DESIGN OF INTERACTIVE MULTIMEDIA SOFTWARE THAT ALLOWS DESCRIBING POLLUTION AND DIFFERENT TYPES OF POLLUTION

DISEÑO DE UN SOFTWARE INTERACTIVO MULTIMEDIA QUE PERMITA DESCRIBIR LA CONTAMINACIÓN Y LOS DIFERENTES TIPOS DE CONTAMINACIÓN

CRIAÇÃO DE SOFTWARE MULTIMÍDIA INTERATIVO QUE PERMITE DESCREVER A POLUIÇÃO E OS DIFERENTES TIPOS DE POLUIÇÃO

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RESUMEN
La utilización de los sistemas multimedia en la educación, responde a una nueva concepción en la enseñanza como un proceso no lineal, y a la integración de texto, imágenes y sonido, habitualmente bajo el control de un ordenador. Debido a las aportaciones de la multimedia y la forma en que se aprovecha e integran diversos medios, para transmitir información; se diseñó y creó un sistema interactivo multimedia utilizando las siguientes herramientas para producción multimedia como: NeoBook 5.7. El sistema está formado por una pantalla de inicio, la cual nos enlaza al menú principal del sistema multimedia, la pantalla de menú principal nos permite navegar en el sistema y tiene las opciones siguientes; introducción, temario, glosario, video, requerimientos, referencias, sitios de interés y actividades de repaso. De esta manera los usuarios podrán realizar actividades que les permitan interactuar con la computadora y lograrán visualizar de una mejor manera el tema de la contaminación.

Palabras clave: Multimedia. Educación. Contaminación.

ABSTRACT
The use of multimedia in education systems, responds to a new conception of teaching as a nonlinear process, and the integration of text, images and sound, usually under the control of a computer. Due to the contributions of the media and how they leverage and integrate various means of transmitting information; An interactive multimedia was designed and created, using the following tools for multimedia production such as NeoBook 5.7. The system consists of a home screen, which links us to the main menu of the multimedia system, the main menu screen allows us to navigate in the system and has the following options: introduction, list of topics, glossary, video, requirements, references, sites of interest and review activities. In this way, users will be able to carry out activities that allow them to interact with the computer and will be able to visualize the issue of global warming in a better way.

Keywords: Multimedia. Education. Global Warming.

RESUMO
O uso de sistemas multimídia na educação responde a uma nova concepção de ensino como um processo não linear e à integração de texto, imagens e som, geralmente sob o controle de um computador. Devido às contribuições da multimídia e à maneira como ela aproveita e integra diferentes mídias para transmitir informações, foi projetado e criado um sistema multimídia interativo usando as seguintes ferramentas de produção multimídia: NeoBook 5.7. A tela do menu principal permite navegar pelo sistema e tem as seguintes opções: introdução, agenda, glossário, vídeo, requisitos, referências, sites de interesse e atividades de revisão. Dessa forma, os usuários poderão realizar atividades que lhes permitam interagir com o computador e visualizar melhor o tema da poluição.

Palavras-chave: Multimídia. Educação. Poluição.

INTRODUCTION

In general, there is an increasing gradual decrease in resources allocated to the equipment, acquisition of laboratory material, bibliography and licenses of applications and software of public institutions in Mexico, which one of the solutions that they can have is the use and generation of educational multimedia software, which can be used as a complementary tool in the teaching-learning process and the training of students in public institutions of higher education.

If the possibility that educational institutions can generate this type of multimedia tools is considered, they must present the verbal form, which can be in printed or spoken text, and the pictorial form, which is given through static graphics, illustrations, diagrams, maps and photos (Mayer, 2005), or, on the other hand, the use of dynamic graphics, such as animations or videos. In addition, incorporating sound through music and audios in general (Ushay & Sanjaya, 2003).

In this sense (Gutiérrez, 1997) the use of multimedia tools allows the student to acquire knowledge, skills and attitudes that are useful for communicating using different languages and media, in addition to developing self-learning and critical thinking that will facilitate their integration into a more just and multicultural society where they interact with technological innovations characteristic of the time in which they develop. This makes it easier for the student to also have the ability to create their own multimedia resources with the help of the available applications.

The main objective of this work is the generation of a multimedia system that allows the student to learn about the subject of pollution and can be used by students from different institutions of the educational sector in Mexico.

