

## PREPTEC: Aid platform for vestibulinho Etec

*PREPTEC: Plataforma de ajuda para o vestibulinho Etec*

*PREPTEC: Plataforma de ayuda para la prueba de acceso a Etec*

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**Apresentado em:**  
05 dezembro, 2023

**Evento:**  
6º EnGeTec

**Local do evento:**  
Fatec Zona Leste

**Publicado em:**  
28 fevereiro, 2024

**KeyWords:**  
Entrance exam.  
Etec.  
Aid.  
Vocational.

**Palavras-chave:**  
Vestibulinho.  
Etec.  
Auxílio.  
Vocacional.

**Palabras clave:**  
Prueba de acceso.  
Etec.  
Ayuda.  
Vocacional.

**Citação:**  
Val, A. I. A.; Bastos, E. P.;  
França, G. S.; Rocha, A. M.  
S. e Lima, J. R. (2024).  
PREPTEC: Aid platform  
for vestibulinho Etec. In:  
EnGeTec em Revista, n. 1,  
v. 1, 108-115.



### Abstract:

This article has the objective of approaching the development of an aid platform for Vestibulinho Etec that has a mock test and a vocational questionnaire, both to help students prepare for Vestibulinho's exam. For such a project, some problems that are present in the Brazilian scholastic context were exposed, like the lack of orientation, teachers, and the presence of various elementary school students' doubts. The project uses some methodologies to improve its veracity, like the bibliographic research to aid the basis of the information displayed in this article, the qualitative research to considerate the students' emotions and feelings, and lastly, the exploratory-descriptive method to aid with the familiarization of the discussed problem. The project seeks to help the people who will accomplish the Vestibulinho Etec, it also seeks to contribute to the choice of a course present in the institutions through the availability of a vocational questionnaire. Through this project, considering its main objective, it's understood that it is possible to aid the formation of new professionals and elevate the education level for those who are ready and willing to have a higher education quality.

### Resumo:

Este artigo apresentará o desenvolvimento de uma plataforma de auxílio aos candidatos ao Vestibulinho Etec na qual estão disponíveis um simulado do próprio Vestibulinho Etec e um questionário vocacional, ambos voltados para auxiliar o preparo do candidato em relação à prova do Vestibulinho. Para tal, foram expostos alguns problemas presentes no contexto escolar brasileiro como a falta de orientação e de professores que geram dúvidas em muitos alunos do Ensino Fundamental II – público-alvo deste processo seletivo. O estudo utiliza algumas metodologias para fortalecer sua veracidade, como a pesquisa bibliográfica para auxiliar no embasamento das informações exibidas ao longo do artigo, a pesquisa qualitativa para considerar as emoções e sentimentos dos estudantes, e por fim, o método exploratório-descritivo para auxiliar na familiarização do problema discutido. O projeto busca ajudar as pessoas que realizarão o Vestibulinho Etec, além de contribuir com a escolha dos candidatos dos cursos presentes nas instituições por meio da disponibilização de um questionário vocacional. Por meio deste projeto, considerando seu objetivo, é compreendido que é possível auxiliar na formação de novos profissionais e elevar o nível da educação de quem se prontifica e anseia por um ensino com maior qualidade.

### Resumen:

Este artículo presentará el desarrollo de una plataforma de ayuda a los candidatos de la Prueba de Acceso a Etec en la que se dispone de una prueba simulada elaborada a partir de la propia Prueba de Acceso a la Etec y de un cuestionario profesional, ambas destinadas al auxilio del candidato con relación a la prueba de Vestibulinho. Para esto, se expusieron algunas problemáticas presentes en el contexto escolar brasileño, como la falta de orientación y de profesores que resultan en las dudas de varios alumnos de la secundaria – público destinatario de este proceso de selección. El proyecto utiliza algunas metodologías para fortalecer su veracidad, como la investigación bibliográfica para respaldar las informaciones que se muestran a lo largo del artículo, la investigación cualitativa para considerar las emociones y sentimientos de los estudiantes y, finalmente, el método exploratorio-descriptivo para auxiliar a familiarizar el problema discutido. El proyecto busca ayudar a las personas que realizarán el Examen de Ingreso Etec, así como contribuir con la elección de los candidatos a los cursos de las instituciones mediante un cuestionario profesional. Teniendo en cuenta el objetivo de este proyecto, se entiende que es posible contribuir a la formación de nuevos profesionales y elevar el nivel educativo de aquellos que están dispuestos y deseosos de una educación de mayor calidad.

