Adv Mobile Learn Educ Res, 2022, 2(2): 455-463
DOI: 10.25082/AMLER.2022.02.014

RESEARCH ARTICLE

School educational software designed for children with special education needs

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Received: June 28, 2022;
Accepted: August 22, 2022;
Published: August 26, 2022.

Citation: Paico Campos, M. M., & Andrade–Arenas, L. (2022). School educational software designed for children with special education needs. *Advances in Mobile Learning Educational Research*, **2**(2), 455-463. https://doi.org/10.25082/AMLER.2022.02.014

Abstract: The research focuses on children with special educational needs who cannot access an education either because they do not have a school near their homes or because parents misinform them that they can access Education regardless of their disability. Children are deprived of their right to Education by not receiving an education. Therefore, a prototype of educational software was designed, taking advantage of the technological tools for learning for children with special educational needs. A hybrid methodology and the Balsamiq tool were used, as they were the appropriate ones to develop the project. The result is that children with disabilities can learn by interacting with technology, and in the same way, their parents can visualize some exercises and crafts that can be done at home with their children since it is based on their educational needs.

Keywords: educational software, methodology hybrid, special education

1 Introduction

Inclusive Education is the model that seeks to meet the learning needs of children, adolescents and adults with disabilities. For example, if the student has a mild disability, he or she could transfer to a regular, inclusive school, where he or she should receive an education without restrictions like those without any disability (Katsaris & Vidakis, 2021). However, of 57,000 students, only 10,000 receive specialized assistance (Santamaria, 2017).

That is why having a child, family member or friend who requires Special Education does not prevent them from receiving a quality education. They often do not receive it in schools because of their disability which limits the child's ability to learn. For that reason, there are methods of learning that can be done from home; just as babies have early stimulation, Special Education can also grow and improve over the years (Hazen, 1978). As a result, special education teachers have been looking for the best way for their students to learn, solving the conflicts they go through regarding stimulation. We know that each child is different; while some may have a skill with musical instruments, others may have the art of drawing (Brownell et al., 2016).

Meanwhile, a study on educational software for children with attention deficit hyperactivity disorder (ADHD) pointed out that the use of technologies can be implemented so that it can be adapted to each person to achieve better learning. The first thing done in the software was to take a small test to see what stage the child is in; after that, it is advanced according to their educational needs (Mohammadhasani et al., 2018). Therefore, parents of special-needs students must be informed about their children's educational development and technology use. Education is based not only on attending school but also on support at home, where parents have an essential role in their children's Education (Zirkel & Hetrick, 2016). The importance of this work is to implement ICT (Information and Communication Technologies) in schools that have students with special needs. As we know today, the use of technology is significant because, through the Internet, we can find useful items, so we want to implement this strategy so that students can learn by playing. Also, it is necessary to know the difficulties and challenges of developing quality educational software for all children with special needs (Blau & Shamir-Inbal, 2016).

The use of technology at the time of implementation in Education must be didactic, like having textbooks with drawings, games, and educational videos that must be implemented at the time of developing an educational software so that the student feels attracted and can learn (Skaraki & Kolokotronis, 2022; Natalia et al., 2019). Considering what we must know about new technologies that can be used when teaching, we must learn from each challenge presented to develop educational software (Hernandez, 2017; Papadakis, 2020; 2022).

ICT is a powerful tool that can reduce the impact of disabilities or special educational needs, thus facilitating social inclusion and Education (Papadakis et al., 2020). Nowadays, technologies help people with disabilities improve their self-esteem and want to know more

(Konstantopoulou et al., 2022). At first, they thought they would not be able to understand the lessons but quickly realized that technological tools are compelling because they allow them to learn more accessible and, above all, very didactic and intuitive (Mamolo, 2022; Pappas & Drigas, 2015).

The objective is to design educational software so all children with special needs can access quality education, taking advantage of new technologies.

The present work is structured as follows; section number 2 will describe in detail the methodology used for educational software. Section 3 will show the results obtained and discussions, and finally, section 4 will present the conclusions and future work.