METHODOLOGY

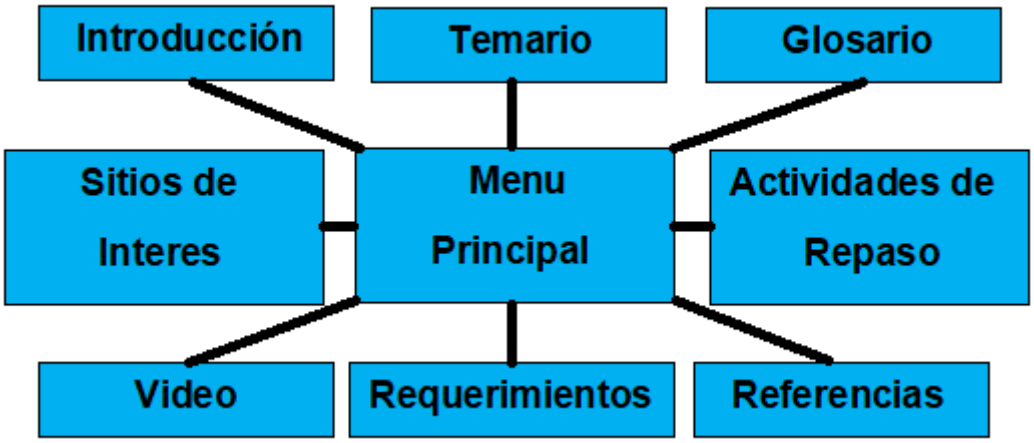
In this work, it was decided to use the MEDESME methodology (García et al, 2016) which includes the phases or stages of: concept or pre-production, analysis, design, development, implementation, evaluation and validation of the program, production and elaboration of the complementary material.

The concept or pre-production phase includes, on the one hand, the introduction section of this work, where the idea that motivated the generation of the educational multimedia system is clearly detailed, and on the other hand, the agents involved (authors of this work) who were responsible for generating and/or carrying out each of the activities described in the MEDESME methodology are defined (García et al, 2016) in addition to determining that the project to generate the multimedia application was viable and

justifiable. Then, in the analysis phase, the general objective and specific objectives, user profile, thematic content present in the multimedia system, as well as a general description of the application and also the technical requirements that the user requires to execute said application are presented. The specifications presented by the computer equipment of the Computer Center of the Academic Unit of Electrical Engineering, of the Autonomous University of Zacatecas "Francisco García Salinas" are: Dell optiplex 755, Windows 7 and XP, 2 Gb RAM, Pentium Dual Core E2160 1.9Gb, 160 Gb hard drive, Windows Media Player, Intel Q35 Express Chipset video driver, Intel 82566 DM-2 Gigabit Network and High Definition Audio.

With regard to the design phase, they present the didactic characteristics that the application must have, which, in this particular case, is based on constructivist pedagogy and the learning obtained by users will be generated based on the inquiry that they carry out. The teacher who makes use of the application must also specify the evaluation tools and the respective grading method. Within the design phase, the structural design must be carried out, which allows the structure of the multimedia system to be visualized graphically, having as a starting point the generation of the storyboard manually, which is a starting point for the generation of the outline or navigation diagram, which includes the structure and general contents of the application (See Figure 1). On the other hand, the Navigation Map shows graphically, the interconnection between each of the screens of the system, which will serve to know how to get to a certain part of the application, in this, the menus, submenus and screens to which each of them takes us are shown.

Figure 1. Navigation Diagram



RESULTS

Once the analysis and development of the system has been carried out, the next phase is carried out, which is the implementation, a phase in which the system is working

efficiently and is ready to be installed on the equipment. Figure 2 shows the home screen of the multimedia system, which allows us to access the main menu of the same, the home button that allows us to access the main menu of the system, if you do not want to access it you will find the exit button.

Figure 2 Home screen.

The main menu screen in Figure 3 presents different button options, which allow us to navigate the system. Below are described each screen with its specific characteristics, on this screen, you have the option to return to the home screen, which is represented by the button with the arrow image, from this screen, this button will appear in the rest of the application, since it will allow you to return to the previous screen.

Figure 3 Main menu screen.

In the introduction screen (Figure 4) as its name indicates, it describes an introduction on the subject of pollution, this screen designed in such a way as to give it the appearance of using a book.

