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Training in project management and international certification models.

Computación con palabras en la evaluación del proceso de formación de master a distancia

Computation with words in the evaluation of the distance master training process

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Abstract

Within the framework of the training activity, the vertiginous pace of our era makes it necessary to incorporate Information and Communication Technologies (ICT) into the educational context to generate new paradigms that favor the development of cognitive and meta-cognitive skills in the student body from the design of techniques that favor the construction of active, participatory and constructive learning capable of allowing students to respond to problems and situations in their real context.

Today the Internet has become a facilitator of knowledge, as it makes information available to society that, under a logical, sequenced and properly analyzed structure, can lead to the design of socially relevant educational programs taught through this innovative network, step to what is known as E-learning, generating new teaching-learning models, allowing ICT to contribute to the improvement of results in the educational field.

At the University of Computer Science, the Master's Degree in Computer Project Management has been taught in its remote modality since 2018 with the use of Ecosystems and teaching platforms with palpable results in the period worked. The objective of this work is to use computing with words, to show the results achieved in the training process of the Master's Degree in Computer Project Management in its remote modality, with the use of information technologies

Key words: Virtual classroom, Ecosystems, Computing with words, Virtual Training, Teaching platform

Introduction

Virtual platforms have produced significant changes in education, which produce new forms of knowledge transfer since, through information and communication technologies, new paradigms are being created in the teaching-

learning process, where society makes use of intensive use of all technological means and computer applications that reduce the time of activities that decades ago was complicated in their process and development.

The aim of this research is to define the importance of the use of virtual platforms, since their improvised use produces loss of interest in students and an unimportant tool in teachers.

In the classrooms, in practice, evaluation is still applied as the central axis, which is why at the moment we are venturing into mixed teaching, which not only emphasizes evolution, but also that students are able to build knowledge and get actively involved in the teaching-learning process. Current teaching promotes the use of technological means that achieve the result of the active participation of students through technological networks. That is why it is important to recognize that virtual platforms in the teaching process become an active agent in the activities, in the evaluation and in the co-evaluation, since they carry out many procedures that were done before by independent impressions and presentations in one or several storage media, now becoming a single virtual social media that enriches self-evaluation among students. [1],

Information and communication technologies man-age to occupy very important spaces in education, where new learning environments that diversify training in educational institutions are being developed each time, and these environments are well received by students, as they show interest in the pursuit of knowledge.

It is noteworthy that the educational system under-stands the trend of the use of ICT to go according to the new demands of society.

Teaching at a higher level is developing alternatives so that teaching is transformed, due to the new times, demands and updated education. [1] According to Baelo and Cantón, the new demands in education focus on improving the educational process and, in this sense, the integration of ICT facilitates aspects related to the improvement of individual work, the autonomy of students, the facility for the development of team and collaborative work, the possibility of modifying and adapting evaluation methods and the two-way interaction between teachers and students.

Higher education and the teaching staff have made great strides in improving education, but it is also important that habits of using technological means continue to be developed, but with a focus on cognitive growth, not only as an educational tool. Work, but as a catalyst for education.

Duar, J. [2] (2008) indicates: the incorporation of information and communication technologies in higher education supposes a commitment to a truly competitive university that tries to promote lifelong learning, which will have a powerful impact on the strengthening of quality and the expansion of distance universities.

Actually, with the help of ICT, a competitive education based on the quality of good use by teachers and students is obtained, marking a systematic progression with very ambitious results that precisely evolves positively in the teaching processes.

At the University of Computer Sciences in Cuba we have the National Center for Distance Education (CENED) [3], which contributes to the development of this type of training, increasing its application with the exploitation of the Virtual Classroom CENED, applying their own distance education model.

The first remote edition of the Master's Degree in Computer Project Management is currently under-way, where, in conjunction with CENED, through the use of the Virtual Classroom platform (aulacened) and the ecosystem (GESPRO), each of the courses to receive as part of their academic training is made available to students.

