The Impact of Xeropan An Online Application Assisting Language Learning on the Processes of Foreign Language Learning

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Abstract - Examining the relationship between technology and the success of language acquisition and the integration of technology into language instruction has been around of a long time by now. In this current study, the impact of a pedagogical intervention is presented grounded on Xeropan, a gamified language learning application. It was found that Xeropan application has a positive impact on language learning processes. There was a visible improvement in language learners, and at the level of some tasks, it was indicated that there was a significant improvement as a result of the developmental intervention using Xeropan. It was also pointed out that students are content to work with Xeropan and find that it has a positive effect on them. Further conclusions are drawn.

Keywords - language learning, technology, mobile-assisted language learning.

1. Introduction

Many EFL instructors are motivated to have the possibility of improving student learning through mobile assisted language learning (MALL).

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Concurrently, however, they can easily be overwhelmed by the sheer amount and variety of applications available for MALL. Consequently, the fundamental challenge of rethinking and integrating new technology into the language classroom comprises three components: sound pedagogy, the technology's capabilities, and the way of using an effective curriculum [9]. Three recent innovations in MALL lay the foundation for this study: student response systems (SRS) [6], gamification [8], and bring your own devices (BYOD) strategy [20]. This study seeks to gain insight into one of these innovations: gamification. It is also an intention to determine the impact of one MALL application, Xeropan, a gamified digital app. The rationale behind the study is that with the emergence of MALL digital apps, it is timely to assess their impact on the language learning process.

In the current study, the impact of a pedagogical intervention is presented based on a language learning application. Xeropan application has been developed by a Hungarian educational institution. The application is described in detail below. In this study the extent was investigated to which a developmental intervention using Xeropan brings improvement among participants. In addition, the aim was to assess language learners' satisfaction with the application. Therefore, in addition to the test measuring progress, a measurement tool was also developed based on self-regulatory motivation [2] in the form of a questionnaire. Based on the original aim of the literature and the study, the following three research questions were formulated:

- 1) How does the Xeropan online application influence the English language learning process?
- 2) How do student users find Xeropan in terms of efficiency and motivation?
- 3) How does self-regulated motivation correlate with use of Xeropan?

2. Presentation of Xeropan

Xeropan is a gamified EFL learning application and LMS offering EFL learners over 500 lessons at 13 different levels with more than 10,000 headwords to learn. Xeropan's developers envision teaching 100 million students worldwide English and developing their reading, writing, speaking and speaking skills. In the near future the developers seek to create online gamified learning material in the following languages: German, Spanish, and French. In addition to plenty of visual elements, users can also see the curriculum in writing. The scientific grounding of Xeropan is provided by double coding theory [13], Vygotskiy's zone of proximal development (ZPD) theory [18], and scaffolding theory [5]. /For detailed description of these theories, see [14].

After downloading Xeropan, students will be taken to the imaginary Xeropan Islands. Students can choose from *CEFR* six levels of knowledge [7].

Xeropan users can choose from a variety of lesson topics. The lessons include a picture dictionary list, short videos, grammar tasks, and a conversation task supported by artificial intelligence as an innovation. At the end of each lesson, students may practice what they have learned. The developers made five different statements about Xeropan and the reason for the development: (1) daily playful language learning is the best way to learn successfully, (2) it offers a fun learning process for all students, (3) English is an important world language that unites different people, (4) technology can innovate learning by providing new structures and methods, (5) development can be achieved through communication.

The developers [1] designed a background digital environment for the Xeropan application. Users see the instructions of the imaginary Professor Max. Professor Max is an eccentric English teacher who lives in 2157. According to the story, a comet then crashes into Earth and mysteriously everyone loses their ability to communicate. Without communication, people say what they want to say and interpret everything the way they want. Truths are relativized; normal communication does not take place. This is when Professor Max helps people regain the ability to communicate effectively. The learning content is divided into 13 different levels. Each level consists of twelve lesson groups. Within each lesson group there is a video lesson and vocabulary lesson before the video lesson. The vocabulary lesson pre-teaches words that students encounter with in the video lessons. The app comprises 22 different test types. Figure 1 presents the opening screen of the platform whereas Figure 2 and Figure 3 present two different tasks. Apart from the vocabulary and the video lessons, a lesson group

may contain further lessons sporadically such as a chat-bot conversation, a pronunciation lesson and a grammar lesson. Learners are supported by translations in their own language throughout the learning process.