On the other hand, a screen of the Syllabus was generated: This screen leads to the syllabus, where other screens can be displayed with content referring to the different types of contamination: Water, air, soil, radioactive, luminous, sound or visual (see figure 5).

Figure 4 Introduction screen.

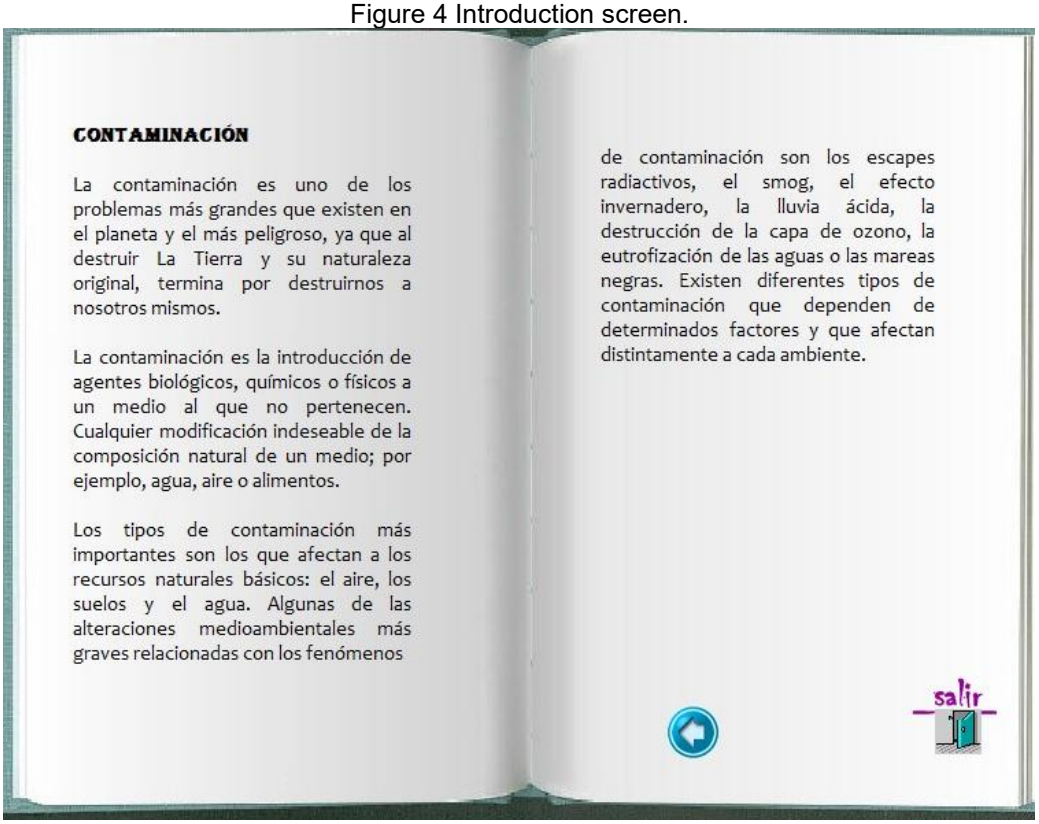
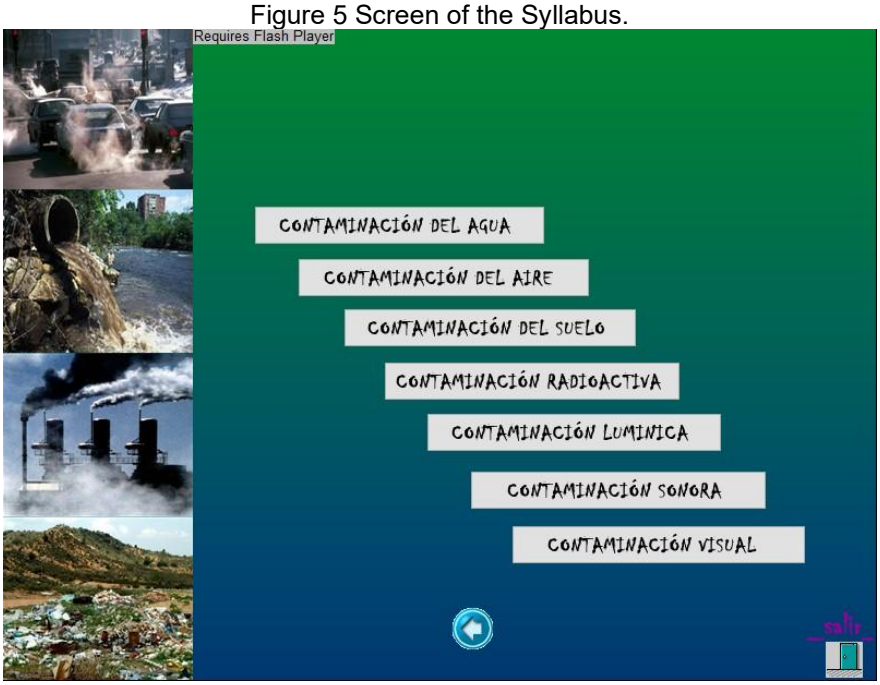


