17 <http://ionicframework.com/>

18 <https://play.google.com/store/apps/details?id=com.ionicframework.pilotprojekt736073>

19 <http://php.net/manual/en/mysqlinfo.api.choosing.php>

to others, without displaying users' names (i.e. anonymously). Through this option we tried to include a slight 'gaming practice' into students' homework assignment, since games proved to be one of the best motivators to enhance practicing and exercising in order to improve individual performance. Another feature of this application is a random selection of 20 questions, if any task contains more. Therefore, the user has a reason to do the task later again to tackle possibly new questions and problems. In foreign language learning revising is necessary because it allows the consolidation of knowledge and accelerates the fluency and accuracy in using various structures of the foreign language, which ultimately leads to better quality and spontaneous use of language.

The application offers teachers the possibility of increasing the number of questions in the tasks and creating new tasks in accordance with the study programme and perceived needs of the students. The option for the students to register provides the teacher with an excellent opportunity to monitor the activity and progress of each student, and to detect the problem areas in which students need extra practice. In addition, using this application as a homework task ensures personal approach of each student, allowing them to access any task at any time from any location.

Methodology

For this research the quantitative data collecting method was used through the software for recording students' interactions. The developed system records the number of students' attempts in each test, calculates the time spent working on it based on the time of starting with the test and the time of submitting the test and finally calculates the success rate. All data were stored in the database and available over administration web application in a form of a data sheet for the data analysis.

Data analysis

In the summer semester of the academic year 2015/2016 all together 69 students accessed the application. There are only 69 students because the total number of students at the Department of English language and literature in the first year doesn't exceed 75 in average. Students were solving the following tests:

- Verb Forms
 - T1 Choose the best answer a), b), c) or d)
 - T2 Put the verbs in brackets in the correct active or passive tense or verb form. Some verbs are negative and some interrogative. When there is no verb in brackets, write one suitable word – an auxiliary verb or a modal verb

- T3 Complete the second sentence so that it is similar in meaning to the first one. The first one has been done for you
- T4 Some of the following sentences are correct and some have mistakes in them. Put a + for the correct ones and correct the ones with mistakes.
- T5 Mark all modal verbs that fit into the sentence
- T6 Decide whether the form of the verb given in the first column (marked as ?) is an infinitive, a past form, or a past participle. Put it in the appropriate column and supply the other two forms
- Clauses
 - T7 Choose the correct form
 - T8 Choose the correct verb and fill in the gaps with the appropriate form. feel, ask, know, want, dress, give, be, prepare, fire, laugh at
 - T9 Complete the second sentence so that it is similar in meaning to the first one(s). Insert commas when necessary. The first one has been done for you
 - T10 Some of the following sentences are correct and some have mistakes in them. Put a + for the correct ones and correct the ones with mistakes.
 - T11 Match each sentence with its translation in English
- Parts of Speech
 - T12 Fill in the gaps with a suitable preposition
 - T13 Insert A/AN, THE, 0, ANY, SOME, MANY or MUCH
 - T14 Choose the correct form of an adjective and turn it into comparative, superlative or adverb if necessary, and put it in the correct place in the sentence. good, bad, skilful, simple, hard, nice, graceful, rich, warm, free
 - T15 Some of the following sentences are correct and some have mistakes in them. Put a + for the correct ones and correct the ones with mistakes.
 - T16 Put the words in brackets in the right order

The results in total are as follows:

- the number of solved test: 1125 - with average of 16.3 solved test per student
- the time spent in solving tests: 70 hours (250648 seconds) - with average of 1 hour (3632.6 seconds) per student.

The average pass score: 56.6 %

In the data analysis phase the overall data sheet is extracted from the administration web application. Figure 2 - 5 show the selected graphs from the data analysis phase.

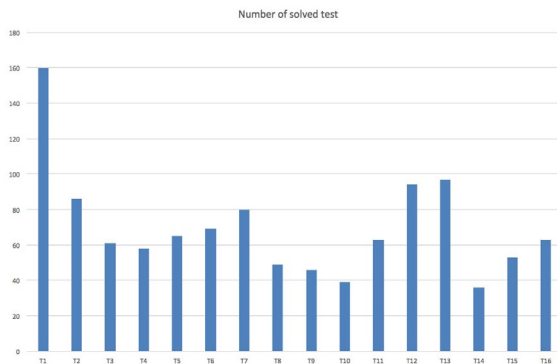


Figure 2. The number of solved test by test type

The results show that the dominantly most popular test (T1) was multiple matching (choosing the right form of the verbs offered). There are several reasons for that, such as, we all start usually from the very beginning and this is the first task. But this is also the task on tenses in English, being one of the most important and most troublesome areas when studying English language. This task is technically less complicated for solving on the mobile device since you just have to click the letter of your choice. Compared with the other test on tenses (T2) where they had to type the whole word. The other two 'popular' tests were (T13 and T12) where students had to fill in the missing articles or quantifiers, and prepositions, respectively. These two deal with other 'problem areas' in English and are also simple to do on the mobile phone since these words to fill in consists only of few letters. The least popular tests (T14 and T10) were those where students had to write the parts of the sentences or change the word order. These tests probably seemed not practical for solving on the mobile phones.