Figure 1. Screenshot of the opening screen of Xeropan

Figure 2. Example of one gap-filling task

Figure 3. Example of one matching task

3. Investigations into MALL App use With Questionnaires

Since in the present study, the self-regulatory motivation of students is also assessed, it is inevitable to gain insight into some of the empirical studies conducted with the use of questionnaires in the field. Three studies [8], [11], [12] are cited that have lately inquired into language learners' use of MALL apps and that the researcher has found relevant towards the assessment of the impact of a gamified tool.

The attitudes of Iranian students towards mobile language learning through questionnaires were examined [8], interviews, and classroom observations. It was found that students appreciated the anywhere, anytime type of learning opportunity and that language learning applications could be with them and they could enjoy it when they got it.

A holistic approach was proposed [11] to assessing the MALL habits of the students surveyed, in which three key components are included: (1) language learning motivation, (2) mobile technologies, and (3) help of others, classmates, and parents.

Similar to [11], a Korean study [12] examined the use of digital devices by 167 Korean university students. About 59% of respondents argued that desktops and laptops are more convenient than smartphones when learning a language. Facts such as a larger screen, faster data transfer, and fewer technical problems were listed as reasons. More than 60% of respondents found the use of desktops and laptops positive. On the other hand, like the research cited earlier, smartphones and laptops were preferred because of their anywhere, anytime features. This study is in alignment with the concept of Xeropan's developers in that the app is designed from the beginning for smartphones and laptops. An internal survey reported that 74% of users use the app on a smartphone and 26% of them use Xeropan on the net with a laptop.

4. Methods

4.1. Participants and Research Purpose

The adult participants of the traditional language course learning English ($N = 12$, CEFR level: A2; average age: 26.8; $SD=2.98$) were included in the pedagogical intervention. The intervention lasted for two months between August 2019 and October 2019. Only a small number of participants could be involved in the study since the researcher wanted to be present intensively in the language learning process of participating students. The maximum number of students in a course is twelve in Hungary in an adult education context so that active participation can be assured. In future research a

much larger number will be involved after relevant experience is gained in the midst of the current research. Students took part in 90-minute lessons during twice week learning along the syllabus provided by one of the textbooks offered on the market and they were assigned daily two lesson groups at Level A2 and then B1. Students spent approximately 45 minutes daily on Xeropan, thus gaining a large amount of input of English as a foreign language. After the second offline class of each week students had to report which lesson groups they had dealt with. They were given an opportunity to share their experience with the app. These sessions were also the venue for the researcher-teacher to assign tasks. In cooperation with the backend developers of Xeropan, times spent on the app could be monitored. It can be stated that students took work with Xeropan seriously and they were honest about their spoken report on working with the app during these sessions.

On the first day of the course, Xeropan was introduced to students and advised that the application be used daily for two months to supplement the course. Prior to the intervention, students were given an offline pre-test of 26 tasks ($\alpha=.81$; $M=8.09$; $SD=2.12$).

4.2. Instruments

Three measures were used in the research: (1) online test, (2) online questionnaire, and (3) online interview. The online test consisted of 26 tasks; each task contained four items. In order to validate, item analysis was performed as described below, and after the development of the measurement tool and before testing, each task was discussed with three language teachers.

