

RESEARCH ARTICLE

Prototype of a mobile application for teaching the first grade letter course

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Abstract: It is essential to highlight that, to ease learning processes and produce a fruitful pedagogical experience, reading and writing skills development requires didactic tactics different from those used in the traditional classroom. The research aims to design a prototype mobile application for teaching letter courses to first graders in a didactic way to enhance the communicative skills of children. The method used is the cascade, which allowed us to understand and solve the problem. The results obtained are the designs of the prototypes, which were designed to teach letters to children in the first grade of primary school. Likewise, a good appreciation was obtained in the surveys conducted on the application.

Keywords: waterfall method, mobile application, primary school

1 Introduction

Mastering written language is essential for the learner's cultural development, so he insists on teaching this form of language in a way that goes beyond teaching the code (Williams, 2018). In the same vein, he questions a teaching strategy that indisputably does not consider the approach of written language as a mediating system for development, and that does not go beyond the teaching of the code (Antoniadi, 2023; Kalogiannakis & Papadakis, 2020).

Learning through play is not a new phenomenon. Especially in the early grades, their use is pervasive because of the many skills they teach and develop in kids (Kalogiannakis & Papadakis, 2022). Although kids are the focus of instruction, teachers are still pivotal figures (Xezonaki, 2023). The educator's responsibilities include catering to the requirements of each student, ensuring that they have access to enough resources, and assessing their progress throughout the year (Papadakis et al., 2021). We propose investigating how both practising and aspiring educators create and use adaptive gamified environments to improve the quality of science instruction (Tzavara et al., 2023).

It is used in education to describe the brief period between the ages of 4 and 6 when young children (early childhood education) begin to learn to read and write. It refers to a process rather than a clearly defined notion that has given rise to several scientific theories about the process (Uğraş et al., 2023). Teachers must carefully check how students significantly improve their academic performance because they must first learn to read to master other subjects, making this period vital (Tallou, 2022b). When a teacher studies early literacy, they meet theories, research, and educational practices that embrace diverse philosophies, such as sociocultural, constructivist, and psycholinguistic perspectives (Papadakis et al., 2022).

The acquisition of written language in its two phases, reading and writing, occupies an integral part of the early years of schooling because it serves as the basis for future academic learning (Kalogiannakis et al., 2021). This explains why teachers and parents are concerned about children struggling with reading and writing. Teachers must continually reinforce techniques and methodologies to teach children to read and write correctly to eradicate reading and writing problems (Papadakis et al., 2022).

Although learning to read and write is a complex process, if the child is guided naturally and enjoyably, they can develop this process autonomously. They will be able to understand the social function of reading and writing instead of seeing it as isolated and meaningless teaching (Acemoglu & Pischke, 1998).

Since messages are sent by reading and writing to others who must necessarily understand them for meaningful communication to take place, they serve only a social function (Papadakis et al., 2021). It has a waterfall method to conduct the project, which is since teams using the waterfall approach must follow a series of procedures and wait for the completion of each phase before moving on (Kaye et al., 2022). In its conventional form, this system almost prohibits unexpected adjustments or updates.

The importance of the research work is to contribute to teaching letters to first graders for effective communication under the mobile application. The research aims to design a mobile application prototype for teaching the course of letters to first graders in a didactic way.

The format of the paper is as follows: Section 2 has the literature review, section 2 holds the method, section 3 contains the results and discussions, and finally, the conclusions are presented.

2 Literature review

At this point, a literature review will be done with the works related to learning communication courses for children in the first grade of elementary school to help to see the points that need to be implemented to develop them.

The authors argue that these factors have made online teaching and learning essential to early childhood education programs. Despite the ongoing controversy about its appropriateness, young children must regularly be exposed to Information and Communication Technologies (ICT) (Kim, 2020; Sholekah et al., 2022). This descriptive study shows how an early childhood education teacher training course was changed to allow aspiring teachers to learn and teach online (Sunar et al., 2022). These aspiring teachers had the opportunity to interact with children through their online teaching experiences, which also fostered contemplation on the best ways to use online communication tools to support young children's development and learning.