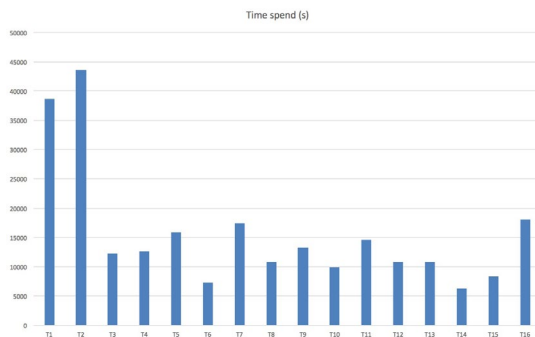


Figure 3. The time spent by test type

Students mostly chose the tests (T2 and T1) that deal with English tenses, but in this case (compared with the previous figure) spending more time with the second task as they had to write the whole word and not just click the letter. Since this is the problem area for the students of English, it is logical that these tests were being solved again and again. The test that took a bit more time for them to solve is T16. It is the most demanding test when it comes to writing because in each sentence students have to write a few jumbled words in the right order and it takes time to type it (especially on their mobile phones). The tests they spent the least time with are T6 and T14. These are the tasks that test the lists learnt by rote. The list of irregular verbs and the list of irregular comparison of adjectives. Students have probably chosen to check the knowledge of these lists in the paper form, without having to type anything.

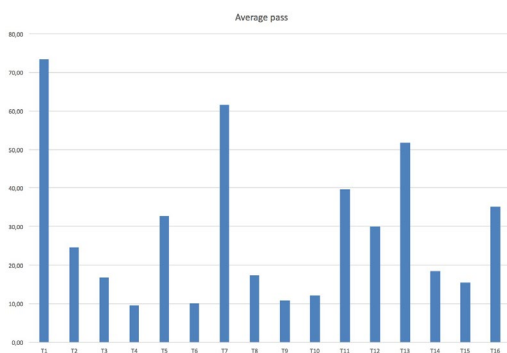


Figure 4. The average pass by test type

In this figure we can see that the best results were scored in the tasks (T1, T7, T13) students chose more often and spent longer time on (tenses and articles). We can conclude that 'the longer you practice, the better you are'. The least successful were T4, T6 and T9 where students had to rewrite the incorrect part of the sentence, all forms of irregular verbs and complete the sentence (so called paraphrasing) respectively. It seems that writing some parts of the sentences on the mobile phone is not so practical for them.

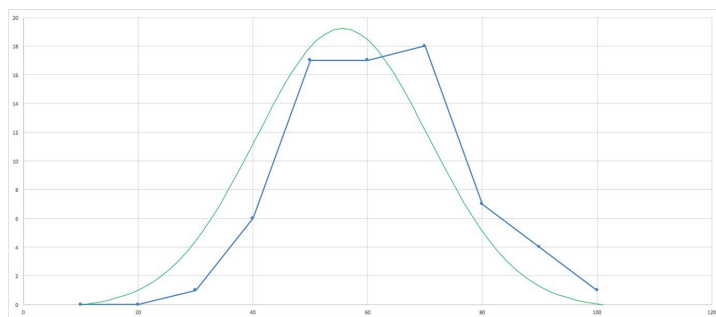


Figure 5. Distribution of the overall average success rate

Distribution of the overall success rate in overall data is visible in Figure 5. Green line is the ideal Gaussian curve of normal distribution. The overall success is rather well distributed with the majority of the students scoring around 50% or above, and only a few being excellent, and also not many failing to solve the tasks well. We can see that the blue line showing students success is slightly better than normal distribution, signifying that with this application students can improve their success by solving the tests again (and again) if they want to.

In the brief interview with the students (41) after they used the application during the whole semester we asked them what choice of topics (content) they find important, majority confirmed the basic areas of grammar and vocabulary. Very rarely they expected something not so usual, such as checking pronunciation, animation and alike.

Regarding the research questions, we believe we have accomplished goals we set. This application monitors each student's involvement and their rate of success, but giving us the data on frequency and accuracy of the tasks solved. It also gives students immediate feedback after submitting the test. Each student can see their position compared with the ranks of other students having done the same test, but they cannot see the names of the other participants as it is anonymous.

Conclusion

Although there is a wide range of available applications for the mobile phones as well as web applications, custom user requirements dictate custom application development. The custom application development enables full control over all system components and gives full data reports for the research purpose and meets the future user requirements. Research data show that students choose the tests tackling the problem areas, but they prefer the tasks they can solve fast, such as clicking the right answer, or typing a short word. They are also ready to invest more time in solving these tasks. And the effort pays itself off. The more time they spend on these tasks, their result is better. Having in mind the limitations of the mobile phones, them not being very practical for typing long sentences (without using shortened mobile phone language), it is understandable that students spend shorter time and choose such tasks less frequently. Especially, when we take into consideration that these are new generations of young people who prefer and are used to do their tasks quickly and prefer an instant feedback. But all in all we can conclude that the overall success is rather well distributed with the majority of students scoring around 50% or above with just a few being excellent, and also not many failing to solve the tasks well. The application offers teachers the possibility to increase the number of questions in the tasks and to create the new tasks in accordance with the study programme and the perceived needs of the students. After the first versions with the fewer questions in various tasks have been put into practice

and tested for a year, it is planned to increase the amount of the material offered in the tasks to motivate students to practice more if wanted or needed. In a course of time, the tasks should contain substantial number of items which will be resourceful and authentic material based on their own mistakes for remedial grammar practice. Further system upgrade (web and mobile applications) is planned in the following period:

1. solving the problem of only one correct answer accepted;
2. avoiding the tasks containing more words to type as an answer;
3. making an archive of login students for each academic year separately;
4. making the application available for other people as well (without logging in).

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