Self-learning in virtual environments of students of postgraduate students at the Autonomous University of Zacatecas

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Abstract

The research problem detected in online postgraduate students of the Master's Degree in Educational Computer Technology of the Autonomous University of Zacatecas is the "Absence of adequate skills and strategies for the management of their own knowledge in the virtual environment", this study has The purpose of determining the main factors that influence self-learning in virtual environments. For that, an instrument with quantitative variables and a non-parametric analysis was applied based on the Ji2 independence test, with a level of significance and the results affirm that "Self-learning in virtual environments" depends to a greater extent on the "Self-assessment of learning". It is concluded that the promotion of self-assessment of learning with an individual self-diagnosis of the technological skills in the search for information on the Web, such as enabling students to learn to rank their knowledge acquired in such searches, Self-learning in postgraduate students In virtual environments, would consolidate and impact on the quality of online education that is currently offered at the Autonomous University of Zacatecas.

Self-learning, Knowledge management, Virtual education

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Introduction

Self-learning or self-management of knowledge is important in the academic training of students of any level of education, however, as regards on-line modalities, it becomes more important, and undoubtedly one of the most important requirements for a Learning process more efficient.

The present research is focused on analyzing what factors are the most important in this ability that the virtual student should have, specifically what is referred to in the search of academic information on the Web through planning in their searches, the choice of Effective strategies and the self-assessment aspect of the knowledge itself, the above in a pertinent and current scenario, such as the online postgraduate offered through the Master's Degree in Information Technology Education (MTIE) of the Academic Unit of Higher Education (UADS) of the Autonomous University of Zacatecas (UAZ).

The research work is elaborated in five sections which comprise the stages. The first section includes the definition of the research problem, as well as its antecedents and justification, also includes the objective and research questions the hypothesis to prove and the limitations and scope of the results.

Section number two includes the theories that frame the research topic, as well as the teaching and learning process, both in postgraduate studies and with the use of ICTs, theoretical approaches to self-learning and their relationships with self-evaluation within environments Virtual, the concept of Web 2.0 and the search processes on the Web.

The methodological design of the research contemplates the type of research applied, which for this case is empirical, explanatory, applied and quantitative, the sample was of the intentional non-probabilistic type, for having focused the object of study with the criterion of "students with more experience in managing virtual platforms , "instruments of data collection were validated with the Alfa statistic Cronbach, and statistical analysis supported by descriptive analysis, contingency tables and chi 2 independence, the above within Of chapter three.

Section four shows the results obtained in order, that is to say, the description of the sample is first shown in its own characteristics of the investigation, then contingency tables are made between variables that present significance in self-learning, and this chapter is completed with tests Chi2independence and discussion.

The conclusions are reflected in section five of the present study and it is organized according to the objectives achieved, the verification of the research hypothesis, and suggestions for future research and a proposal for improvement for the postgraduate intervention.

General problem conception

In speaking of education, it is necessary to locate the central place of the cultural evolution of humanity, this is given by the contiguous world where it turns on the human and the universe in a general, and this is from generation to generation and affirms the permanence of the continuity of humanity.

Education is a key element in the humanized function, Diaz & Quiroz (2001), define education as; "A process and as a result of training undertaken by members of societies."

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This is a step towards acquiring the ends determined by the sociocultural context of each society and historical epoch for the attainment of an ascent in other extensions of the development of its personality.

In order for the objective of education to be fulfilled, it is necessary to count on knowing how to be, to do and to coexist, being born as a scholarized phenomenon, which represents a conscious process deliberately planned, planned and carried out in educational institutions, for Flórez (2006) The definition of education is understood as: "An active, conscious and effective process in the integral development of the individuals of a society through the creative assimilation of the experience of that society and humanity in its material and spiritual production".

The learning of each culture demands the formation of a knowledge which is substantially related to the systems of representation in which that knowledge is conserved and transmitted by the absolute knowledge technologies in a society, Pozo (2006).

The need to develop a new way of learning is established by the characteristics of the complex thinking paradigm.

The emerging paradigm of complex thinking is transforming our way of seeing the world, awakening the consciousness of the relativity of knowledge and the leading role that fulfills the subjectivity of observer in the construction of reality (Wilber, et al, 2004).

Converting information with organized and meaningful knowledge requires an enormous capacity for reflection, where clear criteria must be faced in the face of the uncertainty of not knowing exact and reassuring answers, this only leads one to think that now the student must.

Have the capabilities to search, select and interpret information, for navigation in a chaotic computer flow, Pozo (2006).