5. Results

The online post-test proved to be reliable ($\alpha=.79$). Item analysis was also performed for all tasks. The item-total correlation indicator, which shows whether the item measures what the test as a whole, i.e., separates students with different knowledge from each other in the same way as the test. It was found that each item fits properly with the meter. In the offline pre-test ($\alpha=.81$; $M=8.09$; $SD=2.12$), participants performed relatively poorly, however, there was a significant improvement ($\alpha=.79$; $M=16.72$; $SD=4.12$) on the post-test. Investigating the impact a significant improvement ($t=2.82$; $p<.05$; Cohen's $D=.72$) was also found. To calculate the effect size, Cohen's D was used, which indicates the difference between the two means divided by the standard deviation. Following the post-test, a delayed online test was also taken with the participants in November 2019 ($\alpha=.82$; $M=13.78$; $SD=3.68$).

Based on the results, it can be said that Xeropan contributed to the development of students' general English (L2). Since the pre- and post-tests were equivalent, i.e., each task was similar to items of similar type and word frequency rankings [17], the results were also comparable at the item level. In 17 of the twenty-six cases, based on t-tests, it can be stated that there was a significant difference, i.e. the participants performed better in the post-test (eg: Task 12: $t=1.26$, $p < .05$; Task 17: $t=1.86$, $p < .05$). Even in case of some items that were hypothesized to be more difficult, significant differences were observed (Task 5: $t=1.38$, $p < .05$). It can be said that the students significantly improved their performance compared to the pre-test ($t=2.82$; $p < .05$), although in the delayed post-test it was already found that some of the words and word chunks were forgotten; thus there might be some doubt concerning the storage of these items in long-term memory. This finding is similar to that of an American study [16]. Furthermore, these findings support the results of [3] and [4]. In order to get a clear picture of the operation of each element, item-by-item descriptive statistics were prepared. All items underwent item-total correlation analysis and it was found that none of the items were outliers. It was clear to see that students performed best on Tasks 9 and 2 and weakest on tasks 21 and 25. By the end of the test, exhaustion might have set in and this may have also contributed to more frequent mistakes.

To answer research question 2 ('How useful do students find Xeropan?'), questionnaire data were analyzed. The questionnaire proved to be reliable ($\alpha=.82$). Above all, each questionnaire item underwent item analysis and, according to the item-total correlation indicators, each statement fits the measure.

One item, "When I get stressed when solving Xeropan tasks, I know how to reduce stress" ($M=4.25$; $SD=.78$), has a fairly high level of agreement. This is in line with what was found in [12] and [13]. Almost all participants fully agreed that the application reduces stress and language learning anxiety [10], which is an important factor in the language learning process. However, when participants reported data on whether they could achieve their learning goals more effectively and whether they were less bored, students were less confident ($M=3.26$; $M=3.16$). Overall, students found the mobile application effective and enjoyable, similar to the research found in the literature and described in the present study [8], [11].

It is worth examining those questionnaire items for which a result was obtained close to the mean. For the statement 'When I am nervous while solving a Xeropan task, I give up and close the application', the average is 2.72, but here a value as close to zero

as possible means that participants are likely to have a positive opinion about the application, i.e. they do not give up using the app. This might be the case also due to the high quality design and user experience. Similarly, the reverse statement is 'I am less bored when I use Xeropan', this questionnaire item also states that the closer it is to zero, the less bored the respondents are. As for the responses to the interviews, it was also confirmed that students find Xeropan a useful and effective tool, but also useful critical statements for the future, which can be discussed with developers to create an even better tool. This similar idea is described in [19].

The first interview element was an invitation for participants to describe why they found Xeropan to be effective. 'It teaches with varied elements' and 'visual representation makes words more immersive and non-boring' responses point in the direction that language learners find the application appropriate. The second question in the questionnaire focused on which element Xeropan develops. Students responded primarily that it helps develop grammar and vocabulary. The question about the exciting curriculum element provided clear answers. Everyone marked the artificial intelligence-supported dialogue in the app, although there was also a negative comment. Here are some answers that have been found useful for development:

"Maybe practicing words could be more imaginative... Sometimes a lot of pictures, I can't focus on the task".

The last question 'If you were the developer, what would you change from a student perspective?' sought to place informants in the developer's perspective. Here are some answers:

"I would like it to be good that in some cases the Hungarian translation could be in addition to English....I would put more talking tasks and fewer pictures in it... Some figures are too childish".