On the other hand, the authors in their research paper emphasize that handwriting, peer communication, and explicit and supplementary spelling instruction can play a significant role in teaching writing and speaking to young children who develop their text translation skills more slowly than their peers (Graham et al., 2018). These findings support the theoretical claim that the ability to summarize texts accurately is causally related to writing.

Similarly, beginning readers need systematic phonics instruction, which requires specific knowledge and experience that many elementary teachers need to gain. In the research paper, the authors analyzed a study of how a year-long tutoring program aimed at increasing teachers' knowledge and effectiveness in teaching phonics affected students' progress in reading and spelling (Ehri & Flugman, 2018). Over the year, students' reading and spelling skills improved significantly, exceeding impact sizes from comparable data sources. Students reached expected levels by the end of kindergarten and first grade, but performance in second and third grades was lower compared to younger classes.

Finally, the authors studied the methods used by classroom teachers and special education specialists to assess the pre-reading abilities of first-grade children in letter knowledge and phonological skills. In addition, the extent to which teachers could detect problems in the pre-reading abilities of children with the lowest scores was studied (Virinkoski et al., 2018). By comparing the teachers' assessments with the students' actual test scores, it was possible to figure out the degree of accuracy with which teachers judged their students' pre-reading abilities.

A literature review of the different research works focused on the proposed topic was conducted, which helped to obtain more innovative ideas to develop in the present work.

3 Methodology

The waterfall method is applied in the research work because it is a project divided into successive phases according to the waterfall model, and the team can only move to the next phase when the earlier one has been completed (Rugani et al., 2019). Planning is a crucial phase in this process because the main selling point of the waterfall method is that there is no room for errors or adjustments (Zhou et al., 2018). The quality of the first work figures out the final product (see Figure 1).

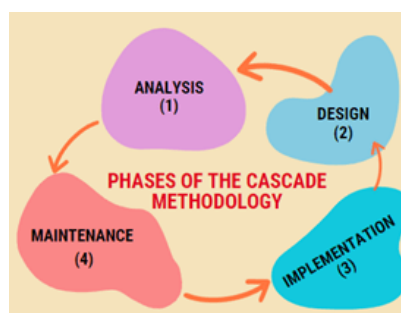


Figure 1 Phases of the method

3.1 Analysis

The first step, analysis, is the project’s planning phase; it is the point at which a user will record all aspects of the concept and gather the energy needed to move it forward (Li et al., 2019). The user task will be to figure out the goals and aims in this phase of the waterfall model and then gather all the requirements that must be met for the software development to execute the entire process. Activities Table 1 shows the functionalities that will be fulfilled in the application, such as the application will have a login to enter the application. The application will be able to manage users. The application will have basic level activities, intermediate level activities, the application will have advanced-level activities. The application will be able to generate a pdf file of the activities since these functionalities will allow first-grade children to learn to interact and write in a didactic and intuitive way.

Table 1 Functionalities

No.	Functionalities
1	The application will have a login to enter the application.
2	The application will be able to manage users.
3	The application will include the activities of the basic level.
4	The application will include the activities of the intermediate level.
5	The application will have the activities of the advanced level.
6	The application will be able to generate a pdf file of the activities.

3.2 Design

Design is undoubtedly one of the stages of the waterfall model that many people like the most, as it allows them to express their creativity and temporarily assume the role of an architect when planning and creating the initial sketches of the final product of their software development (Liu & Qin, 2019). The design of the application prototypes is based on three levels: basic level, intermediate level, and advanced level. Each level consists of ten activities. Figure 2 shows the Login in which the user is asked to enter the e-mail or ID and the password to enter the application for teaching letters to children in the first grade of primary school. In the same way, Figure 3 shows the basic level in which the vowels are presented as the first sample of the ten activities proposed at the basic level. Figure 4 shows the intermediate level in which the alphabet is presented as the first sample of the ten activities presented at the intermediate level. The alphabet is the second one that will allow children to form words. Likewise, Figure 5 shows the advanced level for children in the first grade of primary school. Children can form words quickly, thanks to the earlier activities presented at each level.