## 1. INTRODUCTION

Many schools from everywhere can have problems that affect the environment, teachers, and students. According to the Tribunal de Contas do Município de São Paulo (2019), 45% of elementary schools in the state of São Paulo had a lack of teachers. In addition, the Todos Pela Educação Institute (2019) reported that 92% of students would like to focus on a single area during their studies, and 98% of them want better preparation for the labor market. By developing a website to help those students, the problems mentioned before can be solved and the Vestibulinho Etec candidates will have an aid for the exam, considering that the website is accessible and practical.

The proposed website consists of making available a platform for the candidates that offers a mock test, it contains questions from previous Vestibulinho's exams to train and test the student knowledge. Along with the availability of the mock test, a graphic that the results of the students is present on the website, allowing students to see their growth.

Another functionality proposed to the website is the offered vocational questionnaire, it aids the students with their vocational choice and directs them to an area that best suits their interest, skills, and personalities.

The website also counts with an informational page about Etec, where you can read about what is Etec and the exam to enroll in, the modalities of the courses, the technological axes, and the units from the city of São Paulo using the My Maps tool.

## 2. THEORETICAL FOUNDATION

In this chapter, seeking to give more explanation of the project, some fundamental technologies and knowledge were used to support the project and the information gathered.

### 2.1. ETEC

According to Centro Paula Souza, the State Technical Schools (Escolas Técnicas Estaduais in Portuguese), also known as Etec, are government education networks that provide technical courses, specialization, and high school that help the students by preparing them for the labor market. To enroll in Etec, the student must attend an exam called Vestibulinho Etec, which, according to the official website of Vestibulinho Etec (2023), is a multiple-choice exam to enroll in Etec.

In the news portal São Paulo Governo do Estado (2023), it is said that the Vestibulinho Etec exam is composed of fifty (50) multiple-choice questions that involve school subjects like Portuguese, math, human sciences, and natural sciences.

### 2.2. VOCATIONAL QUESTIONNAIRE

The project used the multiple intelligence theory by Howard Gardner to build up a vocational questionnaire. Baquião (et al., 2021) define vocational orientation as a test that can have various multiple-choice questions, that help the person answering to identify some possible careers that fit the most for them.

The multiple intelligence theory is described by Antunes (1998) as a form of competence and information processing that covers specific areas of the brain. According to Gardner (et al., 2010), there are nine (9) types of intelligence, they are linguistic, bodily-kinesthetic, logical-reasoning, interpersonal, spatial, intrapersonal, musical, naturalist, and existential.

Another part of the project's vocational questionnaire is the answering method, it uses the Likert scale and, as said by Lucian and Domelas (2015), it's a scale that makes it possible to identify the meaning and intensity of an attitude. It is possible to see an example of the Likert scale applied in the project's website within the next figure.

The image shows a screenshot of a web-based vocational questionnaire. At the top, there is a header with a logo of a hand holding a graduation cap surrounded by colorful dots, and the text "Questionário Vocacional". Below the header, the statement "Tenho facilidade em escrever poesias, redações e histórias." is displayed. Underneath the statement, there are four radio button options arranged in a 2x2 grid: "Discordo Muito", "Discordo Pouco", "Concordo Pouco", and "Concordo Muito". At the bottom of the form, there are two blue buttons labeled "Anterior" and "Próximo".

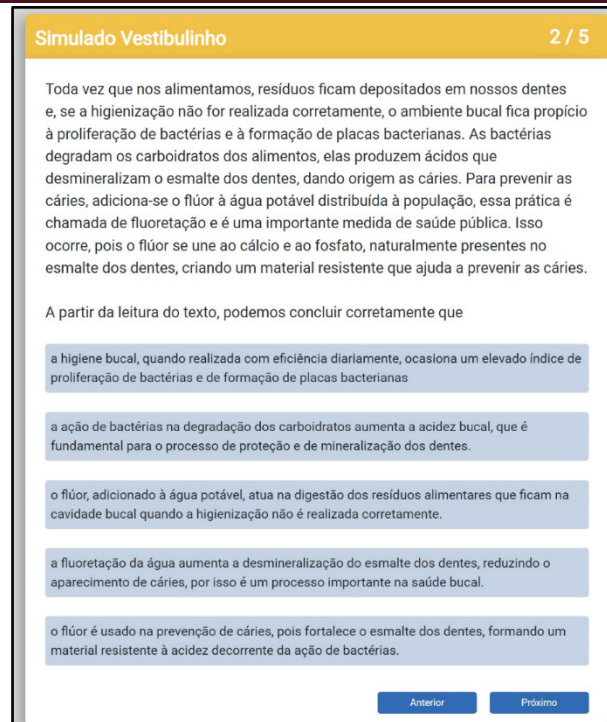
Figure 1 – Applied Likert Scale  
Source: By the Author (2023)

The image shows the vocational questionnaire's page, with an interrogation, that, in loose translation, would significate "it's easy for me to write poetry essays and stories", the Likert's scale is below, with four (4) options, that significate, in sequence: totally disagree, disagree, agree and totally agree.