It is understood in this way the way in which education is taking a formative role to discern and take position in front of the facts, that is to say: "What the students need of the education is not so much more information, that can certainly need it, But the capacity to organize and interpret it as well as to make sense of it, "Pozo (2006).

The present society is known as a society of continuous learning (Pozo, 2006), where learning is not limited by time and space, but becomes part of life within the habitual spaces of the human being, this Emphasizes learning to learn, where each student organizes and manages his learning individually.

This means that if current society is interested in satisfying the demands of education, its main key will be to foster students' knowledge management skills or meta-cognitive management, in this way they will be able to face the tasks and challenges Which await perspective in the knowledge society "(Pozo, 2006).

Teaching within a space of collective construction of knowledge, give great experiences of autonomous and self-directed learning promoting teachers to a reflection of the strategies used.

The constant transformations that Education Psychology has had in 30 years has caused self-regulated learning to become a transcendental subject within research and as a fundamental axis of educational practice (Pintrich, 2000).

Beltrán (1996), I believe that learning is an active, cognitive, constructive, meaningful, mediated and self-regulated process.

In order for a learning to be meaningful and self-regulated, education will have to support students to be aware of their thinking, to be strategic and to guide their motivation towards their own goals, the goal of which is for students to have the need to move from teaching self-reflexive practice, (Schunk DH, & Zimmerman BJ, 1998).

Today education undergoes far-reaching changes, especially in a paradigm shift in the idea of how to teach and learn. This change is highlighted because the learning centered on the teacher, where he had the knowledge from which he would receive and assimilate passively, and the modification is given by emphasizing learning as a central part of the student, becoming a proactive construction Of knowledge, where the teacher becomes a facilitator or guide of learning, in search of an autonomous learning.

That the student works autonomously, does not speak of isolation or abandonment, if not autonomous or self-regulated learning gives the necessary skills and self-management, self-knowledge, as well as having responsibility and self-control of the learning process By the person calling it self-regulation of the learning process, (Fuentes, S., & Rosário, P 2013).

Students with these characteristics are said to learn and improve compared to those who attend passively waiting for the teacher to transmit knowledge, it has been found that those who have greater persistence have a higher motivation, learning more effectively And deep with greater interest and with a positive attitude to learning objectives, (Schunk & Zimmerman, 1998; Pintrich, 200).

Previously, it helps researchers to analyze students' needs, to know about themselves in order to overcome their limitations and achieve their goals (Valle, A. et al., 1999).

Late last century, the concept of learning to learn is reported, is impregnated and supported by the constructivist practice that encourages students to take responsibility for their educational act for their learning, (Rosario, P & Almeida, L.1999).

At present, education is constantly changing in the way it works in the educational field, focusing on younger generations.

It then speaks of a total modification by the teacher from his / her part of cognitive mediation in the processes of education where the student becomes the center of learning, giving greater importance to autonomous and permanent learning, with the introduction of the tools of technologies Informatics and communication more accentuate the self-learning.

Frangniere, G. (1994), points out that the formative processes must be parallel to the transformation of the environment, speaks of a different scenario in Europe and in the world taking into account the fundamental mutations of the human condition.

The Information and Communication Technologies, contribute to the idea of a quality beyond a certain space and time generating virtual and shared spaces.

The origin of Information Technology and Communication (ICT), emerged at the end of the last century with a growth of great importance, this concept emerges as a convergence of electronic technology, software as well as telecommunication infrastructures, and combining these three concepts Communications are born which open up new horizons and paradigms.

But the evolution that this has had since the 1970s, starting the development of the digital age, in the early 1980's have given an electronic, computer and telecommunications affinity enabling the interconnection of networks , In this way ICT becomes a strategic sector for the new economy.

The inclusion of ICT within the education sector becomes an indispensable component of the information that is now in the computers, which helps to process data, saving time and effort. Bell D. & Brooks H. (1984) define technology as: "The use of scientific knowledge to specify ways of doing things in a reproducible way", this leads to the fact that information technologies are not only generative tools Of final products, but are scientific processes whose main objective is to create knowledge, this speaks of not only is a technical space but also achieves the creation of new forms of global communication.

Then the information technology revolution provokes a crucial and decisive point at the global level, representing the process of democratization of knowledge.

During the last years, different ways to confront the new teaching-learning paradigm have been advanced within the universities, specifically the universities that are managed towards the methodological innovation of ICTs, which play a relevant role. This includes acquisition and development by the teacher, creating the necessary competences that integrate it within the ICT in the teaching-learning process, (UNESCO, 1996).