Figure 5 Screen of the Syllabus.



The glossary screen includes definitions of important concepts in the topic (see Figure 6). Figure 7 shows the video screen, in which you can see a video related to the different types of pollution.

Figure 6 Glossary screen.

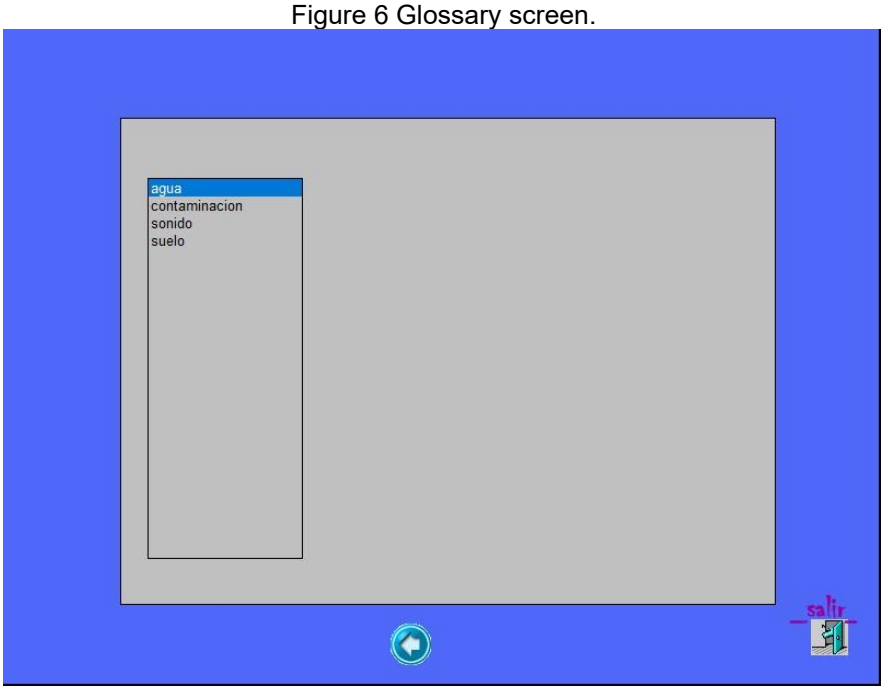
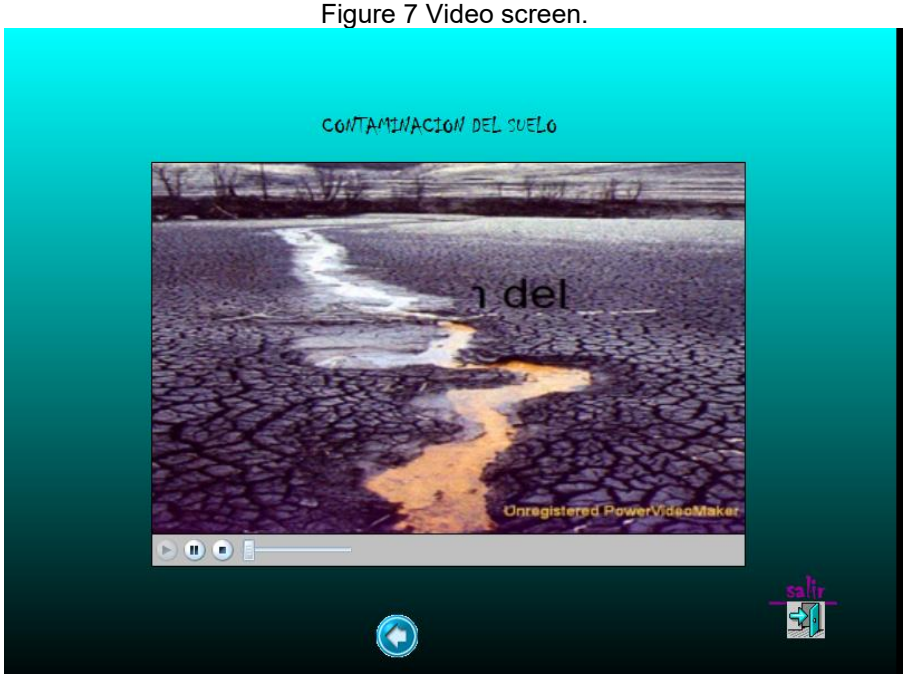