2 Methodology

In this research, a hybrid methodology was applied, which is the fusion of the methodology of soft systems and the methodology of Design Thinking, taking into consideration the first two stages, which are the section A and B of the methodology of soft systems and Design Thinking C, D, E and F.

2.1 Unstructured situation

In this stage, the problem causes are obtained by making a definition through an interview, survey or focus group with those involved. You can take tools such as the problem tree comprising the causes, the central problem, and the consequences of the problem. The first cause is that there are still children and young people with disabilities who do not attend school and, in most cases, do not have the necessary resources to receive a quality education, causing many children to be unable to study (O'hanlon, 2018). Also, there is a lack of trained professionals to take charge of a classroom with children with special needs. A specialized teacher will be able to perform in the best way when teaching a class (Hagaman & Casey, 2017).

Another more important cause is the lack of empathy between teachers and students. It is essential to generate a friendly bond in the classroom; a survey of parents noted that many times teachers fail to generate a friendly bond with their students, a student who has a disability and hugs you that means you are causing the confidence necessary to socialize (Jansen, 2018) as a fourth cause is the location of educational institutions. Finding a general education school is much easier than finding a special one; if they find one, it is too far away for most people with disabilities. Since technology is not being used to favour the student performance of children with special needs, it generates a significant problem since technology can be implemented during teaching and learning.

2.2 Structured situation

At this stage, all those involved and the materials, entities, and infrastructure involved in the research work are identified. For the research work, those involved are parents, children with special educational needs, the teacher, the school, and the Ministry of Education and all of this is represented by a pictorial graphic.

2.3 Define

Teaching a child with special needs is a challenge for teachers. Technology is driving significant and favourable change for teachers and students. That is why tablets, computers, cell phones, and whiteboards are being used as educational tools, becoming an enhancement to learning (Artacho et al., 2020). It has been proven that students with specific learning problems tend to pay more attention to a class where technology is used. Similarly, students with physical disabilities may access the use of technology as a learning opportunity. That is why it is imperative to know each student to know what their needs are; teachers, when looking for an application or educational website, should take into account that it is eye-catching, educational, and, above all meets the needs of students (Langher et al., 2017).

2.4 Idea

The aim is to design an educational software where the educational needs of the students can be met using the new technological tools. Bearing in mind that the design is essential since this way the students will feel attracted and will be able to use it with the more excellent facility, for that it has to consider that it must contain animated images, educational videos, games of learning and easy handling, without deviating from his needs of learning. The students will be able to learn how to play when using the software. In this way, we will be using a very applied strategy by the teachers at the time of teaching, since the student will not only see it as a responsibility, but it will also make him/her want to continue advancing. It is about motivating the students to be able to develop their learning (Piedade et al., 2020)

2.5 Prototype

The following tools were used for this work, as they are accommodating for developing what you want to design.

(1) Balsamiq. It is a tool that allows you to quickly and easily design interface designs for websites and mobile applications. That is why we will also use this software to design the prototypes, as we know it is a very creative and easy-to-use platform (Zhao & Shute, 2019).

(2) Photoshop. Thanks to this program, we will be able to make the design the creation of the images that go to our educational software. We will use its tools to make creative images that are of the pleasure of the children.

2.6 Evaluate

Results are expected where students can learn something new with the new technologies based on the requirements they need for their learning, as seen in Table 1.

Table 1 Expected results

Achievements	Results
The student likes the software	10%
Perform the activities correctly	40%
I manage to learn	50%
Total	100%

Therefore, in the research, the method that was applied is a hybrid (soft systems method and Design Thinking) where they apply some points that they consider to develop in the field of Special Education. Its main objective is to assist decision-making and provide motivation, socialization and understanding to choose the most appropriate options for each student in the established software.

3 Results and discussions

3.1 About the survey

After conducting the survey, we found that the right program was Google forms since it was easier to use and only with the link provided can send the necessary contacts to answer the questions raised (Chaiyo & Nokham, 2017).