Learning in the present age is considered as a cognitive process, meaningful and complex, which requires the construction of knowledge from the student who learns, which drives the strategies appropriate to the situation or information of what he wants to be learned, (Zimmerman & Schunck, 2011).

The student must have a process of self-regulation which facilitates the control of what is performing, all this means that it must have autonomy, initiative and decision in the learning process.

One of the educational models accessible to the higher education level that fosters lifelong learning through an innovative educational method that develops critical thinking and student-centered creativity as established by the 1998 World Conference on Higher Education in Paris , Is the model of distance education in its various modalities and nowadays are possible thanks to information and communication technologies, and in the educational field known since the sixties as educational technology, booming in the United States since The 70s.

Distance education was defined by Schlosser & Simonson (2009), and was adopted by the British encyclopedia, such as formal education based on intuition where the learning group is separated and where interactive telecommunications systems are used to connect apprentices, Resources and instructors. To meet the educational demand with coverage and flexibility, distance education is one of the models that began decades ago in universities in Europe and North America. Today, this educational model is still in force and thanks to the development of the information and communication, takes force in institutions at world, national and state level.

The integration of ICT in the teaching and learning process in Universities at international and national level, particularly in the Autonomous University of Zacatecas (UAZ), began with the beginning of distance education at the postgraduate level.

This initiative dates back to November 2010, when it was restructured the postgraduate level Masters and Specialty of the Academic Unit of Higher Education, to achieve this objective, a curricular commission was established that established the stages and mechanisms of the process and determined the work centers Which will make it possible to achieve the goal already set. Thus, in February 2011, three educational programs were completed: the Specialization in Information Technology for Education (ETIE) online (the first distance academic program in the UAZ), the Masters in Humanities and Educational Processes (MHPE) Master's Degree in Humanistic and Educational Research (MIHE) with research orientation.

The MHPE was designed with three terminal outputs: in Institutional Processes, in Teaching History and in Educational Technology, the latter under the distance modality.

However, the MHPE with orientation in Educational Technology, was redesigned by its online modality and to be able to apply at the time to the National Program of Postgraduate Quality (PNPC), as a graduate of the non-school type, in the redesign is approved for October Of 2015 the Master's Degree in Information Technology Education (MTIE) as an independent academic program but related to the ETIE in its online mode.

The relevance of this academic program is consistent with state and federal policies according to the basic, higher and postgraduate educational reforms of both private and public institutions, highlighting the importance of incorporating ICT in teaching and learning processes.

In view of these policies and the Institutional Development Plan (2012-2016) of the UAZ, which also includes in one of its main axes the use of Educational Technologies in all its teaching activities and the increase of academic programs online.

The importance of online mode and MTIE is known for the fact that it optimizes economic resources, especially in relation to physical infrastructure of classrooms and buildings, and maintenance and service costs, savings in the displacement of Students from their homes to schools, and fosters the culture of self-study and time management.

Disability, transitory diseases, natural, political and social contingencies, habits and customs, economic of marginal sectors, are an obstacle that prevents the achievement of the objectives of a face-to-face academic program, especially public universities. Distance education and the MTIE is a solution to cover these gaps that prevent the coverage of demand from all social sectors.

The inclusion in the curricula of the use of the free software of digital material in the training of teachers of the MTIE gives an opportunity to the education of knowing the diversity of computer material with license of use and closed code and the one of open code. Without the use of paper in all academic activities, it contributes to the protection of the environment and ecological sustainability.

The purpose of the MTIE educational model is to respond to the missions and functions embodied in international declarations such as the 1998 World Conference on Higher Education in Paris and the UNESCO World Education Forum in Dakar 2000 Key to the development and implementation of educational systems of institutions of prestige worldwide and on which the UAZ Siglo XXI educational model is based.

From these it is derived that higher education must be a student-centered education, through professional training in both the theoretical and practical aspects, with open and flexible academic programs for all and for life, incorporating the use of the technologies of Information and communication (ICT), as well as a sustained education in research. To achieve this requires a model that responds to the educational needs of the present and solve the problems that affect society.

It should be noted that the proper use of ICT and educational technology depends at all times on the instructional design implemented in such a way as to guarantee a teaching-learning process with quality.

In accordance with the international proposals and the educational demand of the entity and the country, the educational model of the MTIE was designed under an instructional model called ASSURE, developed by; Smaldino, Russell, Heinich and Molenda in 2005 to be offered through a distance education system under online mode.