Materials and Methods or Computational Methodology

In the field of the Cuban software industry, the University of Computer Sciences (UCI) constitutes an institution with peculiar characteristics given its novel university-business model. This institution integrates undergraduate and postgraduate academic training activities, research and software development (Romillo Tarke, et al., 2013). The increase in its production commitments and the magnitude of the products to be developed created the need for a computer tool to manage the projects in its network of centers. This is how the Xedro-GESPRO package for help in decision-making and integrated project management emerged (Piñero Pérez, et al., 2014). [4] This suite, based on Redmine and other free tools, is governed (Piñero Pérez, et al., 2013) [5] by the PMBOK standard (PMI, 2017), [6] the CMMI model (SEI, 2010) [7] and the good practices of the training program of the Master in Project Management of the UCI (Piñero, et al., 2008) [6].

This section explains how the research was done. It describes the design of the research and explains how it was carried out, justifying the choice of methods and techniques so that a reader can repeat the study.

GESPRO ECOSYSTEM

The GESPRO Ecosystem: is a Suite that combines the use of a computer solution for the integrated management of projects and a specialized training system in project management. It enables the planning, control and monitoring of projects and the resources associated with them, in alignment with the strategic projection of the organizations.

This Project Management Suite is presented as a service-based business model that combines the use of an IT solution for project management and a specialized training system in project management. This combination enables not only the computerization of project management in organizations, but also the continuous improvement of their planning,

monitoring and control processes. It is a computer solution completely based on free technologies. This suite is made up of a set of plugins that cover all areas of knowledge of project management, in coherence with the main standards of this science.

The students set up the project in the ecosystem and through a set of indicators, monitoring, control and evaluation of each of the activities that take place during the project are given, this allows the teachers to evaluate the performance of the students. in the project area corresponding to their subject.

AULACENED PLATFORM

The National Center for Distance Education is an academic organization created to contribute to the development and excellence of distance and blended education in Cuba, increasing its competitiveness through the dissemination, continuous improvement and application of ICT . This platform supports a set of Database servers, among the most used such as: PostgreSQL, MySQL, Microsoft SQL Server and Oracle Database. It is compatible with any Internet browser that complies with current standards. It has a simple, light and efficient navigation interface, with a wide range of resources for the creation of activities during the assembly of assignments and access through devices, both fixed and mobile [2]; [9].

The CENED at the UCI contributes to the development of teaching programs in the virtual modality, as well as the design and evaluation of courses and educational resources to support this type of training (CENED, 2018)

Results and discussion

During 2018, the group from the Project Management Research laboratory worked on the first re-mote edition of the Project Management Master's Degree, to teach it, the entire organizational structure was mounted on the aulacened.uci.cu platform and informative and a total of 13 subjects, of which 11 have been published and taught.

For the development of the activities that facilitate the acquisition of the practical skills of the professional in this field, a training platform in Computer Project Management was developed gespro.uci.cu with its corresponding help for the use of the re-sources provided by the same, through which the Teacher develops all the stages of a project, assessing its progress over time and the behavior of its indicators, moving through the areas of knowledge of this specialty and facilitating the evaluation of their performance, serving support to 11 of the 13 subjects that make up the master's degree for 85% integration. Table 1 shows the courses taught with the use of GESPRO and aulacened.

Table 1. Courses taught in the Master of Computer Project Management.

Curse	Editions	# of study	Platform used	
			GESPRO	aulacened
Leadership of Excellence	1	18	no	yes
Negotiation	2	33	no	yes
Basic Course on Project Management	4	41	yes	yes
Risk management	3	29	yes	yes
Human resources management	1	18	yes	yes
Management of Project Oriented Organizations	1	7	yes	yes
Integrated Project Management	1	6	yes	yes
Scope and Time Management	1	10	yes	yes
Cost and Procurement Management	1	23	yes	yes
Quality management	1	10	yes	yes
Thesis seminar		36	yes	yes

COMPUTER METHODOLOGY

A survey was conducted on a group of 44 students, a representative sample, taking into account that it constitutes the majority of the population, to find out their opinion regarding the care provided by the teachers and the quality and timeliness of the contents. Received, taking into account the courses published in the Virtual Classroom, it was processed taking into account the uncertainty of the information present in the evaluations issued by the students regarding the courses received. For this, the computational technique with word (CWW), exactly 2-tuples, was used.

