

Study: Mobile application using gamifications for students Who Will do the National High School Exam

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Abstract. The National High School Examination - ENEM was first applied in 1998. It was created with the objective of evaluating student performance and improving the quality of teaching in the country. Today this exam is one of the main means of access to higher education in the country. Just last year, 9.2 million students took ENEM and this number is increasing more and more, since the goal of the Ministry of Education is that in the near future the ENEM will become the only means of access to higher education in the country, Replacing the vestibular. This article presents a mobile application developed to support teachers and students who prepare for the ENEM, the concepts of gamification, the application will show contents related to the previous exams for the student to study, some questions to test the level of the students with the goal of Offer fun and learning at the same time.

Keywords: Examination, mobile application, student evaluation.

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1 Introduction

The National High School Examination, also known as ENEM, is a test held annually by the National Institute of Educational Studies and Research An sio Teixeira (INEP), this institute is linked to the Ministry of Education. Created in the year 1998 is a test used to evaluate the quality of high school in the country. Its result is used for admission to public universities through the Unified Selection System (SISU), for the acquisition of a full or partial scholarship in private universities through the University for All Program (PROUNI), to obtain funding through the Student Financing Fund (FIES), to exchange in foreign institutions through Science without Borders and to join some universities abroad [2].

The ENEM is held in two days of proof, containing 180 objective questions and a writing question. The methodology applied to the test is transdisciplinary,

which consists of elaborating questions where it is necessary to use two or more disciplines taught in High School to obtain their answer. What attracts the students interest in the ENEM is their method of evaluating reflecting on a certain subject, valuing their autonomy in making decisions and not their ability to accumulate information, since several competences are required to be successful in each area of knowledge.

The Study consists of a mobile application that will use gamification as a teaching tool, was developed with the purpose of helping teachers and students preparing for the ENEM. Through a simple interface the application will allow the student to enjoy and learn while answering questions related to previous editions of the Exam. The application will automatically correct the responses by displaying the data retrieved in the database when the student chooses the correct option and will display a message to the student when they

choose an incorrect option.

The choice to develop the Study as a mobile application is to give the student the freedom to study for the ENEM anywhere and at the time that is most appropriate to them, and also to make available to teachers a new tool to help students who are preparing to take the exam using the technology of mobile devices for this. The application was tested and approved by the students of Cedup Renato Ramos da Silva who observed the contributions that the tool brought to the students who are preparing for the Exam.

The article is organized as follows: in Section 2, the basic concepts and some curiosities related to the National High School Examination are presented; in Section 3, some similar tools are presented in the research; Section 4 presents an overview of the application developed, as well as the techniques and tools used for its construction; in Section 5, describes the evaluation performed by the users of the application; Finally, in Section 6, the conclusions of this work are presented.

2 National High School Exam

The ENEM was created with the objective of evaluating the quality of Higher Education in Brazil, prioritizing interdisciplinary and providing the student with various forms of entrance to higher education through programs such as SISU (Unified Selection System), Prouni (University Program for All) and Fies (Student Financing Fund).

The ENEM is very important for the student, since it provides that it develops skills and abilities while preparing for the test and while performing the same and for the schools, since it is already used as a qualifier for high schools [4].

The adoption of the ENEM / SISU by some universities contributed to the democratization of the opportunities offered by Federal Institutions of Higher Education (IFES), favoring access to quality higher education and inducing the restructuring of secondary school curricula [4]. But even so, only 14% of the population between 18 and 24 years old enter higher education in Brazil. Compared with other countries in Latin America, North America and Europe [1].

According to the student guide created by the National Institute of Studies and Educational Research An sio Teixeira - INEP, the calculation of the grade of a school is done as follows is made a scale that depends on two values: value of position or reference, which represents the average performance of the students who took the exam that year, and the dispersion value, which is the average of the students' scores in relation to the number of students of a given school who

did the ENEM in that year [3].

The 1 shows the school scores that were best placed in the previous edition of ENEM.