### 2.3. MOCK TEST

One of the methods used to train and test the student's knowledge was the mock test based on the Vestibulinho Exam. It is said by Junior and Costa (2009) that exams (or mock tests) are forms of verification of what was learned by the student. Furthermore, Luckesi (2011) says that the exam result can be changed based on the aid materials a person has. Another quote from Portela (et al., 2021) explains that it is possible to use learning virtual environments. This project's mock test is based on the Vestibulinho Etec exam, and it uses the four (4) main subjects, which according to the official website of Vestibulinho Etec (2023) are: Portuguese, math, human sciences, and natural sciences.

The mock test also provides a multiple-choice system that Sant'Anna (2002) explains as the choice of an answer between various choices. Those alternatives, according to the official website of Vestibulinho Etec, are present in the exam, being made of five (5) possible answers where only one (1) is correct, an example of this can be found on our website in the mock test page, as showed in the image bellow.



**Figure 2 – Applied multiple-choice system**  
Source: By the Author (2023)

In the image, it is possible to see an example of a question that appeared on the Vestibulinho exam displayed on the project's website, the text explains the importance of oral hygiene and asks the student what can be concluded by reading, then, it gives them five (5) options where there are four (4) wrong and only one (1) right, in that case, the last one is the correct choice.

## 2.4. REQUIREMENTS ANALYSIS

When building up this project, a requirement analysis was done to see which functionalities were needed. It is said by Fowler (2007) that the requirements analysis is an important step to comprehend how the system works as well as the expectations of the clients upon that system. To gather those requirements, according to Guedes (2008), it is necessary to interview the client, where the developer seeks to understand the requirements of the system through some questions. Those requirements are divided into two (2) groups, the functional requirements (FR) and the non-functional requirements (NFR). According to Valente (2022), the functional requirements, as the name says, are the system's functionalities, in other words, the main functions that the client wants the system to do. The non-functional requirements are restrictions, conditions, consistencies, and validations that must be applied to the functional requirements (GUEDES, 2018). In Other words, the non-functional requirements are characteristics of the functionalities that are present in the system, like performance, accessibility, and even security.

It's also important to highlight that the requirements are very important to elaborate the diagrams. The author Fowler (2007) quotes, for example, that requirement analysis aids with the visualization and interaction between the user and the system.

## 2.5. BEHAVIORAL DIAGRAMS

The behavioral diagrams used on the project were built based on the requirement analysis and they help with the visualization of how the system works.

There are some types of diagrams help with the visualization of the system, like the behavioral one that, according to Booch (et al., 2012), is a visual representation of the system's behavior in different situations. Some of the behavioral diagrams are the Use Case diagram, the Sequence diagram, and the Activity diagram.

The Use Case diagram helped this project to build the other diagrams quoted before. According to Guedes (2018), this diagram allows us to see a general view of the system, showing the interactions between the actor and the system. Fowler (2007) says that an actor is like a character that acts as the system. Lastly, the use case diagram has some ellipses that are named Use Case, Guedes (2008) explains that they are the system's functionalities, they are gathered in the requirements analysis.

The Sequence diagram is, according to Guedes (2018), based on the Use Case diagram and the Class diagram, they both help with the identification of objects and classes involved in the process. The Sequence diagram is also explained by Booch (et al., 2012) as a diagram that illustrates a dynamic view of a system, representing the roles and instances that send and receive messages. Those messages, according to Guedes (2018), show the events that normally force a call-up of a method in any object in the process. The messages can be divided into two types: synchronous and asynchronous. Booch (et al., 2012) say that the synchronous message needs to wait for a response to continue the process. The other message type – asynchronous, is explained by Fowler (2007) that it is a message that doesn't need to wait for a response to continue the process.

Lastly, the Activity diagram, according to Guedes (2018), has an objective to describe the steps needed to conclude an activity, highlighting the control's flow and the objects involved. Fowler (2007) explains that the Activity diagram is a visual representation of the activity's flow in a system that shows the executed actions and the sequence between them, including the objects within.

## 2.6. STRUCTURAL DIAGRAMS

Another type of diagram that was used when building up the system is the structural diagram type. According to Booch (et al., 2012), the structural diagram performs a fundamental role in the visual representation of a static structure of a system. One of the diagrams presented in the structural type is the Class diagram which, as explained by Guedes (2018), illustrates the system's classes and its structural organization, as well as its attributes and methods. The classes, as said by Booch (et al., 2012) is the description of an object group that shares the same attributes, operations, relationships, and semantics. The Class diagram also presents some relationships between the classes, Fowler (2007) quotes that those relationships can be represented through associations, aggregations, compositions, generalization, dependency, and more. Each one of them has a specific purpose.