A survey was conducted among 44 parents, where the following four questions were asked:

(1) Do you think it is crucial that the design of the software is eye-catching so that children can like it? The question was posed to the 44 parents; whether software design must be eye-catching to attract children. In Figure 1 of the 100%, 95.3%agreed, but 4.7% of the respondents disagreed that the design was important, causing that small proportion to disagree and only focus on the software being educational and that the design would not matter as much.

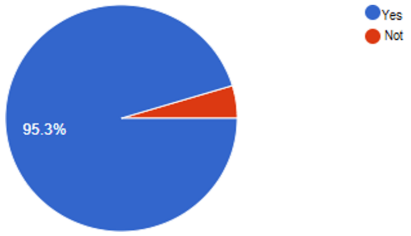

Figure 1 Importance of software design

(2) What should be used on a website developed for Special Education? In order to develop educational software, we have to know the students' primary needs, especially since the software to be developed is preferred by the students(Akopyan et al., 2019). When the question was asked about what should be used in a website developed for Special Education, three alternatives were shown, which were as followings:

(a) That it meets your educational needs;

(b) Make it educational;

(c) That it is only based on educational games.

Figure 2 shows that out of 100%, 58.1% want the software to meet the educational needs of the children, while 34% want it to. 9% was focused on that it is only creative, leaving aside the special educational needs, and only 7% wanted that they are only educational games. This generates a great controversy: perhaps, as parents, we forget that technology should be taken

advantage of for educational use. With these three alternatives to the question, we conclude that the alternatives can be joined, and to do that, the software this based on the educational needs, but not forget us. That it is creating this way, the students can use the technological tools.

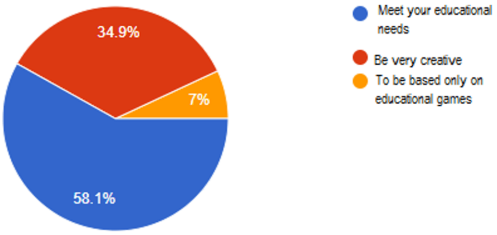

Figure 2 Tools for Software

(3) If you had a family member or friend who has a disability and does not attend school for X reasons, would you want him or her to learn through software? The rapid progress of technology makes us want to implement Special Education, but we must know the advantages and disadvantages of creating educational software (Frisancho & Delgado, 2018).

Therefore, in Figure 3, 100% of the parents agreed. This gives us to understand that technology can be used for Education, meeting the special educational needs children require.

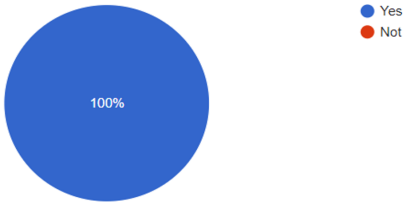

Figure 3 Importance of learning through technology

(4) As a citizen, what would you like the government to do for Special Education? In Figure 4, you can visualize the answers to the question that was planted to the parents to know what they would like the government to do for Special Education. The great majority of them pointed out building more schools specializing in Special Education so that the children can attend a school, but not forgetting the constant pieces of training to the teachers since it is necessary to have the teachers trained in Special Education (Kapaniaris & Zampetoglou, 2021). Suppose the state neglects to provide special Education for students with disabilities, which causes parents to be angry that a family member or friend with a disability cannot receive an education. In that case, the necessary information should also be promoted. Parents who have a child with Special Education needs at home are informed of the Education that should be provided at school and at home.

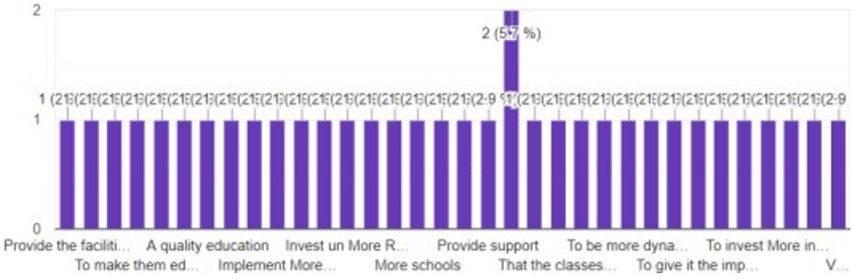

Figure 4 Importance of special education

Table 2 shows the results of the reliability analysis of the variables included in the software design in the model proposed in the study.