Definition of the problem

For the realization of this study and definition of the problem to be investigated, it was based on a premise which starts from a dangerous expectation considering that online training requires little effort or minimal application on the part of the student. However, online learning requires as much effort as any learning in other modalities and, the most relevant is that the student has knowledge of the virtual environments, know where he is, what he needs and know how to get it, read and write messages, read And study the learning material, comply with activities and tasks, pass the assessment tests.

The importance of defining the research problem clearly is the core of the work that was carried out, that is why we can define the origin of the problem with findings in the course of the studies of the students of the MTIE, these tracks were presented with most often in a "Lack of skills and appropriate strategies for managing their own knowledge in the virtual arena."

Unaware of strategies and skills in the learning environment and online communication in one of the limiting factors in online training, in addition a basic level of computer skills is fundamental for an online student that is why Hara & Kling (1999) point out that the level of online proficiency of the student can influence their level of frustration.
It is because of the above that the problem becomes important since virtual education should be a student-centered education, through professional training in both theoretical and practical, with academic programs open and flexible for all and for life, incorporating the use of information and communication technologies, as stated in the UAZ Institutional Development Plan 2016.

Justification

The non-presential modalities have become a hopeful measure to solve some problems of the Higher Education System in Mexico, however, there have also been criticisms and suspicions that their practice is far from being a real solution. The public institutions of higher education are making efforts to ensure that the studies offered meet the quality and relevance indicators, despite the fact that there is still a long way to consolidate the distance modality and to have validity and rigor within society.

Education systems that are supported by information and communication technologies must have a redefinition with respect to traditional models so that this becomes a process of teaching and learning adapted to the needs of those who study today, Already counting on new systems which aspire to an application adapted to the technologies.

The existence of computer technologies has given an innovative sense to education, its applications in the field of education at all levels of education are still the beginning of a new cycle of how to train human beings with self-learning skills in virtual environments.

Technology itself adapts to how, where, why and when learning is carried out, and all elements of teaching are involved; Institution, teacher and student.

It can be said that distance education models have their main emphasis on the student, which is why he becomes the main responsible for their success in this pedagogical model.

The present study shows empirical evidence that, despite confirming some of the factors that have been identified as causing the absence of skills and strategies in the management of own knowledge in virtual environments of students, also expose elements to To design the strategies that should be considered to mitigate them.

Self-management of student learning is a relevant element, without neglecting the part played by the teacher or facilitator as well as the part that corresponds to the well-designed and structured programs in the virtual platforms.

The planning of the web search, the change of ineffective strategies and self-evaluation in the performance of their school activities are considered as the factors that have a direct influence in the development of the good formative tasks of the student, with competences for the Self-learning in virtual environments.

When talking about the advantages that technological resources bring to the teaching-learning processes, there are many, however, it goes beyond just including them with technological tools, a planned, developed and validated pedagogical action is needed.

Objectives

General objective

Explain the main factors that influence self-learning in virtual environments of online postgraduate students of the Master's Degree in Educational Computer Technology of the Autonomous University of Zacatecas.

Specific objectives

1. Describe the skills of searching for academic documents on the Web of postgraduate students online of the Master in Educational Computer Technology of the Autonomous University of Zacatecas.

2. Identify the effective strategies, given in the decisions taken in the search of academic documents on the Web, for the achievement of the objectives of the students of the online postgraduate course of the Master in Educational Computer Technology of the Autonomous University of Zacatecas.

3. Explain the influence of self-assessment of one's own performance on school skills and its relation to the self-learning of online postgraduate students of the Master's Degree in Educational Computer Technology at the Autonomous University of Zacatecas.

Hypothesis

In order to define the research hypothesis, certain theoretical assumptions about the problem are addressed, ie, a question is raised about the main factors that are related to self-learning, in this way we propose the following research questions:

1.   Does planning and rectifying strategies in Web search for academic documentation lead to effective academic tasks for online graduate students?

2.   Does self-learning depend on the effectiveness of the academic tasks of online postgraduate students?

3.   Is self-evaluation in virtual environments a factor that must be considered to contribute to the development of self-learning for postgraduate students online?

The hypothesis to be tested arises as follows:

        Self-learning in virtual environments of online postgraduate students of the Master's Degree in Educational Computer Technology of the Autonomous University of Zacatecas is determined by the planning in the search on the Web, effective strategies and self-evaluation in the performance of their activities School children.

