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B-learning. Vía para la preparación en seguridad informática del docente del Politécnico "Julio Antonio Delgado Reyes"

B-learning .Via for the preparation in computer security of the teacher of the Polytechnic "Julio Antonio Delgado Reyes"

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Resumen: En el presente trabajo se propone una alternativa metodológica B-learning para perfeccionar la preparación en seguridad informática del docente del Politécnico "Julio Antonio Delgado Reyes", dicha alternativa fue elaborada tomando como premisa el modelo Pedagógico Profesional de la Educación Técnica y Profesional en Cuba desde donde se determina el modo de actuación del docente que se desempeña desde estas condiciones. En ella se ofrece la estructuración de los contenidos para la preparación en seguridad informática del docente de forma presencial y a distancia con el empleo de Entornos Virtuales de Enseñanza Aprendizaje.

Palabras clave: B-learning; Seguridad informática, Entornos Virtuales de Enseñanza Aprendizaje.

Abstract: This paper proposes a B-learning methodological alternative to improve the preparation in computer security of the teacher of the Polytechnic "Julio Antonio Delgado Reyes". This alternative was elaborated taking as a premise the Professional Pedagogical model of the Technical and Professional Education in Cuba from where the way of acting of the teacher who performs under these conditions is determined. It offers the structuring of the contents for the preparation in computer security of the teacher in a face-to-face and distance way with the use of Virtual Teaching and Learning Environments. Keywords: B-learning; Computer security, Virtual Teaching and Learning Environments.

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Introduction

At present, the development experienced by the different branches of science, technique and technology has caused considerable changes in social, economic, political and cultural life, characterized by the accelerated growth of scientific information generating important advances in the field of Information and Communication Technologies (ICT).

Precisely in this context, the introduction of ICTs in Cuba has been mediated by the implementation of the Program for the Informatization of Cuban Society, whose purpose is to meet the growing demand for information and knowledge in all spheres of society as well as to raise the levels of efficiency and effectiveness in both services and productive processes that are generated, always with the support of security strategies that guarantee continuity and access to them. (Hurtado, 2015).

Therefore, the security of information and therefore of Information Technology (IT) is a vitally important issue because, as the development of ICTs increases, the number of risks associated with constant threats to computer systems increases, causing, among other things: loss of information, denial of services and information sources, the increase of computer viruses and cyberespionage tools, and the implementation of subversive activities.

Correspondingly, authors such as Sosa, Vialart and Vidal (2012), state that, with the growing development of ICTs and increased connectivity, information systems and computer networks are increasingly vulnerable and exposed to a greater number of threats. This makes possible the emergence of the new information society, which needs to achieve greater awareness and understanding of security issues.

In this same sense, Bidot (2012, p. 21), director of the Cuban company "Segurmática", in the report entitled "Information security scenario at the beginning of 2013" expressed:

> (...) "the scenario of computer security is the most complex ever experienced and neither the IT industry, nor the users, nor the governments are prepared to face it proactively, it is therefore a pending subject at international level that urgently needs to be solved".

On this same idea, Rodriguez (2012, p. 4), director of Educational Informatics of MINED, when analyzing the situation related to ICT users and computer security, pointed out:

-Users know very little about the different types of IT security incidents that can occur and the impact they can have, considering, moreover, that their IT systems are well protected and are not exposed to any risk.

-Technical solutions are underestimated, minimizing educational and preventive ones, hence, in spite of the efforts made in the IT legal framework, the end user continues to be unprotected, disoriented and unprepared, an aspect that has not yet been resolved and is likely to increase.

With the above reflections, it can be seen that in contemporary society, it is not only enough for users to know how to use ICTs properly, but they must also be well prepared to implement computer security procedures and techniques to safeguard the information and computer systems used in their creation.

Hence, the preparation of human resources in computer security is essential to ensure the integrity, availability and confidentiality of the information processed, stored or transmitted using this type of technology.

All of the above motivated the interest of the authors of this work in seeking proposals related to the problem under investigation, especially in the Cuban educational system, where the so-called ICTs have been implemented in all educational subsystems, becoming important means of support for teachers and professors in the training of present and future generations.