As for some negative comments, one student indicated that 'I do not find Xeropan effective that much.' and it has to be highlighted that two students wrote some critical thoughts. Some of their comments are reported here:

"I find some elements too playful, I would definitely change the design that is too childish, I miss translation practice, I miss productive tasks from the app", "After some time, tasks become too repetitive, I find the matching tasks too easy and not challenging".

A large amount of conclusions may be drawn from these user statements and they have been. A new version of Xeropan came out in the summer of 2020 reflecting on user feedback. The design was changed and it does not have any more elements that would remind users of a game for under 10-year-old children. New tasks are considered to be integrated into the app. These tasks will require productive

skills and translation will have a larger emphasis in some of the tasks. As for the repetitiveness, the developers are working on adding even more new tasks and elements to the app. In future development, it should be reconsidered that more illustrations for adults should be included in the graphics and that fewer images could be used.

Having investigated the descriptive statistics of the questionnaire results and having gained an insight into the items, factor analysis was conducted to check whether the two factors reflect the original conceptualization. After the factor-analysis had been conducted, it turned out that the previously conceptualized two factors; Cognitive and Affective factor existed on the basis of the results. The KMO-index was .72 which was an indication that the strength of the correlation between the two dimensions makes it moderately adequate for factor analysis. The factor-loadings over the .50 factor-loading limits (see [15]) were taken into account.

The correlation of the two variables with the results of the post-test was investigated. The Affective factor is significantly correlated in a strong relationship with the result of the post-test ($r=.82$, $p<.05$); however the Cognitive factor did not show a significant correlation with the post-test result ($r=.61$, $p>.05$). This outcome is an indication that gamification exerts an influence on language learning because of emotional factors. It must be added that based on the z-test ($z=2.42$, $p>.05$), it can be concluded that there is no significant correlation between those of the Cognitive and Affective factor with the post-test result.

To further get an insight into the relationship between the impact of Xeropan and self-regulated motivation, two sub-samples were created. One sub-sample was created out of the four best achieving students and the other was created out of the four worst achieving students regarding the scores on the post-test. The answers given on the questionnaire were taken into consideration. Grounded on the t-tests, three items were found to show a significant difference between the answers of the best achieving group and those of the worst achieving group (Item 2: $t=2.12$; $p<.05$; Item 5: $t=1.18$; $p<.05$; Item 10: $t=1.65$; $p<.05$). All of these items belong to the Affective variable of the self-regulatory motivation construct. Thus, it can be concluded that emotion control might play a vital role in the success of learning languages supported by digital technology.

6. Conclusion

The research presented here was a good starting point for further research examining the impact of Xeropan and compare it with other MALL applications. In order to draw through conclusions, an item analysis for the language test was performed. The construction of the tasks and the selection of the items were performed according to several criteria listed above. In the current research, it was found that the Xeropan application has a positive effect on language learning processes. There was a visible improvement in language learners, and at the level of some tasks, it was demonstrated that there was a significant improvement as a result of the developmental intervention using Xeropan. It was also found that students are satisfied to work with Xeropan and find that it has a positive effect on them. Based on the results of the questionnaire, it is likely that the application is motivating for learners to learn independently. However, it was found that the affective variable of self-regulated motivation is more significant than the cognitive variable towards the impact of a gamified language learning app. It has to be pointed out that the research was conducted with a relatively low sample size of participants, which is a significant limitation. Another drawback of the research is that there was no control group whose development and results could be compared to the progress of the experimental group (this deficiency was remedied in the fall of 2020 when the author of this study conducted a control group treatment with 312 primary school participants). However some implications can be drawn from this study. Language courses in the 21st century are better off providing students with MALL part. Traditional offline language courses are legitimate but they can provide more robust service when supported by a digital app. Thus, after deducting some conclusions it can be recommended that language course providers may have to tend to provide language education supported by gamified digital apps.

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