The variables to be considered in the study are reflected in: Dependent variable that corresponds to self-learning in virtual environments and in independent variables defined by Web search planning, non-effective strategies and self-evaluation of academic performance.

Saw. Limitations of the study

The main limitation of the present study is that it is a case study, the results of which are valid for the Master's degree in Educational Computer Technology of the Autonomous University of Zacatecas and for a given period.

        The variables considered are determined as nominal qualitative variables characterized by Likert scales, whose analysis must be performed with non-parametric quantitative statistics and levels of significance of 95%.

        The selected universe is representative of a generational court that corresponds to students of the fourth semester of the Master in Educational Computer Technology for the academic year 2015-2016.

        The data collection instrument was a questionnaire elaborated ad hoc digitally and presented in the platform for its application, validated for its reliability by the statistician of Crobanch Alpha.

        The results can be corroborated by applying the methodological design of the present research work.

Metodological design

I type of research

The objectives set and the research hypothesis as the main focus of this study contemplate describing the main factors that influence self-learning in virtual environments.

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In particular those that imply the non-effective search strategies academic documents on the Web and self-evaluation of the own performance in school skills, of the postgraduate students online of the Master in Educational Computer Technology of the Autonomous University of Zacatecas.

For Murillo, W. (2008), applied research is called "practical or empirical research", which is characterized because it seeks the application or use of the knowledge acquired, while others are acquired, after implementing and systematizing Research-based practice. The use of knowledge and research results that results in a rigorous, organized and systematic way of knowing reality.

Therefore you can define this work as an applied research aims as the solution to immediate problems to transform teaching and raise the quality of education based on self - learning students graduate UAZ online.

It is of explanatory type or confirmatory since its goal is the explanation of the phenomena that include non-effective search strategies academics in Web documents and self - assessment of student performance and its relationship with independent learning in virtual environments.

Bavaresco (2006) indicates that this type of research pretends the search, the discovery, the reasons or the reasons of the raised problems. Similarly, Hernández, Fernández and Baptista (2006) consider that explanatory research goes beyond the description of phenomena, that is, they are completely directed to respond to the causes of events and physical or social phenomena. In sum, explanatory research, as its name indicates, has as its main function to find the cause of events or phenomena, that is, to find and identify what is considered the origin of a specific event, in a given case an investigation.

According to the study approach can be defined as a quantitative research, since it mainly focuses it is observable and susceptible aspects qualify them using the empirical methodology analytical and applying statistical suitable for data whose nature come from qualitative variables of nominal type and ordinal.

Hernandez, Fernandez and Baptista (2006) explain that in it, the researcher uses more detailed tools, methods and numerical formulas that allow the solution of a problem.

In this research, a specific statistical analysis is based on the observed and expected frequency measure of central tendency as the median and is known as nonparametric statistics applies.

According to the physical location of research, even if it is virtual can be defined as a field research, as occurs in the natural place of the objects of study is, students graduate MTIE and the results can be generalized in similar situations distance education in graduate school. Bavaresco (2006) indicates that this type of research is that which is done in the study site itself, where the object of it is; thus allowing further knowledge of research problem. According to Arias (2006) field research is one that involves the collection of data directly from the research subjects or reality where facts (primary data) occur.

Not to extend the theoretical knowledge nor reach general laws the ideographic research is that this study presents, and is set to an educational phenomenon in particular as a case study for a well - defined time and at a particular time, which is for students of fourth semester of 2015-2016 school year so also acquires a definition of transversal research . Arias (2006) defines transversal research as the study model by which the researcher has a period of time to run the research analysis.

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Population and sample

The population of students enrolled in the school year 2015-2016 the MTIE in the four semesters is 123 students each semester has four groups, the first two semesters are distributed according to their place of residence, ie groups A and B correspond to foreign students in the state of Zacatecas, and C and D students resident in the state, in the case of the third and fourth semesters distribution is limited to the seminars offered and have a maximum capacity of 17 students per group, and these are formed according to the registration of own students to seminars.

Therefore the universe of research to all students with tuition for the 2015-2016 school year, which has an N (population size) equal to 123 students defined.

The sample is one that can determine the problem and they can generate data with which to identify faults within the process. According to Tamayo & Tamayo (1997) state that the ¨ sample is the group of individuals that is taken from the population, to study a statistical phenomenon.