Figure 7 Video screen.



On the requirements screen (see figure 8) we find the information of the hardware and software that is required to be able to properly use the multimedia system. Figure 9 shows a screen with the main references with which the multimedia system was made.

Figure 8 Requirements screen.

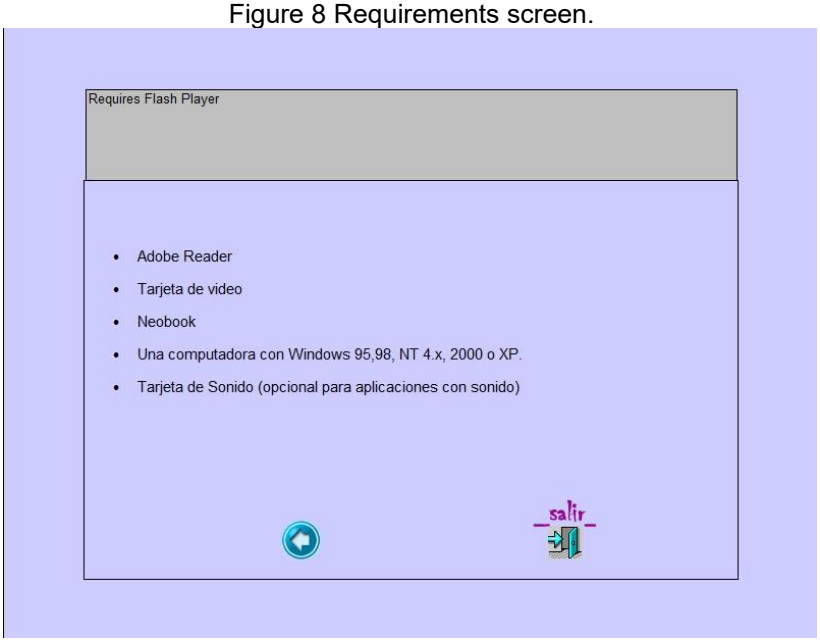


Figure 9 Reference screen.

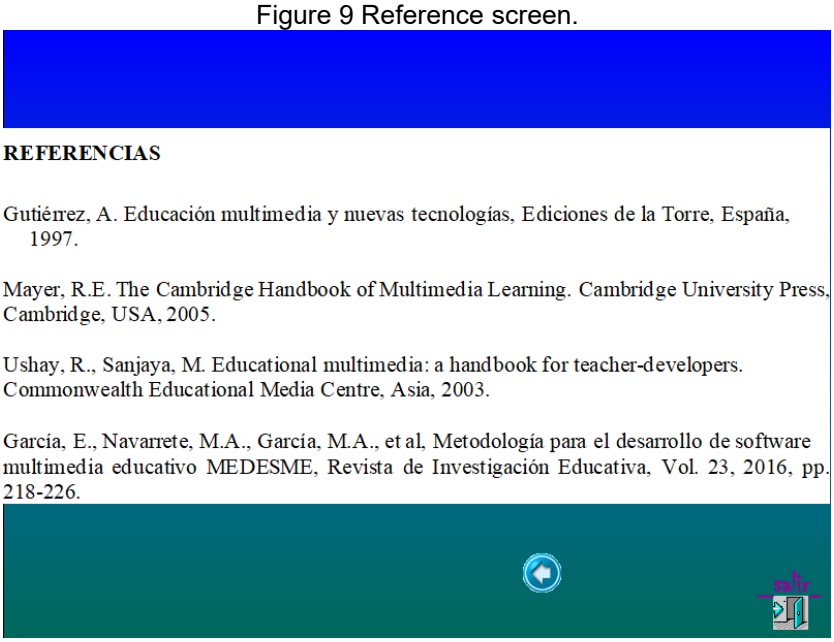


Figure 10 Sites of Interest Screen.