Table 2 Software design reliability analysis

Variables	Survey index
Importance of software design	Very high
Software tools	High
Importance of learning through technology	High
The importance of technology throughout Special Education	High

The study results have provided much relevant information about the reality of the experiences of young people needing special Education with ICT in the educational sector. At the same time, it shows that there is still a long way to go, and many obstacles must be overcome to create an actual knowledge society in the country with all the innovative emerging technologies.

3.2 About the prototypes

(1) Main Window: In Figure 5, you can see the main window of our prototype, which is divided into four areas in videos, games, tips and downloadable templates; we have made these four options as we consider them essential in teaching children, the student by selecting an option from the four presented will be able to see its content and learn. We want to reach out with this research on how much parents, students and teachers can access the technological tools through this software. Inclusive Education aims to improve all children with a disability, which is why we want to implement the technology to develop educational software to ensure that children learn in a didactic way (Timpane-Padgham et al., 2017).

Figure 5 Main window

(2) Videos Window: Implementing educational videos when teaching is a teaching strategy to promote better learning (Christ et al., 2017).

Figure 6 shows the option of videos, where parents can be involved in their children's learning. We will find options for physical exercises, motor, crafts and games that parents can apply at home with their children. We know that for a child to learn, the parent has to be aware of his or her Education and that better than doing so, he or she should participate in the use of educational software.

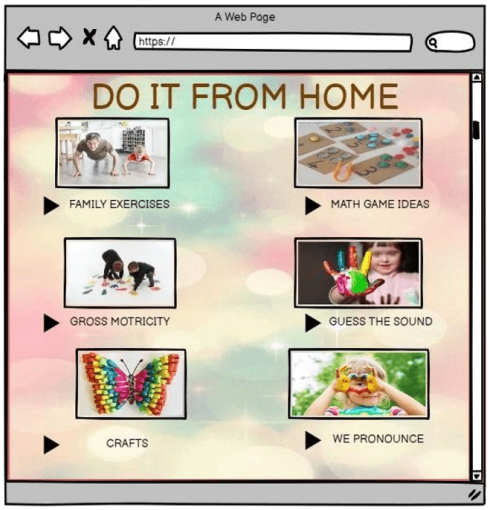

Figure 6 Main window

(3) Tips Window: In Figure 7, this is the option of advice. As parents, we have many doubts at the time about being able to teach our children, which is why this option was implemented to be able to guide our children during the time of learning with the use of educational Tips. The software also is to disposition for the teachers in this window also counts on advice so that the teachers can elaborate a suitable class for the children with special educative needs. If a student has 3 hours of classes.

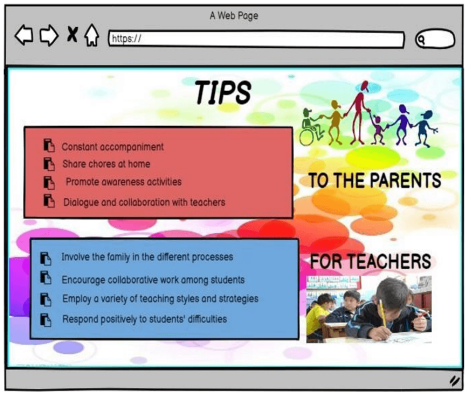

Figure 7 Tips window

(4) Games window: An educational video game is an interactive multimedia material from which you can learn one or more topics. The possibility of incorporating video games into Education has been a much-discussed topic. We know that all children spend much time on their cell phones, making it a vice that prevents them from concentrating on their tasks, but if we mix a video game with Education, we will achieve that the child learns how to play whose content has to be of introductory courses (Kauffman et al., 2018).

Figure 8 shows the window of educational games. When carrying out this implementation, we had the results obtained from the survey, where the parents pointed out that it was essential to implement the educational software games, as we know all children like games either through a computer or by cell phone, seeing this great advantage was raised to put educational games, it was not easy to find the right ones. However, we took into account the main curricular courses, such as the area of mathematics and communication, to evaluate children's intellectual development using educational games.