The sample obtained in the present study is supported by the technique of non - probability sampling and aspirational, the criteria for inclusion of the elements is as follows: The main criterion was to be taken into account students more experience in managing virtual platforms for which all students last semester of graduate studies were selected, ie the fourth semester whose sample (n) results from 33 students divided into groups a and B.

This type of non-probability sampling is the most used in this type of case investigations where there is a target very specific to qualify and where the sample is as representative as possible given the school career of distance students consistent with self-learning in virtual environments.

Techniques measurement tool

Obtaining information was performed with the application of a questionnaire administered to 33 students in the fourth semester of the MTIE constituting the sample, it is noteworthy that the questionnaire was applied online, for which the program was used LimeSurvey, same which allows the application of surveys and / or questionnaires online, and offers the ability to develop, publish and retrieve responses from the surveys, and can be exported to Excel and the SPSS (Statistical Package for the Social Sciences).

The questionnaire was designed according to the operationalization of the variables that define the objectives and research hypotheses, which includes 40 reagents which are the type of closed questions, the first 35 with a Likert scale; 1. Always 2. Almost always 3. Sometimes 4. And 5. Never almost never.

And the other 5 reagents with a measuring scale 1. Analyze the information, 2. Processes information, 3. You contrast with some other source, 4. You write in your work on the subject with your words, 5. The copies and paste it into your work without analyzing the information, 6. You make references on information, 7. You make all the above actions and 8. Do not take any action above.

This questionnaire was subjected to a reliability test to measure the degree of consistency in the answers and in turn validate the instrument in all its reagents with Cronbach's Alpha statistic.

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The result of the screening test as shown in Table No. 3, shows a very acceptable reliability for the instrument that was applied in this investigation.

Cronbach	N elements
0.824	35

Table 1 Statistical reliability

Thus each reagent is expressed in a vector of 40 variables, which in turn defined for each indicator and that related to the research objectives and hypotheses.

Study Concepts	Concept	Indicators (variables)	Unit of measurement
Self-learning in virtual environments	Self-Learning: How to learn by yourself.	X8, X10, X12, X14, X19, X23, X31, X32, X34, X36, X37	Likert scale and multiple choice
Plan Web search	Plan: It is a systematic model that is made before performing an action, in order to direct and manage it.	X1, X3, X6, X9, X11, X18, X20, X21, X22, X24 X25, X26, X27, X29	Likert scale.
Effectiveness of Web Search	Effectiveness: Capacity or ability to achieve a desired goal or purpose.	X5, X15, X38, X39, X40	Likert scale.
Self-assessment of learning	Assessment: Ability to judge their achievements regarding a particular task.	X2, X4, X7, X13, X16, X17, X28, X30 X33, X35	Likert scale.

Table 2 Operationalization of variables

Table iv contingenica and test of independence

Variable 1	Variable 2			Total
	Always	Almost always	Sometimes	
Always	6	1	0	7
Almost always	5	6	1	12
Sometimes	2	2	3	7
Hardly ever	6	1	0	7
Total	19	10	4	33

Table 3 Variable contingency table 1 * Variable 2

Test (chi - square) seeks to analyze whether two random variables are independent (or are not). That is, you want to test whether or not the occurrence of one of the attributes conditions (or not) the occurrence of the other. Features Attributes:

Each attribute that is tested is divided into "n" layers:

- Mutually exclusive

- Fully comprehensive

Test hypothesis:

Ho) the attribute attribute X is independent of Y

H1) the X attribute is not independent of attribute Y

Test statistic:

They are:

r = the number of mutually exclusive strata which divides the (X)
s = the number of mutually exclusive strata which divides the (Y)
ei = simple absolute frequencies observed in the sample
e i = simple absolute frequencies that would be expected if they were independent random variables (are calculated using the marginal probabilities).

$$\chi^2_{\{(r-1)*(s-1)\}} = \sum_{i=1}^{k=(r^*s)} \frac{(O_i - e_i)^2}{e_i}$$

$$Si : \chi^2_e < \chi^2_t \Rightarrow se\ rechaza\ Ho$$

(1)

Steps for crosstabulated

a) Ask hypotheses.
b) Define the alpha and establish the rule of decision.
c) Calculate the theoretical critical value of the test $\chi_t^2 = \chi_{(1-\alpha)}^2\{(r-1)*(s-1)\}gl$

d.1 Build a table that contains the observed values.
d.2 Build a table containing expected for the case that attributes are independent values.
d.3 Calculate the empirical value of the test using data from the above tables.

$$\chi_e^2 = \sum_{i=1}^{n=(r*s)} \frac{(O_i - e_i)^2}{e_i}$$

(2)

e) Comparing the theoretical value with the empirical and decide on the null hypothesis.

