

Digital Products for Children. UX/UI Design

Isabela Lavinia Răpeși

Abstract: *This paper aims at studying the educational applications for children used in Timisoara and around the world to find out what children think about these products and the impact they have on them, what they want from an application as well as to compare their desires concerning the existing applications in order to create a good application for them and to promote a bookstore. In order to do that, it was necessary to learn about application design, multimedia content, information layout, children's experience in applications and the manner in which they interact when using them, the device they are available for, the age category to which they are addressed, whether they have certain security options and whether they are related in the offline environment to a bookstore, toy store, organisation, etc.*

Keywords: *digital products, user interface, user experience, educational applications, mobile applications, children's preferences, bookstore promotion.*

1. Introduction

Children are increasingly using new technologies and need digital products that are appropriate for their age group and fit their preferences. As Paul Osborne (2020) stated, "A UX design that works perfectly for most people, most of the time, may not work well for children at all". When using an application, it is important that the user needs to be satisfied both visually and through the experience provided, even if it is for children or adults.

The objectives of this research are to create an application as suitable as possible for children, to promote reading among children, and to promote the "Librarul cu papion" bookstore. The information about the children in Timisoara was needed in order to respect their preferences when an application could be proposed for them. Therefore, the children's preferences in terms of digital applications needed to be known in order to find other features that could be useful in developing applications and their correlation with the needs of the "Librarul cu papion" bookstore in order to obtain a beneficial product both for children and for the bookstore.

Children differ from adults in dexterity and thinking, so they need applications designed specifically for them. When making such applications, certain characteristics must be taken into account: for children, age groups vary more; children need immediate results; children need an interface as simple as possible; children need a story to understand; children act emotionally, not rationally; children need more encouragement; children learn faster than adults; children do not need to be loaded with a lot of information; children do not have the same dexterity as adults, children's applications require special measures for safety; advertising in children's applications should be avoided; younger children cannot read or they read with difficulty; testing products for children is more difficult, etc.

2. Research methods

In addition to researching the theory and consulting the existing studies, a more detailed analysis is needed. For example, even if we found out information about children's preferences in general, it is important to have specific data about the children in Timisoara. In addition, it was important to know what has worked and what needed to be improved on what has been developed so far in the field of digital products for children. Therefore, to meet the above objectives, two research methods - the comparative analysis and the questionnaire - will be used.

2.1. Comparative Analysis

Following the analysis of ten educational applications, the focus was on some characteristics in order to discover the children's preferences. In order to analyse the mobile educational applications for children, certain steps have been followed, such as identifying the applications to be analysed (by consulting certain sites and centralised answers after applying the questionnaire and checking the number of downloads from Google Play and the reviews), identifying common quantitative and qualitative characteristics, creating an analysis grid and ticking the characteristics of the respective applications, analysing the data and formulating the conclusions. To meet the objectives of the paper, some of the popular applications in the world and the applications used by the children in Timisoara have been analysed.

This comparative analysis helps to identify the differences and similarities between the applications and to find out how a similar application for the bookstore can be made, as well as the application that can be used by the children in Timisoara and some elements that would make it equally attractive or even more attractive than the existing

applications. In the analysis grid, the applications used by the children in Timisoara have been compared with the applications that are very popular among the international children.

In the analysis of the educational applications, the following will be highlighted - the subject of the applications, the age category, the number of their downloads from Google Play, the reviews, the device for which they have an available version, the safety measures it offers, whether they have a website or a logo; the design features; the multimedia content; the way the information is presented; the way of interacting; the assistant; whether they have game features; whether they offer feedback; whether they have offline connections; whether they are free or have ads; the languages in which they have versions and whether children can connect with other children when they are using them.

2.2. Quantitative Analysis

The questionnaire was applied in order to find out more about the children in Timisoara, especially about those who use digital products and educational applications. This questionnaire was applied before having conducted the content analysis to find out which applications are the most used in this category, in order to analyse them and observe the children's preferences.

The stages of conducting the survey were the following: selecting the target audience, writing the questions and organising them, and presenting the necessary information to those who received the questionnaire to complete it. The questions have been ordered as follows: the first were the questions about the children participating in the study, followed by questions about the questionnaire, digital products for children, how they use them and their experience with such products, and at the end I asked the questions for parents, through whose answers they were to express their opinion about these products and the effect they have on their children.