Based on the aforementioned shortcomings, it was necessary to conduct an exploration related to the preparation in computer security of teachers working at the "Julio Antonio Delgado Reyes" Polytechnic, taking as premises: observation, analysis of national seminars on teacher preparation, as well as the exchange of ideas with managers of the Municipal and

Provincial Directorates of Education of Guantánamo, which made it possible to arrive at the following shortcomings:

-The number of preparation activities planned and developed in the field of computer security is limited; those that are carried out focus only on the superficial analysis of certain resolutions, addressing theoretical aspects linked to what to do and not to how to do it, excluding some elements related to technological, organizational, educational and ideological aspects. All this hinders the treatment of these contents from the initial training of the future medium technician and skilled worker in this educational entity.

-Similarly, there is insufficient mastery of the technical language related to ICT security, which causes a lack of understanding of the legislation in force and the procedures incorporated into this activity.

Furthermore, there is a lack of aspects to be taken into account for the conservation, protection and security of ICTs, together with a limited archival culture, which affects the information available in digital and printed sources and the development of the professional pedagogical process itself.

-Therefore, the number of bibliography referring to computer security is scarce, and those that are available present a sequential reading that restricts the level of interactivity and hinders the process of activity and communication according to the level of preparation and needs of the users.

-Es por ello que el presente trabajo tiene como objetivo elaborar una alternativa metodológica B-learning para perfeccionar la preparación en seguridad informática del docente del Politécnico “Julio Antonio Delgado Reyes”.

Development

In order to provide a solution to the aforementioned limitations referred to the security preparation of the teacher of the Polytechnic "Julio Antonio Delgado Reyes", the B-Learning modality is used, also known nationally and internationally as Blended Learning, mixed,

blended, combined, hybrid, blended, blended learning, from where it tries to overcome the traditional pedagogical model of teaching focused on the teacher and the transmission of content by the teacher. This is why it is based on providing flexible, open learning where communication will be mediated by ICT.

For this reason, from the conception of this research work, the B-Learning educational modality facilitates the convergence between face-to-face or traditional teaching and virtual teaching using ICT.

Precisely from this context, the so-called Virtual Teaching and Learning Environments (EVEA) are used, which constitute spaces configured in the telematic network, since thanks to the different activity and communication tools they have, they facilitate the exchange, collaboration and reflection among the subjects participating in the preparation in computer security, also providing access to the different learning objects.

In this sense, the virtual environment to be used is the Moodle platform, which is widespread in practically all Cuban universities, but not in the General Polytechnic and Labor Education. Hence, its use constitutes a novelty from the Polytechnic "Julio Antonio Delgado Reyes", not only from the technological point of view but also from the pedagogical point of view (See Figure 1).

Figure 1: Moodle platform. Presentation block.

❖ Therefore, the preparation in computer security from the Moodle platform was conformed taking into account two fundamental blocks, the first one entitled Initial or Presentation Block from which the preliminary orientations are offered to start the preparation activities in computer security from EVEA and in a face-to-face manner.

❖ Various synchronous and asynchronous communication tools are used, such as chat and communication forums, which in the case under analysis help to welcome the teachers and make them aware of the new features of the computer security training course; the aspects selected for this purpose are shown below:

❖ **Presentation**: is executed through a forum activity, welcoming the trainees, as well as motivating them to insert their expectations and requesting them to insert their personal data to fill in their profile as users of the computer security training course.

❖ **Updates**: is a forum for communication created to offer trainees the novelty of the course by providing them with information that provokes a series of sensations and uncertainties, stimulating the need and search for new knowledge related to computer security.

❖ **Preliminary guidelines for the implementation of the learning activities**: As its name indicates, this is the preliminary guide for the participants of the computer security training course. It shows once again the importance of the course, the modality that will be used, how the learning tasks will be carried out, how to access and obtain information from the selected platform, the evaluation methods, the necessary requirements to enroll in the course, the general objective of the course and suggestions for the use of some activity and communication tools.

❖ **General course program**: provides general information such as the rationale of the course, general and specific objectives, organization of the didactic units with their respective knowledge systems, the system of skills to be developed, the values to which it refers, the evaluation system, methodological suggestions, basic and complementary bibliographies, among other aspects.