Descriptive Analysis

Answers	Frequency	Percentage	Accumulated percentage
Always	6	18.2	18.2
Almost always	fifteen	45.5	63.6
Sometimes	7	21.2	84.8
Hardly ever	4	12.1	97.0
Never	1	3.0	100.0
Total	33	100.0	

Table 4 The quiz is a capacity of his job performance

Regarding the ability to self-assess the student according to their job performance it is 45.5% almost always evaluate themselves in their practice, while 21.2% do it sometimes and 18.2% of students always evaluate themselves the tasks performed, while 12.2% of students almost never do a 3% admit never have self-assessed.
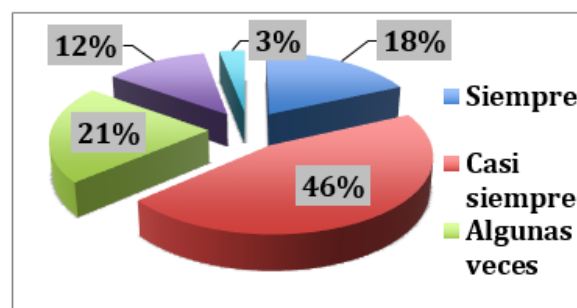

Figure 1 "The quiz is a capacity of his job performance.

Answers	Frequency	Percentage	Accumulated percentage
Always	17	51.5	51.5
Almost always	12	36.4	87.9
Sometimes	3	9.1	97.0
Hardly ever	1	3.0	100.0
Total	33	100.0	

Table 5 In assessing the task solving strategies are given

Punctually when they were questioned on the assessment of their tasks and the strategy used to improve these, 51.5% of students responded that employ strategies to improve their tasks, the percentage of students who almost always performed is 36.4% and 9.1% for those who only sometimes does and 3% for those who almost never seek a strategy for the resolution of their results.
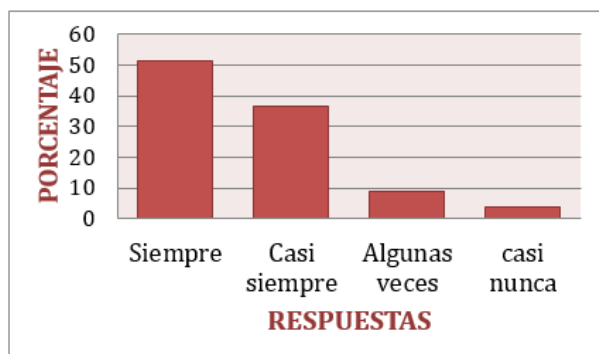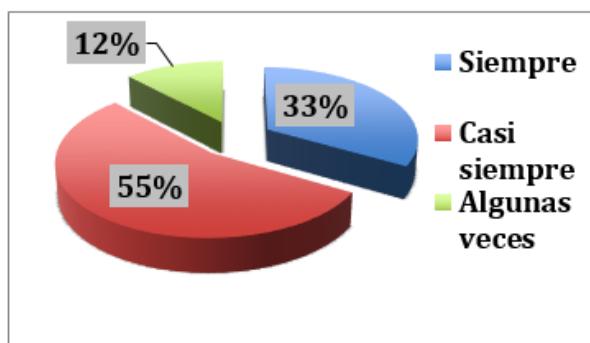
Figure 2 Graph "In evaluating the task-solving strategies are given"

Answers	Frequency	Percentage	Accumulated percentage
Always	eleven	33.3	33.3
Almost always	18	54.5	87.9
Sometimes	4	12.1	100.0
Total	33	100.0	

Table 6 Strategies are designed in search of information.

For a student makes their own strategies must have prior knowledge to carry out this practice, are generally students who raise the situation this way contemplate a strategy that will lead to the answer of research, as you may notice in table No.35 le 54.5% almost always done as opposed strategies 33.3% always have strategies to help them carry out a true and with the objectives set in each task or research investigation. 12.1% ensures only use sometimes as part of their investigations.


Figure 3 "strategies are designed in search of information"

Answers	Frequency	Percentage	Accumulated percentage
Always	eleven	33.3	33.3
Almost always	7	21.2	54.5
Sometimes	14	42.4	97.0
Hardly ever	1	3.0	100.0
Total	33	100.0	

Table 7 You learn from mistakes in use on the web.