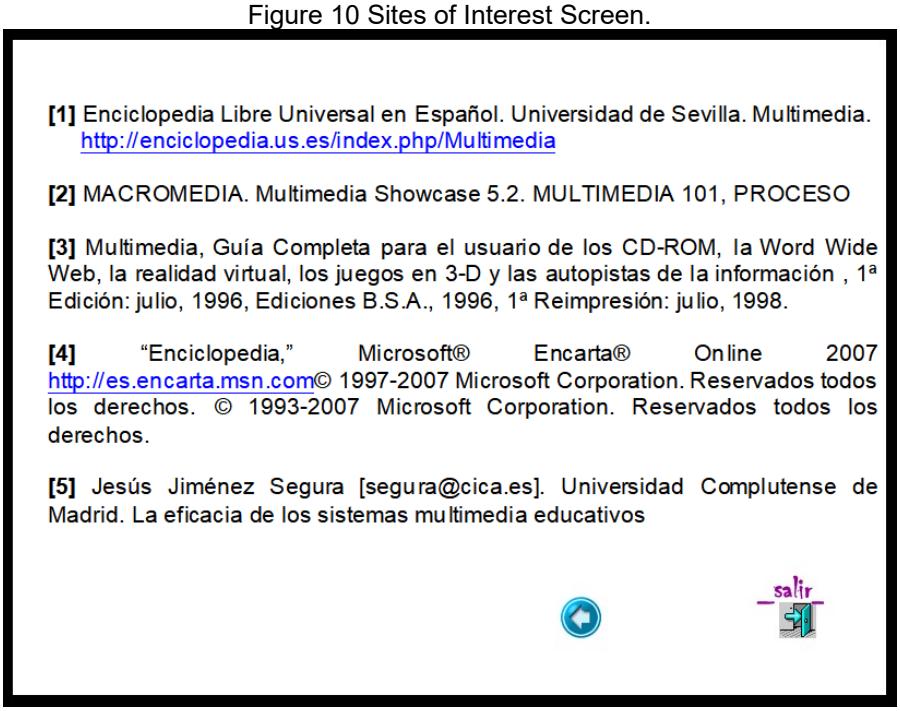


Figure 11 shows the screen of review activities, which is specifically about putting together a puzzle. Broadly speaking, these are the screens that make up the multimedia system, as well as the link between them, which allows us to know the navigation and action of each button in the system.

Figure 11 Review Activities Screen

In the production phase, the creation and search of the components that were placed on each of the screens was carried out, mentioning some such as: videos, background sounds and buttons, animations were made (Astro Flash Creator 2.0.2 tool) and photos were edited (Macromedia Fireworks Mx 2004 tool). Next, the programming process was carried out, this in order to add interactivity with the user, as defined in the design stage.

At the end of the programming, tests were carried out to verify that the actions added to the different components worked according to the specifications of each of them. The necessary tests were carried out in different scenarios (equipment) together with our advisors in a qualitative way, with the aim of detecting a malfunction, making a correction or improvement.

Finally, the system generated and documented in this work was recorded in a distribution medium, in this case, the USB Memory storage format was selected.

CONCLUSIONS

Some means that facilitate the approach to science and technology is educational software that aims to facilitate self-learning and independent learning for the user, which is why there are programs created in order to have interactivity between the user and the computer.

To this end, an interactive multimedia system was designed that would allow the user to acquire a better understanding of the subject of Pollution, using NeoBook 5.7, Astro Flash Creator 2.0.2, Flash Optimizer 2.0, Macromedia Fireworks Mx 2004, Microsoft Office Word 2007, Microsoft Office Paint 2007, Microsoft Office Visio 2010 and Microsoft Office Excel 2007, which was successfully achieved.

The system developed in this work managed to meet the characteristics proposed, but even so, there are still several possibilities to improve it by adding new functionalities.

- An improvement that can be made in such a system is that it works on any operating system.
- A next one would be that the system works on any computer, whether it is a notebook, Ipad, etc; since it only works on desktops and laptops.
- Another improvement would be if the system were implemented on the internet.
- Using Neobook 5.7 software to create additional games.

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