❖ **Glossary of terms**: is an activity of a general nature, from which the protagonists of computer security training have the possibility of inserting concepts, definitions elaborated by them or simply derived from the study activities.

❖ **Communication activity to familiarize trainees with the course structure**: This activity turned into a chat to familiarize participants with the Moodle platform communication interface, as well as a means of exchange and help as discussed in the initial activities of the course.

❖ **Initial diagnosis**: presents the sequence of questions to determine the level of preparation in computer security of the teachers of the Polytechnic "Julio Antonio Delgado Reyes", which contributes to the structuring of the contents and the necessary levels of support.

❖ **Communication activity for socialization and systematic orientation:** constitutes a space for preparation, socialization and systematic orientation to be used during the preparation actions in computer security, from this context all the participants of the course will be able to insert new information obtained by interacting with the contents of the course, visiting other websites or through the exchange with specialists in computer security.

In this order of ideas and from the second block entitled ″Instrumentation of the Preparation in Computer Security″ Block, the structuring of different teaching-learning situations will be carried out through eight didactic units.

In this sense, didactic units one, two, three, five, six and seven will be destined to the development of activities for self-learning and collaborative work from EVEA (See Figure 2 and 3).

Figura 2: Plataforma Moodle. Bloque de instrumentación de la preparación en seguridad informática. Unidades Didácticas 1,2 y 3.

Figure 3: Moodle platform. Instrumentation block of computer security training. Didactic Units 5,6 and 7.

The other two remaining didactic units, i.e., four and eight (see Figure 4) are consigned to the development of face-to-face meetings not in isolation but as a complement to the activities to be developed from the EVEAs.

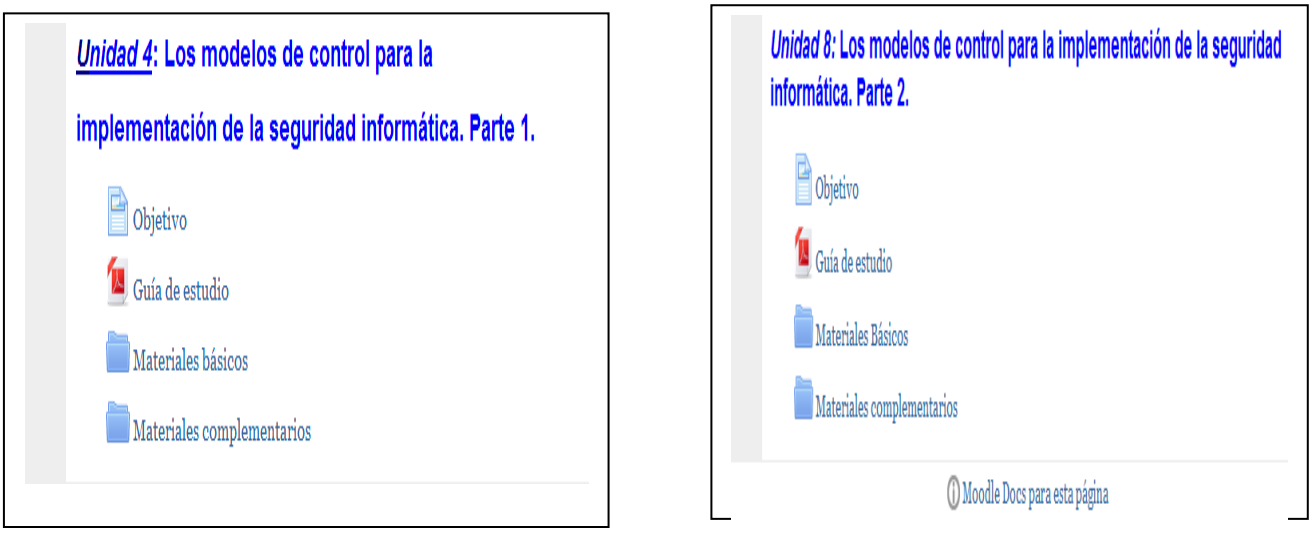

Figure 4: Moodle platform. Instrumentation block of computer security training. Didactic Units 4 and 8.