Although the target audience is children from Timisoara aged between 3 and 14 years old, the questionnaire was sent to parents and they were asked to complete it with their children, requesting them to answer certain questions and explaining to them what they have to do.

Some questions only needed to be answered by parents to find out what they think about the educational applications and the other types of applications that their children use. It would have been more difficult for the children to complete it directly because some of them cannot read or understand the questions, making it easier for them if their parents explained to them what they were talking about. If the author had met these children and asked them the questions, they might not have answered so correctly or they might not have been able to answer some questions at all, being intimidated by the presence of a stranger. It would have been much harder to conduct this survey, especially for very young children. Therefore, the questionnaire was applied to a sample of 60 people (60 parents with their children).

3. Results

When asked what their favorite colours were, most of the children (28.4%) answered "light blue", and 13.4% of the children chose purple as their favourite colour. Surprisingly, black is among the favourite colours of 11.9% of the children. Light green and pink were chosen as favourite colours by 19.4% of the children.

The most used device by children is the mobile phone (96.7%). The children's favourite activities when using a mobile phone, laptop or tablet include games (37.6%), applications for learning or acquiring certain skills (31.7%), watching videos (25%) and using social networks (6.7%). More than half of the children who responded to the study prefer interaction through gestures and voice with applications (61.7%). When asked which

applications they prefer, 26.7% of the children chose educational applications (with stories, mathematics, etc.).

35% of the children who answered the questionnaire preferred an animal as an assistant. The analysis has also shown that many applications have animated characters in the form of an animal as an assistant that helps children. Most children (91.7%) want to be rewarded with virtual prizes during the interaction with the application. Children get bored quickly, which is why 95% of the children in Timisoara who were surveyed want the level of difficulty of the application to be increased at some point.

Following the analysis of the 10 educational applications for children, several common features that make the applications as enjoyable as possible for those who use them have been found out. Educational applications are found in various forms: applications with stories, Romanian language, mathematics, languages, puzzles, colours, finding differences, general culture, applications for schools, applications for learning notions of history, chemistry, and others. A part of this analysis will be presented as follows.

Table 1 - Analysis of educational applications for children

Name of the application		Duolingo	Infinite	Lingokids	Povești pentru copii	Învățarea numerelor
Application subject	Stories	✓	-	-	✓	-
	Romanian language	-	-	-	-	-
	Mathematics	-	-	-	-	✓
	Foreign languages	✓	✓	✓	-	-
	Puzzle	-	✓	-	✓	-

	Application for schools	✓	-	-	-	-
Age category	3-5 years	-	-	✓	✓	✓
	6-8 years	-	✓	✓	✓	-
	9-11 years	✓	✓	-	-	-
	12-14 years	✓	✓	-	-	-
Downloads from Google Play		Over 100,000,000	Over 10,000	Over 10,000,000	Over 100,000	Over 1,000,000
Google Play review (from 1 to 5)		4.7★	4.6★	4.6★	4.7★	4.6★
Number of reviews		9,000,000	294	68,000	2,000	4,000
Safety	Internet necessity	✓	✓	✓	-	-
	External links access	✓	-	-	-	-
	Settings access without password	✓	-	✓	-	-
	Transactions possibility	✓	-	-	-	-
	Ads	✓	-	✓	-	-
	Security code	-	✓	-	✓	-

	Login required	✓	✓	-	-	-
	Parental control	-	✓	-	✓	-
Design	Dominant colours	✓	✓	✓	-	-
	Cold colours	✓	-	✓	✓	✓
	Warm colours	-	-	✓	✓	✓
	Neutral colours	✓	✓	✓	✓	✓
	Simple interface	✓	✓	-	✓	✓
	Menu	✓	-	-	-	-
	Template	✓	✓	-	✓	-
	Playful font	-	-	-	-	✓

The children's applications have many downloads, being widely used, especially the educational ones, because parents consider them useful for the children's development and are a good way to spend time having fun and learning something new. The analysed applications have between 50,000 and 100,000,000 downloads in Google Play.

The children in Timisoara prefer applications for learning foreign languages, applications with stories and applications with mathematics. Internationally, language applications are less widely used. The children in Timisoara prefer to have an animal as an assistant in the application, and internationally, in addition to the animal, a boy or a girl is also preferred.