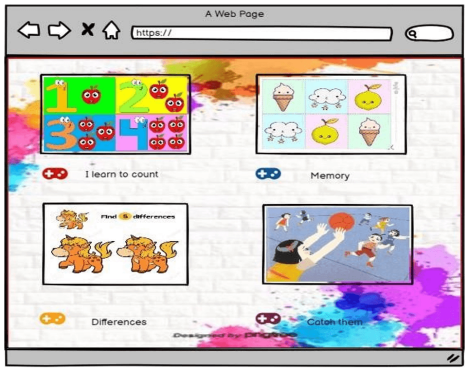

Figure 8 Games window

(5) Downloadable templates window: Figure 9 shows the window of downloadable templates. Consulting with some teachers, it became known that each class has a downloadable template of the course taught as a strategic way to see if students learned in class. That is why it was decided to put this window so that children can continue learning from home with the help of their parents, as the main courses are the curricular areas of mathematics and communication, so they can continue learning without the use of the software.

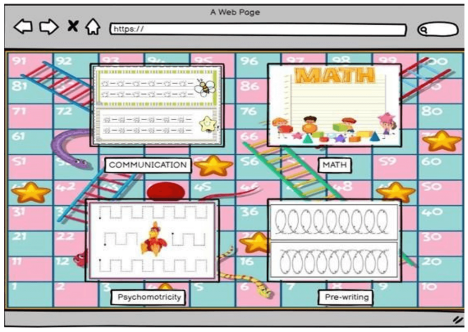

Figure 9 Downloadable templates window

3.3 About the methodology

(1) Advantage: The advantage of using a hybrid methodology is that they execute robust yet flexible practices to detect potential threats and improvements during the project research. For this reason, using a hybrid methodology is simple and easy to understand and use. This will guarantee the success in the implementation of the project since it will allow us to develop step-by-step research from studying the field where we will carry out the research and looking for the causes of the problem until looking for a solution with what we want to arrive with our research (Xu & Zammit, 2020)

(2) Disadvantages: Although the hybrid methodology is very agile and flexible, have not yet been tested in large information systems because they are new to the market, and companies are a little afraid to use them because of the lack of experience also involved only focus on software development this generates a disadvantage when using it.

(3) Comparison: A hybrid methodology has been used and not the Scrum methodology because this methodology allows and adapts better than the scrum methodology. Since the scrum methodology is more for software development than the white systems methodology, the Design Thinking methodology allows one to know the structured and unstructured situations, define, devise, prototype, and evaluate. It allows working in an orderly manner, knowing each process until the expected result is reached, generating that the research is very flexible when making a change to correct or improve it.

The use of technology in special Education is growing, increasingly used to facilitate student learning, not only through tools for teachers but also with resources, whether to help students understand, comprehend or express confidentiality (Kalogiannakis & Papadakis, 2017a; 2017b). When a child, who is also an adult, has a disadvantage or learning difficulty compared to other peers and therefore requires additional support to achieve optimal educational development (Kalogiannakis & Papadakis, 2020). That is why we created the prototypes of the educational software that will be used to test a design that we can run briefly on a web page. It is a product to reproduce later or test the product to detect errors and think about how we can improve it.

4 Conclusions

In this research, we managed to design the prototype of the Educational Software with the Balsamiq tool that shows what the software will contain, helping to achieve that all children with a disability can access Education through technology. The method applied was very agile; therefore, it was sought that the designed prototypes were so actual that you can appreciate how the educational software would be understood by meeting all the needs that involve a student with special educational needs. That is why the Balsamiq tool was used. In the end, we saw good results with the design of the software prototype. With this, we want to continue implementing Special Education so that all children can access Education using new technologies.

The research scope is to design software for special Education. It is recommended for future work to continue researching to solve the needs of children with special needs, seeking a benefit for all those in need with the support of the Ministry of Education and parents who are directly involved so that they can continue to learn and improve their Education using new technologies that are appropriate for Special Education.

Conflicts of interest

The authors declare that they have no conflict of interest.

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