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LEAR+: Learning aid

LEAR+: Auxílio à aprendizagem

LEAR+: Ayuda para el aprendizaje

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Abstract:
This article aims to address the development of an application designed to assist teachers, providing playful activities for elementary school students. The application aims to make the learning experience more engaging and fun, combining technology with pedagogy. In the context of this project, we identified issues that affect the educational system, such as the lack of proximity and significant interest in subjects. Given this, an effective approach to improving the reading and writing skills of primary school children involves combining daily reading practices, interactive activities, and encouraging creativity in writing, creating a stimulating and encouraging learning environment. The development of the project will be based on bibliographical research, which uses materials published by other authors, such as books, articles, and information available on the internet. Based on this research, which highlights the importance of rethinking teaching methods to promote student engagement and the use of technology as support, the objective of this project is to develop a learning platform that employs playful and interactive methods to improve the teaching process and learning, encouraging student participation and involvement, in addition to facilitating the assimilation of the content covered.

Resumo:
Este artigo tem como objetivo abordar o desenvolvimento de um aplicativo destinado a auxiliar professores, disponibilizando atividades lúdicas para alunos do Ensino Fundamental I. O aplicativo visa tornar a experiência de aprendizagem mais envolvente e divertida, combinando a tecnologia com a pedagogia. No contexto deste projeto, identificaram-se questões que afetam o sistema educacional como a falta de proximidade e interesse significativo nas matérias. Diante disso, uma abordagem eficaz para aprimorar as habilidades de leitura e escrita de crianças do Ensino Fundamental I envolve a combinação de práticas de leitura diárias, atividades interativas e o estímulo à criatividade na escrita, criando um ambiente de aprendizagem estimulante e encorajador. O desenvolvimento do projeto baseou-se na revisão bibliográfica que utiliza publicações de outros autores como livros, artigos e informações disponíveis na internet. Com base nestes materiais, que destacam a importância de repensar métodos de ensino para promover o engajamento dos alunos e o uso da tecnologia como apoio, o objetivo deste artigo é desenvolver uma plataforma de aprendizagem que empregue métodos lúdicos e interativos para aprimorar o processo de ensino-aprendizagem, incentivando a participação e o envolvimento dos alunos, além de facilitar a assimilação dos conteúdos abordados.

Resumen:
El objetivo de este artículo es desarrollar una aplicación diseñada para ayudar a profesores proporcionándoles actividades divertidas para los alumnos de primaria. La aplicación pretende hacer más atractiva y divertida la experiencia de aprendizaje combinando la tecnología con la pedagogía. En el contexto de este proyecto se identificaron problemas que afectan al sistema educativo, como la falta de proximidad y de interés significativo por las asignaturas. Por ello, un enfoque eficaz para mejorar la capacidad de lectura y escritura de los niños de primaria consiste en combinar la práctica diaria de lectura, actividades interactivas y el estímulo de la creatividad en la escritura, creando un entorno de aprendizaje estimulante y alentador. El desarrollo del proyecto se basó en una revisión bibliográfica a partir de publicaciones de otros autores como libros, artículos e información disponible en Internet. A partir de estos materiales, que enfatizan la importancia de repensar los métodos de enseñanza para promover el compromiso de los estudiantes y el uso de la tecnología como soporte, el objetivo de este artículo es desarrollar una plataforma de aprendizaje que emplee métodos lúdicos e interactivos para mejorar el proceso de enseñanza-aprendizaje, fomentando la participación e implicación de los estudiantes, además de facilitar la asimilación de los contenidos tratados.

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1. INTRODUCTION

Nowadays, technology is ubiquitous in all aspects of our lives. Knowing this, education is emphasized, which is fundamental for human and social development. Through it, we acquire knowledge, develop new skills, and expand our understanding of the world around us. Just as Mandela (1994) emphasized: In the information age, knowledge is power. Education is the most powerful weapon you can use to change the world.

Given the relevance of teaching as a source of knowledge, it is possible to highlight the obstacles that educational institutions face during the learning process. Within this perspective, we can identify several testimonies that focus on the importance of elementary education and innovative methods to motivate students to get involved and show interest in academic activities.