Both in Timisoara and internationally, toys are promoted through applications. Therefore, this promotion strategy was used in the case of “Librarul cu papion” bookstore, to make children buy as many books as possible and, of course, to read them, contributing thus to their development.

The characteristics of the analysed applications match the answers to the questionnaire perfectly. All the analysed applications have a version for the phone or tablet, the interaction on this device being the one preferred by the children in Timisoara who answered the questionnaire.

Among the analysed applications, Duolingo is the most appreciated application, having the most downloads and being mentioned most often in the answers to the questionnaire. This is an application that is frequently used by the adults who want to learn a foreign language, so it is the only one of the analysed applications that offers the possibility of transactions, without the need for a code that only parents can enter. However, you need an account and an e-mail to make transactions if you want the Premium version without ads. Some applications offer the ability to access certain stories or sections of the application without Internet access, but additional features are required.

All the applications use neutral colours and do not make a difference for boys or girls. Both cold and warm colours are used and all the interfaces contain many colours. Many of the applications have simple interfaces, with a few characters, to help children navigate as easily as possible. However, very colourful applications with more complex graphics are also appreciated.

Half of the analysed applications are free, others have only a version that can be tested for a short period of time or for an indefinite period of time, but with fewer interactions than the paid version. The children in Timisoara prefer to use free applications. Half of the analysed applications have parental control, allowing only parents to access certain parts of the

application and requiring the use of a password, or writing numbers / letters, which young children who interact with the application cannot enter only by touch.

4. Expert sources consulted

The topic of this paper is part of the graphic design field and, therefore, many graphic design books, such as “The principles of Beautiful Web Design” (Beaird, 2010), “Graphic Design Solutions” (Landa, 2014), “The Elements of Graphic Design” (White, 2011) have been read. Books for the UX/UI field, such as “UX for Beginners. A Crash Course in 100 Short Lessons” (Marsh, 2015), “The Elements of User Experience” (Garett, 2011) and many specialised articles such as “UX Design for Kids: Key Design Considerations” (Osborne, 2020) have been consulted. The course notes in Onița (2018) have been used; valuable information on graphic design and UX/UI design and on how to create a UX/UI design project could be found in these course notes.

These studies have been based only on recent and updated books. All the books and online sources are not older than 10 years. Some of the books are revised editions of the old books.

Conclusions

After having collected this information, a proposal for an educational application that should be as suitable as possible for children will be made. An example is the Webkinz desktop application that can be accessed by children with a code they receive when they buy a toy. In the application, the child discovers a world of animals, where s/he can play a variety of games and participate in various activities with his/her friends, each with the character of the purchased animal.

A similar idea for the “Librarul cu papion” bookstore in Timisoara was believed to be a good idea in order to create a connection between the

offline (buying and reading books) and online (using an application for fun and testing the knowledge learnt from books). Children who buy a book from the bookstore will have access to the application and will be able to answer questions from the stories they read, playing with their favourite heroes and deepening the knowledge they have from reading the books.

Of course, children will be helped by their parents from the purchase of the book to the use of the application. It will also be easy for the children to use. In this way, they will be able to learn and have fun at the same time. Currently, there are many applications that take away children's time and make them have no time to learn or read. Therefore, it was thought that designing this application will solve two things at the same time: the children's desire to play and the promotion of reading among them.

This application also promotes "Librarul cu papion", a children's bookstore opened last year, which already has quite a few followers and organises a lot of events, but could develop even more in a short period of time with the help of this application and could increase its popularity. In addition to the well-known stories, bookstore-specific stories can be introduced in the app, which are read for children who come to "Librarul cu papion" or books that can be purchased from there. A message can be displayed in the app urging children to buy the books from this bookstore. They will then talk to their parents. It is important for them to know that there is a place where they will find the book. Maybe they will buy the book, so the bookstore sales will increase.

By conducting this research and by designing this educational application several problems have been solved: children who spend a lot of time on mobile phones will use them in a constructive way, children who do not give too much importance to reading will be more motivated to read in order to play with friends in the application, and even though most applications have ads, children will now be able to use an application without ads and without referring to external links. In addition, the

"Librarul cu papion" bookstore, which has recently opened and needs advertising, will be promoted in a unique way.



Figure 1: Start page and Home page

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