## 2.7. PROGRAMMING LANGUAGES

Considering the objective of making the website of this project accessible for most students, the programming languages used for coding the visual part were HTML, CSS, and JavaScript. The author Ferreira (2013) says that HTML stands for HyperText Markup Language and it is used to create web pages through the marking of contents. Duckett (2011) says that CSS stands for Cascading Style Sheets, and it allows us to make rules that specify how content or elements will be presented on the web page. And lastly, the JavaScript language is explained by Iepsen (2018) as a language that allows one to define the element's behavior of a web page.

For the server side of the project where all the data is gathered and stored, PHP was used as the programming language and MySQL was used as the database. According to Welling and Thomson (2005), PHP stands for Hypertext Preprocessor and it's a web programming language made to create scripts that make a connection with the server. Bento (2010) explains that it allows the data capture that is put in web pages' forms. Following up with MySQL, it is said by Welling and Thomson (2005)

that it is a DBMS or Data Base Management System that uses the programming language SQL. Bento (2010) says that MySQL has the role of saving information as if it were a database, in other words, all the data registered is stored inside of it.

### 3. MATERIALS AND METHODS

To finalize the project presented in this article, some methodologies were used to aid the structure and organization of it, providing a project with more quality and efficiency. The methods and research used were bibliographic research, qualitative research, and exploratory-descriptive methods.

The Qualitative research, according to Gil (2008), is a study the considerate the feelings, emotions, behavior, and personal life experiences from people. With that research, it was possible to extract information about the difficulties and problems that students go through while preparing for or attending Vestibulinho's exam. The next research utilized was bibliographic research, which according to Amaral (2007), it's when research is based on bibliographical sources like books, selections, and archiving of information related to the research. Lastly, the exploratory-descriptive method, as indicated by Gil (2002), familiarizes with the problem and describes the characteristics of a certain population or phenomenon. This method allowed the best comprehension of the problem's structure and made it easier to search for an adequate solution.

To design an interface for the website, the Figma tool was used, it helped with the planning of the visual and user experience. The other technology used to code the website was Visual Studio Code, a programming environment that allows coding in the programming languages used for this project. To accomplish the creation of the software model, named as diagrams, the Astah tool was used, it contains its components for the model creation, allowing a more organized visual representation of the system.

For the technology used for storing data, MySQL was used as the database and, lastly, to enhance the website's efficiency, two frameworks were used: Laravel and Bootstrap. Laravel aided in simplifying the website, making it more robust, safer, and with more quality. On the other hand, Bootstrap allows to create of a user interface more personalized and visually attractive.

### 4. RESULTS AND DICUSSION

The problems related to education that were exposed earlier reveal the lack of teachers and the existence of doubts from the students that relate to the vocational subject.

The construction and result of this project turned out positively. Acknowledging the necessity of a website that contains the needs of those students in just one place, this project's website can indeed help them with the lack of education by providing the mock test to help them in a more practical way to get use the Vestibulinho exam model, besides that, the doubts with a vocation can also be solved with the vocational questionnaire because it can orientate the student to choose a course that most fits for them. Lastly, above everything, it is accessible for everyone, even with simpler devices like old cell phones or computers.

After the project, considering every content of the website (mock test, vocational questionnaire, and information about Vestibulinho Etec), many people will be interested in Etec and how they can enroll in it, which course they're most able to go based on their traits, and lastly, which Etec unity they can go in the state of São Paulo.

In general, helping the students to have a better education and orientation can also result in the growth of the education system and the students that enroll in any Etec unity can provide better professionals in the labor market.

## 5. CONCLUSION

The authors of this article consider that the problem exposed can be aggravated at any moment, and dealing with it can be hard but it can be accomplished. Building a website to deal with the problem quoted earlier can solve the problems that many elementary school students have because it will help the students to get to a better education and along with it, it helps to find out a course for them. In the end, this can be one of the solutions to the problems exposed previously, and most importantly, it is accessible to most students nowadays.

## APPRECIATION

We, the authors, are thankful to the orientation for guiding us until here, helping with the building of the project since the beginning, and for the knowledge and experiences. We are also thankful for our English teacher Andreza Maria de Souza Rocha for helping us so much with this foreign language, for giving us ideas, encouraging us, and guiding us to the correct ways to write this article and others coursework.

We also thank our family, friends, and the companions of my colleagues through all those years, it helped to make everything easier to handle.

Thank you so much to everyone who made the realization of this article and project possible, and for every moment and experience that we had along the way.

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