> *What often happens is that the school offers teaching that does not interact with the student's world. The student, then, does not see himself represented in what is being taught and is unable to establish a meaningful connection with the content, which ends up generating disinterest and a lack of motivation to learn. (Freire, 1987)*

Within this scenario, the importance of reevaluating and expanding the variety of educational methods becomes evident. With the implementation of this specific project, we intend to support educators by providing resources that are captivating and engaging, with the potential to generate significant long-term results. As the authors Silva and Oliveira (2020) state, the use of playful activities in the classroom has shown positive results in the teaching and learning process, as they attract students' attention and encourage them to participate more actively.

2. THEORETICAL FOUNDATION

In this segment, we will expose a conceptual basis, disagreeing on the essential topics that enrich the study, as well as the technologies used in creating the project.

2.1. TECHNOLOGIES USED

In developing the project, the Tkinter, Custom Tkinter, and Kivy programming languages were used for Android development to implement features and achieve the proposed objectives. Several aspects were emphasized and one of them involves compatibility with platforms, being the aspect with the highest priority. As stated by Castells (2002), the internet is not just a technology, but also a language, a means of communication, a culture, and a new way of thinking.

From this statement provided earlier, the essential languages and tools for the project were examined. As noted by Ramalho (2015), Python stands out due to its design philosophy, which emphasizes code readability and clarity. It further reinforces that Python is a high-level, general-purpose programming language. Aware of this, Python was used as one of the project's languages, being widely used in software development, data analysis, automation, and several other applications. Ramalho (2015) emphasizes that Python is valued for its clear syntax, support for object-oriented programming, and for having a vast community of developers, making it a popular choice for both beginners and experienced professionals. This resulted in a code that was easy to build, understand, and maintain, thus providing a solid foundation.

For the development of graphical interfaces, Tkinter was used as it is a Python library that helps in creating graphical user interfaces (GUI). This library allows you to create windows, buttons, text boxes,

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and other interface elements intuitively. As highlighted in the Python (2023) documentation, Tkinter is not just a thin wrapper; it adds its logic to enrich the Python programming experience. So, the Python (2023) documentation goes on to say that Tkinter is widely used in developing applications with user interfaces, simplifying the creation of programs that involve visual interactions with the user. It is a popular choice among Python developers who want to create applications with graphical interfaces.

As a complement to the Tkinter library, CustomTkinter is another user interface (UI) library that was used. According to the Python documentation (2023), this library offers a wide range of customizable and modern widgets for creating attractive, customizable, and unique interfaces, it expands the capabilities of Tkinter, allowing developers to customize the appearance and behavior interface elements according to your specific needs. Again, being stated by the Python documentation (2023), CustomTkinter provides a consistent and contemporary appearance across all platforms.

Below is shown the prototyping of the menu screen made in Tkinter and CustomTkinter.

Figure 1 – Example Tkinter Menu and Custom Tkinter Screen
Source: From the author himself, 2023.

Exploring beyond graphical interfaces, Kivy was introduced into the project as a library used for Android development. The hallmark of Kivy is its ability to write code once and run it across multiple platforms, providing a consistent user experience. As highlighted in the Kivy documentation (2023), this open-source platform allows for the agile development of applications with innovative interfaces, especially aimed at multi-touch applications. This platform is often chosen by developers looking to create mobile apps, games, and other applications with dynamic, feature-rich user interfaces. As mentioned in the Kivy (2023) documentation, Kivy offers the flexibility of writing your code just once and running it on multiple distinct platforms, making it an effective choice for developing applications with engaging and interactive interfaces.

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Below is the same screen as the prototyping in Tkinter and CustomTkinter, but done using the Kivy library.