Figure 2 Login



Figure 3 Basic level – vowels



Figure 4 Intermediate level – the alphabet

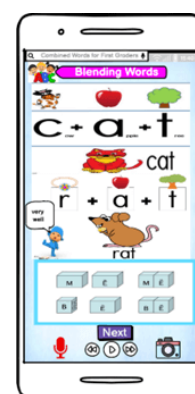


Figure 5 Advanced level – word formation

3.3 Implementation

At this stage, the waterfall development process requires you to convert all the design elements you produced in the earlier stage into programming language once you reach the implementation stage (Singh et al., 2018). You must include each of these in the programming and software code, checking for problems through testing before progressively creating your finished product. Figure 6 and 7 show the Login coding for the implementation of the designed prototypes of the Login and each level of the application,

```

% Components initialization
methods (Access = private)
% Create Figure and components
function CreateComponents(app)
% Create Figure and hide until all components are Create
app.Figure = figure ('visible','off');
app.Figure.Position = [100 100 640 480];
app.Figure.Name = 'COMMUNICATION COURSE';
% create UserTextArealabel
app.UserTextArealabel = label (app.figure);
app.UserTextArealabel.HorizontalAlignment = 'right';
app.UserTextArealabel.FontSize = 18;
app.UserTextArealabel.Position = [213 228 48 23];
app.UserTextArealabel.Text = 'User: ';
% create UserTextArealabel_2
app.UsuarioTextArealabel_2= textarea(app.figure);
app.UsuarioTextArea.Position = [276 206 150 27];
app.UsuarioTextArealabel_2 = label (app.figure);
app.UsuarioTextArealabel_2.HorizontalAlignment = 'right';
app.UsuarioTextArealabel_2.FontSize = 18;
app.UsuarioTextArealabel_2.Position = [172 182 89 23];
app.UsuarioTextArealabel_2.Text = 'Password: ';
% create LoginButton
app.LoginButton = button(app.figure, 'push');
app.LoginButton.BackgroundColor = [0.651 0.651 0.651];
app.LoginButton.FontSize = 18;77;
app.LoginButton.FontColor = [1 1 1];
app.LoginButton.Position = [271 72 100 30];
app.LoginButton.Text = 'Login';
end
end
    
```

Figure 6 Login code

```

% Create Figure and components
function CreateComponents(app)
% Create Figure and hide until all components are Create
app.Figure = figure ('visible','off');
app.Figure.Position = [100 100 640 480];
app.Figure.Name = 'COMMUNICATION COURSE';
% create ReportLabel
app.ReportLabel = label(app.figure);
app.ReportLabel.FontSize = 18;
app.ReportLabel.Position = [282 409 59 23];
app.ReportLabel.Text = 'Recognition of Vowels ';
% create ReportLabel
app.ReportLabel = label(app.figure);
app.ReportLabel.FontSize = 18;
app.ReportLabel.Position = [282 409 59 23];
app.ReportLabel.Text = 'Recognition of the Alphabets';
% create ReportLabel
app.ReportLabel = label(app.figure);
app.ReportLabel.FontSize = 18;
app.ReportLabel.Position = [282 409 59 23];
app.ReportLabel.Text = ' Combined Words for First Graders';
app.figure.visible = 'on';
end
end
    
```

Figure 7 Code by application levels

3.4 Maintenance

After entering the fifth and final phase of the waterfall model, it is finally time to evaluate the results of the earlier phase and make the necessary adjustments (if needed) to complete the project (Tilloy et al., 2019). To ensure that the waterfall model adapts to changes in your environment, you may have to return to this phase several times. Table 2 shows the four questions asked of parents about the application, such as: What did you think of the application? Are you satisfied with the children’s application? Would you recommend using the application? Furthermore, what recommendations would you give to improve the application?