The survey was applied to students in 4 of the subjects: Basic Course on Project Management (CBGP), Risk Management (GR), Thesis Seminar (ST) and Negotiation (N). The results of the preferences issued by the students are shown in table 2.

Table 2. Student preferences by course.

Cursos	Criteria / CTL	None	Under	Half	High	Very high
CBGP	Teachers' attention			4	25	9
	Quality and timeliness of the content			4	22	12
GR	Teachers' attention			3	7	7
	Quality and timeliness of the content			3	7	7
ST	Teachers' attention	1	3	10	16	3
	Quality and timeliness of the content		2	6	17	8
N	Teachers' attention				6	9
	Quality and timeliness of the content			1	8	7

The results were expressed in 2-tuples and the general evaluation for each subject was obtained as shown in table 3.

Table 3. General assessment of the subjects

Course	Criterion	Course evaluation (evaluation; precision)
CBGP	C_1	(Alto; 0,17)
	C_2	
GR	C_1	(Alto; 0,24)
	C_2	
ST	C_1	(Alto; -0,20)
	C_2	
Neg	C_1	(Alto; 0,49)
	C_2	

The criteria shown in table 3 indicate that the stu-dents give the high evaluation to the subjects in terms of the attention of the teachers and Quality and timeliness of the contents.

APPLICATION OF THE PROCEDURE FOR THE EVALUATION

In the master's degree, a guide for evaluating the quality of a guide for evaluating the quality of virtual training in project management was applied, defined by three fundamental steps (quality planning, developing project management activities). quality assurance and develop quality control activities), organizing the system of indicators for evaluation in five variables (Nayma 2019) [3] as shown in table 4

Table 4. Evaluation of the variables according to the student role.

Variables	Evaluation
Variable Cloister	MB, 0.3
Variable Infrastructure	MB, 0.2
Variable Relevance and social impact	E, -0.4
Variable Students	MB, 0.5
Variable Curriculum	MB, 0.3

In this analysis of the Cloister Variable it can be verified that most of the students agree with the program and in the general evaluation of its criteria according to the variables show the quality of the guide, allowing to detect that the students, despite evaluating of Excellency (E) the publications associated with the research lines of the master's

degree, of Very Good (MB) the publications in one of the four groups established by the MES in the last five years and papers presented at scientific events of national and international prestige in the area of knowledge of the master's program, 8.33% of indeterminacy is shown in these criteria since some do not have a good internet connection, they do not use the main bibliographic managers to keep informed about the more recent research and others do not take time to mention which of them were of interest to you. In the analysis of the Infrastructure Variable, it can be seen that most of the students evaluated the criteria as Very Good (MB) in a general way, but some weaknesses of our virtual training process were registered, which are mentioned below:

Improve teacher / student exchange of each course through the teaching platform.

• Have better accessibility to GESPRO.

• Flexibility with dates to carry out questionnaires and delivery of tasks.

• Better connection to the internet and the teaching platform.

In the Curriculum Variable, the only element that raised doubts is the time used for the development of evaluative activities, where it is suggested to expand it in several subjects of the master's degree, especially those that make up the list of compulsory courses.

The Variable Relevance and social impact and the Variable Students did not show indeterminacy in any of their criteria and were evaluated as Excellent (E) and Very Good (MB) by all the students surveyed.

The table 5 shows the evaluation for each variable issued by the graduates.

Table 5. Evaluación de las variables según el rol de egresados

Variables	Evalutión
Variable Cloister	MB, -0.1
Infrastructure Variable	MB, -0.4
Variable Relevance and social impact	MB, 0
Variable Students	MB, 0.2

All the variables were evaluated as Very Good (MB) by the graduates surveyed, showing their satisfaction with the virtual training program and its quality. The following table shows the evaluation for each variable issued by the teachers.