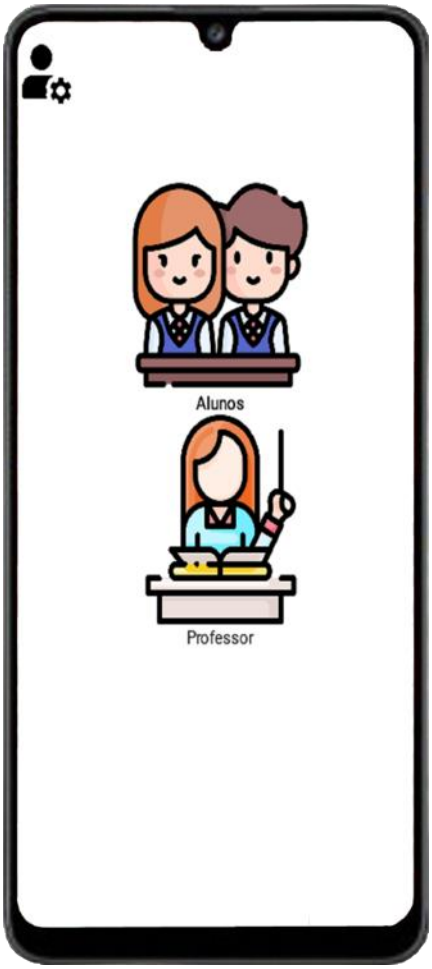

Figure 2 – Kivy Menu Screen Example
Source: From the author himself, 2023.

The project contains non-relational databases, often referred to as NoSQL (Not Only SQL). As highlighted by Moura and Casanova (1999), non-relational databases increase productivity in application development, facilitating the sharing of information between users. It is a Database Management System (DBMS) that differs from traditional relational databases. They do not follow the model of rigid tables and schemas, instead, they allow flexibility in storing and retrieving data, often using structures such as documents, graphs, or key-value pairs. The authors Moura and Casanova (1999) emphasize again that NoSQL did not come to replace SQL, but rather to offer another alternative for a more flexible database in data support, thus reinforcing the importance of this approach in the data management scenario. data. NoSQL databases are useful when dealing with large volumes of data, semi-structured data, or in rapid development scenarios where the data structure may change frequently. They are widely adopted in web applications, big data analytics, and distributed storage systems. Moura and Casanova (1999) emphasize that NoSQL did not come to replace SQL, but rather to offer another alternative for a more flexible database in data support, thus reinforcing the importance of this approach in the data management scenario.

To complete the development, Firebase was used. According to the Firebase (2023) documentation, Realtime Database is a NoSQL database designed for storing and synchronizing data. This database offers automatic synchronization between devices, efficient scalability, and features such as instant updates. Being a mobile and web application development platform provided by Google, this platform encompasses a variety of services including a real-time database. The Firebase (2023) documentation

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states that it is a platform that simplifies the implementation of essential features such as user authentication, data storage, and messaging.

2.2. UML

The Unified Modeling Language or Unified Modeling Language (UML), known as is a visual system applied to the construction of software that is based on the object orientation pattern. It represents a general modeling language, suitable for use in a wide range of application fields. Guedes (2018) states that it is currently the most common and internationally accepted language by the software engineering industry for modeling purposes. As highlighted by Guedes (2018), UML plays a crucial role as a universal modeling language, providing an effective approach to the visual representation of software systems. UML is an essential tool in software engineering, helping to document, design, and communicate the requirements and design of complex systems, as explained by Guedes (2018).

2.2.1.USE CASE DIAGRAMS

A use case is a representation of the interactions between a system and its actors, describing a sequence of actions that produce an observable result as described by Guedes (2018).
As Guedes (2018) confirmed, the use case diagram aims to present a general external view of the functionalities that the system should offer to users. It is important to highlight that the use case is a specification of a specific flow of events in the system. Guedes (2018) continues to state that the main objective of Use Cases is to identify and describe the system's functional requirements clearly and understandably way. This technique was introduced by Ivar Jacobson in his methodology for developing object-oriented systems, known as OOSE (Object Oriented Software Engineering).