Table 1: Schools that were better placed in ENEM 2016 in the city of Lages

School	Score
Colegio Bom Jesus Diocesano	632.47
Sistema De Ensino Energia Lages	592.62
Colegio Santa Rosa De Lima	581.32
Senai Sc Lages	546.83
Sociedade De Ens Santa Barbara	539.43
Eeb Belisario Ramos	516.46
Cedup Renato Ramos Da Silva	513.10
Eeb Ns Do Rosario	513.10
Escola De Educacao Basica Industrial De Lages	505.99
Eeb Prof Ilza Amaral De Oliveira	468.22

The application has several issues related to Mathematics and its technologies, Languages, Codes and their technologies, Natural Sciences and their technologies and Human Sciences and their technologies. Simulating what happens in the ENEM. Currently Cedup Renato Ramos da Silva students are already using the application to prepare for ENEM and studying the possibility of publishing it in an application store so that more students have access to this tool. A survey was conducted among the users to know their opinion about the Study and if it is meeting their needs the result is in the chart below.

The Figure 1 presents the opinion of Cedup Renato Ramos da Silva students who use the Study to prepare for the ENEM.

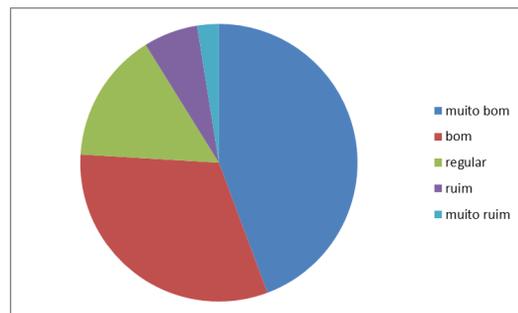


Figure 1: Opinion of Cedup Renato Ramos da Silva students who use the Study to prepare for the ENEM.

However, the Study will not be able to help the student with the writing, as this is the only ENEM item to which the TRI (Item Response Theory) [5] does not apply. Whose value of each question varies according to the percentage of correctness and errors of each student, but the Study application will contain questions related to the cultured norm of the Portuguese language, essential during the writing of the ENEM so that the student

can develop the necessary skills to go well in it and get a good grade.

3 Similar Tools

3.1 Questions ENEM

This application contains contain several simulated with all questions of previous tests, the user can choose the questions by area of knowledge and year of application of the test.

The Figure 2 shows the questions of ENEM presented to the student.



Figure 2: Questions of ENEM presented to the student.

3.2 G1 ENEM

The differential of the G1 ENEM, is entertaining while studying, it contains questions puzzles that are worth more points and new questions for you to study and have good moments of recreation with the game. The user can also challenge their friends and strangers or play alone and track their position in the general ranking, their friends or the course. The only disadvantage of the ENEM G1 is the reliance on the internet connection.

3.3 Geekie Games ENEM

One of the differences of this application is the collection of free classes, which makes it possible to study various contents of High School where and when you want the user can also schedule a schedule of studies in the application, Geekie Games was chosen to the official platform of the Program of the Enem and is the only study application to be recognized by the Ministry of Education. However just as the G1 ENEM Geekie Games relies on internet connection.



Figure 3: G1 ENEM.

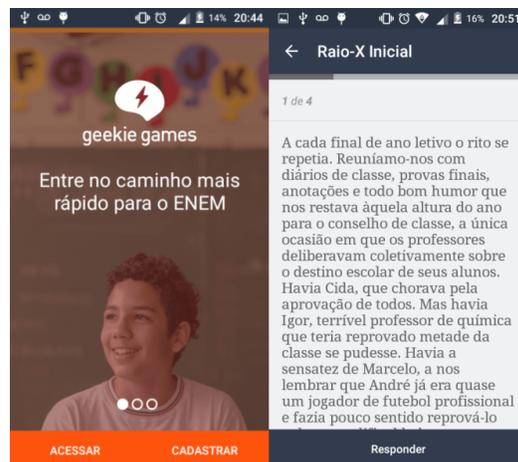


Figure 4: Geekie Games.