Table 2 Application questions

No.	Questions about the application
1	What did you think of the application?
2	Are you satisfied with the children’s application?
3	Would you recommend using the application?

4 Results and discussion

The thirty-five parents of the first-grade children were surveyed about what they thought of the application for teaching letters. The survey scale was as follows: one respondent answered "Bad", two answered "Fair", six answered "Good", and twenty-six parents answered, "Very good," as shown in Figure 8.

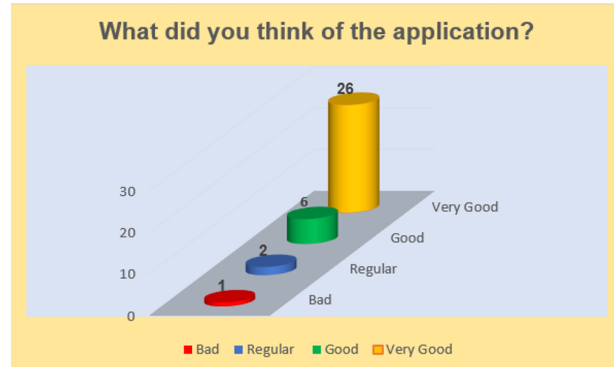


Figure 8 Graph of a survey on application appreciation

Figure 9 shows the survey results on whether they are satisfied with the application designed for the children. The following information was obtained: thirty-five parents at the primary level responded that they were satisfied with the application, and two parents were not satisfied.



Figure 9 Application satisfaction chart

Figure 10 shows the survey results on whether they would recommend using the application for learning letters for children at the primary level. In this way, the following information was obtained: thirty-three parents at the primary level responded that they would recommend the application, and one parent would not recommend it.

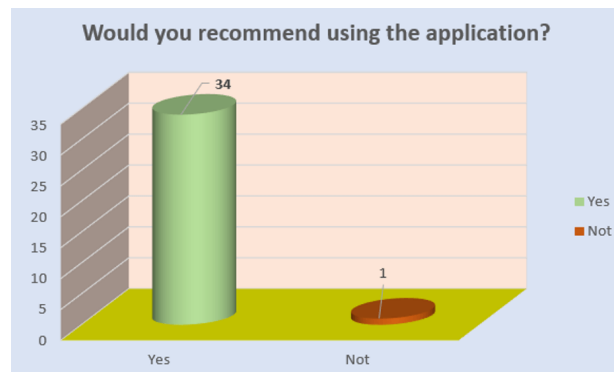


Figure 10 Chart on application recommendation

The authors (Kim, 2020) emphasize that handwriting, communication with peers, and explicit and complementary orthographic instruction can play an essential role in teaching writing and

speaking to young children who develop their text translation skills more slowly than their peers. Therefore, the research work was prototyping for teaching children at the first level, giving satisfactory results of all the questions surveyed to the parents of the family. In the recommendation of the application for the children of the primary level, it was possible to obtain the information that thirty-three parents of the primary level responded that they would recommend it with the application, and one parent would not recommend it.

5 Conclusion

In conclusion, the design of the prototypes for teaching letters at the primary level was created for children. The application of playful pedagogical practices resulted in considerable improvement since the communicative skills of reading and writing were reinforced. The ability to recognize the different phonemes that make up oral language, read phrases or short sentences and take simple dictations showed improvements. In addition, it was shown that when methodological playful tactics are used in the educational process, and the students are directly and actively included in conducting the exercises, they feel more motivated to read and write. For future work, it is recommended to implement the design of prototypes for teaching letters for primary school children as an Android studio for the different methodologies to improve children's learning in a didactic and intuitive way.

Conflicts of interest

The authors declare that they have no conflict of interest.

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