From this proposal, the solution to the existing limitations is not only from the technological point of view as it has been previously proposed, but first of all from the pedagogical point of view, which also integrates the technological, the organizational and the political-ideological.

Hence, the EVEA to be used does not constitute the purpose of the research, even though it represents the transversal axis of the instrumentation of the preparation in computer security of the teacher of the Polytechnic "Julio Antonio Delgado Reyes".

In this same order of ideas, it is necessary to approach how to implement this Virtual Environment (VE) and the contents in computer security in the real conditions of the educational institutions, especially of the Polytechnic "Julio Antonio Delgado Reyes".

For this purpose, we start from the pedagogical point of view in the use of the so-called Regular Forms of the Informatics Teaching-Learning Process, based on the:

- ✓ Concept formation.
- ✓ Elaboration of procedures.
- ✓ Problemical resolution.

Why are they called regular forms? Because the methodological procedure for their structuring can be executed in an analogous or similar way for all cases.

From this point of view, it is necessary to mention the following aspects:

Firstly: How will the concepts and procedures be introduced if we take into account the use of EVEA characterized by self-learning and the physical separation of the members of the computer security training?

And secondly: What immediate or mediate actions will be implemented for the training, elaboration and fixation of the concepts and procedures respectively?

In this sense and through the deductive way, the concepts and procedures will be introduced through the use of the learning objects provided in the Moodle platform and the actions shown below must be executed for this purpose:

For example, for the case of the training of the concept computer security plan that aims to familiarize teachers with the elementary technical language that allows them to interact in an easy enjoyable way with the cultural context related to computer security.

It will be necessary to analyze first of all the study guide presented in the didactic unit number two, which constitutes the guiding basis for the search for new knowledge.

This will determine how to go through the basic and complementary materials that contain the elementary contents to be studied by teachers.

In order to be able to describe and identify the common characteristics associated with the computer security plan concept, synthesizing and relating them in a summary table, thus complying with other activities foreseen in didactic unit number two with a view to establishing knowledge.

Once the computer security plan concept has been dealt with, the procedure for the elaboration of a computer security plan will be worked on.

How will this be done? In a similar way to the way used in the formation of concepts.

How will it be introduced? by analyzing the study guide, interacting with the basic and complementary materials to identify and relate the steps or successions of fundamental indications to be taken into account in the elaboration of a computer security plan.

In relation to the problemical resolution, which will have its maximum expression in the development of face-to-face meetings, considering to concretize from that space the project approach, stimulating the application of the acquired knowledge to the real conditions of the educational entity?

How will it be introduced? Starting from the analysis of the study guide, implementing the IT security inspection guide to identify and relate the existing problems in the elaboration and implementation of an IT security plan with a view to making critical assessments and proposing possible solutions.

In this way, the instrumentation of the teacher's preparation in computer security is carried out through the use of EVEA and face-to-face meetings integrated in the B-Learning educational modality.

From this point of view, it is necessary to refer to the main results provided by the work.

Main results

It promotes a flexible form of preparation in computer security directed to the teacher of the Polytechnic "Julio Antonio Delgado Reyes" that proposes the solution to a problem derived from the ethical, responsible and safe use of ICT.

It contributes to the preparation in computer security of the teacher from the work place, adjusting it to the real conditions of the educational entity.

From the pedagogical point of view, it offers the possibility of using a multiplatform technological tool that facilitates not only the insertion and systematic updating of available information, but also the use of tools for activity and communication, facilitating collaborative work and reflection on computer security issues.

Conclusions

This work proposes a methodological alternative based on the B-learning educational modality, aimed at improving the preparation in computer security of the "Julio Antonio Delgado Reyes" Polytechnic teacher. This alternative was elaborated taking into account the real conditions of this type of educational entity and the professional performance mode of the teacher who works in it. It also offers the structuring of the contents in computer security in a classroom and distance way with the use of Virtual Learning Environments.

The way in which the elaborated alternative is projected contributes to the search for new knowledge in computer security, in a collaborative and reflexive way, favoring the ethical, responsible and safe use of ICT from the Technical and Professional Education and its subsequent use in the different educational processes.

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