Table 6. Evaluation of the variables according to the role of teachers

Variables	Evaluación
Variable Infrastructure	B, 0.1
Variable Relevance and social impact	B, 0.2
Variable Students	B, 0.3
Variable Curriculum	B, 0.5

The surveyed teachers evaluated the variables as Good (B) in a general sense. The following table shows the evaluation for each variable issued by the managers.

Table 7. Evaluation of the variables according to the managerial role

Variables	Evaluación
Variable Cloister	MB, 0.5
Variable Infraestructura	MB, 0.3
Variable Pertinencia e impacto social	E, -0.4
Variable Estudiantes	MB, 0.2

In general, the managers issued evaluations of Very Good (MB) and Excellent (E) regarding the variables evaluated. Paragraphs should be written in Times New Roman at 11 points and 1.5 spacing with a blank line as a separator.

CONCLUSIONS

1. The application of word computing allowed obtaining results with less degree of uncertainty during the evaluation process of distance training corresponding to the master's degree in computer project management
2. The surveys carried out to evaluate the attention of the teachers, the quality and timeliness of the subjects mounted on the aulacened platform yielded a high level of satisfaction.
3. The results obtained in each subject taught show the level of use of the GESPRO ecosystem and the aulacened platform.

4. The application of the guide to teachers, students and managers yielded satisfactory results in the indicators that reflect the quality of the virtual training process with the use of the GESPRO ecosystem and the aulacened platform.

.References

1. Víctor Fernando Barrera Rea y Ana Guapi Mullo julio 2018: "La importancia del uso de las plataformas virtuales en la educación superior", Revista Atlante: Cuadernos de Educación y Desarrollo ().Retrieved from https://www.eumed.net/rev/atlante/2018/07/plataformas-virtuales-educacion.html //hdl.handle.net/20.500.11763/atlante1807plataformas-virtuales-educacion.

2.Plataformas. Universia. [En línea] 02 de 11 de 2017. Retrieved from http://noticias.universia.edu.pe/educacion/noticia/2016/07/14/1141829/plataformas-virtuales-educativas.html.

3. Martín, N.: 2019. "Guía para la evaluación de la ca-lidad de la formación virtual en gestión de proyec-tos", Tesis de maestría, Universidad de Las Cien-cias Informáticas, Ciudad de La Habana.

4. PEDRO Y. PIÑERO PÉREZ, ET AL. 2014. SISTE-MA DE INFORMACIÓN PARA LA GESTIÓN DE ORGANIZACIONES ORIENTADAS A PROYECTOS. V Congreso Iberoamericano de Ingeniería de Proyectos, CIIP. Retrieved from http://congreso.riipro.org/index.php/CIIP/V-CIIP/paper/viewFile/105/31

5. PIÑERO, P.; PÉREZ, I. 2015. Modelo de desa-rrollo de software basado en líneas de productos de software y ecosistemas de software. Reporte de Investigación. Laboratorio de investigación en Gestión de Proyectos, Universidad de las Ciencias Informáticas. La Habana, Cuba.

6.SEI. CMMI FOR DEVELOPMENT V1.3. ANSI/AGMA ISO 2008.17485-A08: Bevel Gears -- ISO System of Accuracy, American Gear Manufacturers Association (AGMA), Alexandria, Virginia, USA,

7. PROJECT MANAGEMENT INSTITUTE.2017. Newtown Square, Pennsylvania 19073-3299 USA. ISBN 978-1-62825-184-5. Retrieved from http://www.pmi.org/.

8. FELIX-BENJAMÍN, G. 2015. Aplicación de la computación con palabras en la evaluación del impacto de la capacitación. págs. 39-48. Three-Dimensional Gear Crack Propagation Studies, National Aeronautics and Space Administration, TR: NASA TM-1998-208827, Washington, DC, Dec. 1998.

9. MOODLE 3.7 RELEASE NOTES. Retrieved from https://docs.moodle.org/dev/Moodle_3.7_release_notes