2.2.2.ACTIVITY DIAGRAMS

The activity diagram is a graphical representation that describes the flow of activities or processes in a system, emphasizing the control of actions and decisions made during execution. This type of diagram is valuable for modeling business logic and procedures within a system, showing how activities are related and how execution progresses. It is widely used in software engineering and business processes to document and analyze workflows, providing a clear and organized view of how tasks are performed. As Guedes (2018) emphasizes, the activity diagram is concerned with describing the steps to be taken to complete a specific activity.

2.2.3.SEQUENCE DIAGRAMS

A sequence diagram is a graphical representation that illustrates the interaction between objects in a software system. It describes the order and exchange of messages between these objects over time, providing a sequential view of interactions. This tool is especially useful for understanding the flow of execution and message exchanges in complex systems, aiding in design, debugging, and effective communication between development team members. Guedes (2018) explains that the activity diagram is concerned with describing the steps to be taken to complete a specific activity.

2.2.4.CLASS DIAGRAMS

A class diagram is a visual representation that describes the structure and relationships between classes in an object-oriented system. Guedes (2018) highlights that the class diagram is one of the most important and used in the UML. It is an essential tool in software modeling, highlighting classes, their attributes, and methods, as well as the associations between them. Additionally, the class diagram shows inheritance and interfaces, providing a clear view of the system architecture. Through rectangles that represent classes and lines that indicate connections and associations, the class diagram helps to document and visualize the structure of a system, helping developers understand and communicate the relationships between software components.

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3. MATERIALS AND METHODS

To carry out this project, some specific technologies and tools were used, such as, for the scope, the Astah tool, in which the use case, activity, sequence, and class diagrams were created. After this step, low and high-fidelity wireframes were created using the Figma tool and based on them, prototyping was started in Visual Studio Code with the Tkinter and CustomTkinter libraries, both available in the Python language. With the interfaces duly complete, programming of the application's interfaces began, which were carried out using the Kivy library, also available in the Python programming language.

4. RESULTS AND DISCUSSION

To carry out the research, it was necessary to base it on a question: is there a way to help primary 1 children improve their reading and writing skills?

Castells (2002) highlights the transformation of the internet in the way we learn and teach, it expands the horizons of knowledge and education, allowing people to access content and information that was previously limited to a few people.

Being aware of this issue and the need for a solution for primary 1 students, the impetus for the result to happen was to use something that engaged children more easily, this makes the barrier between educator and student smaller. The teacher delivers his teaching method playfully and attractively, facilitating the student's development. Finally, the aim of supporting and reinforcing how children pay attention can occur positively, as the activities are carried out with pleasure and enthusiasm regardless of the assigned task and, consequently, reduces the teachers' difficulty about their imperativeness.

5. CONCLUSION

The application that was developed proves to be an effective tool in the children's learning process. The playful lessons offered by the application provide a stimulating and fun learning environment, in which children can assimilate and retain knowledge more efficiently.

We conclude that the development of an application to help children learn will be carried out with playful and simple lessons. It is a promising and relevant approach in the educational context, making it possible to create a dynamic, accessible, and personalized learning environment, contributing to children's cognitive development and interest in studies.

APPRECIATION

We express our sincere gratitude to our beloved family members, whose constant support and unwavering encouragement have been guiding lights throughout the entire journey of this project. Your words of encouragement and constant presence were true anchors, providing the strength we needed to achieve our goals.

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Due to the constant increase in the number of vehicles in circulation around the world, challenges arise in traffic, especially in its management and access control in parking lots, both in public and private places. This is especially seen in densely populated regions, such as the state of São Paulo.

According to data from the Secretaria Nacional do Trânsito (SENATRAN), in 2022, the fleet of vehicles registered in the country exceeded 115 million, with approximately 35 million of these vehicles being in the state of São Paulo.

This excessive number of vehicles in a single region justifies the problems of congestion and difficulties in access control. Given the data presented, the question arises: what can we develop to solve these problems related to traffic management?

This project aims to develop a simulation of a license plate recognition system, aiming to automate access control in condominium parking lots. Thus allowing the optimization of the entry process and an improvement in traffic management.

The system has an application for controlling data related to the condominium. In addition to a device that performs the identification of vehicle license plates and the possible release of the vehicle to access the place.

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