4 Application Presentation

4.1 Application Features

The application is designed to provide ENEM students with a new tool for this purpose, making them enjoy and learn by answering exercises based on the previous exam questions. In the current version of the application the following modules have been developed: questions based on previous exam exams, concepts of gamification, send notification to the user informing that he has contents to study in the application, scoring system for the user to monitor their performance in the application. One of the differentials of the Study is that it is a totally off-line application, not requiring an internet connection for its use. Each issue of the application is related to previous editions of ENEM. The questions were developed by the Study developers in partnership with high school teachers to develop an application that

will help teachers develop more dynamic lessons using technology and will make the student discover a new way to prepare for the ENEM. You can sign in to the application with facebook or your Google accounts, set up your own study schedule and manage your study schedules, and receive a notification at the scheduled time with a reminder of the content that will be studied at the scheduled time. The resolution of the questions is done through the application itself, the database contains questions from all areas of knowledge that have been applied in previous issues of ENEM, allowing the user to test their knowledge and prepare for the test. Randomly, the application looks up an issue in itâs in the database and displays the statement on the user's smartphone screen. After answering the question, the application informs you if the response was correct, incorrect or if there was an error in its preparation. It also shows the user's progress, the score acquired and the last attempts to respond. The correction of the questions is done in two steps: initially, it is if the option chosen by the user is equal to the option that appears as correct in the database; once it is correct, a hit message and score will appear on the application screen

4.2 Implementation

The application was developed using Ionic an open source framework widely used for the development of hybrid mobile applications. Ionic uses web technologies like HTML5, CSS and JavaScript to develop hybrid mobile applications [5]. Ionic builds on the Apache Cordova project and features a full set of components and a complete command-line interface (CLI) to create, test, and publish applications with just a few commands [5].

Apache Cordova is also open source and is used by Ionic to access the native features of mobile devices such as accelerometer, camera and geo location. It also has the requirement to generate the application for different platforms such as Android, iOS, Windows Phone, blackberry among others [5].

AngularJS is a framework written in open source JavaScript, maintained by Google, and aims to facilitate the development of web applications by extending traditional HTML to work with dynamic content, with direct and bidirectional data binding (twoway databinding) that allows automatic synchronization between the HTML and the object in JavaScript [5].

5 App evaluation

The application was tested and approved by the students of Cedup Renato Ramos da Silva with the support of

the teachers of this institution. The choice of this institution was justified by a partnership that it has with the Unifacvest University Center, which allowed the application to be evaluated satisfactorily. Students were preparing for the ENEM in a conventional way. Students were asked to use the application express their opinion on the same: "I liked the way the application displays exercise responses, this helps you understand the subject when you have the table view with the answer." "The application has proved useful in helping to better understand the contents of the ENEM, making learning easier than it is only on paper." Evaluating the results obtained and the comments written by the students can be observed an improvement in the understanding of the ENEM contents. With the use of the application it became possible to have fun and learn at the same time.

6 Conclusion

The ENEM covers a series of theoretical contents and the understanding of these contents is very important to obtain a positive result in the test. It is known that new technologies are a strong ally in the process of learning various contents. The resolution of exercises is a practice that helps the student to better understand the subject, especially in the case of computer languages. The elaboration of the application was based on a need strongly observed through the difficulties encountered by the students in understanding the contents of ENEM. The experiment carried out with the students of Cedup Renato Ramos da Silva showed that the application can be very useful for learning the contents of ENEM, because the interaction provided by the tool makes the understanding easier. As future work, the project foresees the development of more functionality, such as the implementation of modules for the creation of study groups that will facilitate the application of tests for students. It is also interesting to improve the application by implementing some reports that provide feedback so that teachers can assess student performance. Another important point is to carry out new evaluations with the students, in order to test the tool from the beginning of the studies of the relational algebra content, allowing a better verification of the improvement in the learning.

References

- [1] de. Sousa Albuquerque, I. M., de. Neto, J. R., and Andrade, M. Cooperative learning: development of skills as reviewer of enem-style essays, Sep. 26, 2017.

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- [2] Filho, F. A. Right profession: Enem's grandfather (for a long time, the college entrance examination was elitist: only those who studied in traditional colleges could enter universities). *Jornal O Dia - Jobs Business*, August 2017.
 - [3] Junqueira, R. D., Martins, D. A., and Lacerda, C. B. F. Accessibility policy and national examination of high school (enem), Aug. 2017.
 - [4] Munhoz, C. Enem ten years later, Aug. 2007.
 - [5] Stadler, J. P. and e Silva, H. F. R. G. The perf of natural science questions of the new enem: inter-disciplinarity or contextualization?, Aug. 2017.