Learning from their mistakes in the use of the web, 42.4% of students believe that only sometimes manage to have a learning from mistakes made while 33.3% say that it has always acquired learning fouls charged, leaving to 21.2% of those students who consider regularly, that is, almost always get a teaching oversights committed, having a 3% almost never has a learning Erras executed.
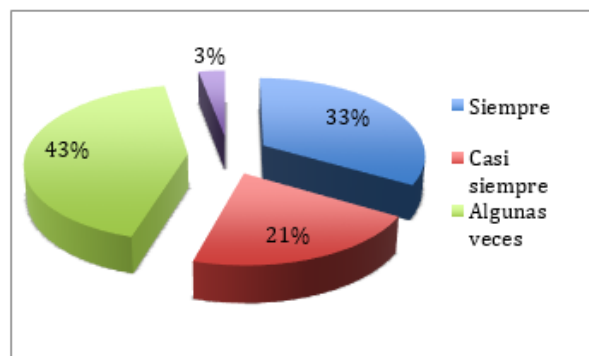
Figure 4 Graph: "You learn from mistakes in using the Web"

Analysis independence Ji 2

The results show the dependency (acceptance of H1), the main research concept "self - learning in virtual environments" with variables that define it, with the three concepts independent; "Plan Web search; Effectiveness of Web search and learning Self - Assessment" with the variables that are significant.

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Dimensión	Definición	Variables involucradas	Unidad de medida
Plan de búsqueda en la Web	Plan: Se trata de un modelo sistemático que se elabora antes de realizar una acción, con el objetivo de dirigirla y encauzarla.	X1, X3, X6, X9, X11,X18,X20, X21, X22, X24 X25, X26, X27, X29	Escala de Likert.
Efectividad de Búsqueda en la Web	Efectividad: Capacidad o facultad para lograr un objetivo o fin deseado.	X5, X15, X38, X39, X40	Escala de Likert.
Autoevaluación del aprendizaje	Auto evaluación: Capacidad de juzgar sus logros respecto a una tarea determinada.	X2, X4,X7,X13, X16, X17,X28,X30 X33,X35	Escala de Likert.

Table 8 Web searching plan

As shown in the table No.1 independent learning in virtual environments characterized by "feedback information through discussion forums, blogs, social networks, etc. "Is dependent Plan Web search characterized by variables " Planning for Web searches, Check whether the solution found corresponds to the objectives and Use information networks for conducting academic work ", the This is confirmed with a level of significance.

Variable dependiente (Y)	Variable independiente (X)	Ha
Y10= Retroalimentar la información en foros de discusión, blogs, redes sociales, etc.	X11=Planear las búsquedas en la Web.	**
	X18= Revisar si la solución corresponde a los objetivos planteados.	*
Y8= Corregir errores mientras busca información	X26= Encontrar en las redes la información para los trabajos.	**
	X8=Utiliza ejemplos de la Web como fuente de aprendizaje	**
	X11=Planear las búsquedas en la Web.	**
	X18= Revisar si la solución corresponde a los objetivos planteados.	*
	X27=El las bases de datos encuentra información para sus trabajos.	*
Y12=Aprender de los errores	X22=Utiliza buscadores en la Web.	**
	X26= Encontrar en las redes la información para los trabajos.	*
Y19= Reflexionar los pasos para llegar a la solución de un problema	X26=En foros de discusión encuentra la información.	**
Y23=Cuando resuelve el problema se pregunta si había otra forma de hacerlo	X26=En foros de discusión encuentra la información.	**

Table 9 Web searching plan

Dimensión	Definición	Variables involucradas	Unidad de medida
Plan de búsqueda en la Web	Plan: Se trata de un modelo sistemático que se elabora antes de realizar una acción, con el objetivo de dirigirla y encauzarla.	X1, X3, X6, X9, X11,X18,X20, X21, X22, X24 X25, X26, X27, X29	Escala de Likert.
Efectividad de Búsqueda en la Web	Efectividad: Capacidad o facultad para lograr un objetivo o fin deseado.	X5, X15, X38, X39, X40	Escala de Likert.
Autoevaluación del aprendizaje	Autoevaluación: Capacidad de juzgar sus logros respecto a una tarea determinada.	X2,X4,X7,X13, X16,X17,X28,X30 X33,X35	Escala de Likert.

Table 10 Search effectiveness in the wb

In the table No.2 other concept is the effectiveness of Web search that determines the behavior of self - learning in virtual environments, with variable arises "Changing ineffective strategy in the process of finding information" based on the independent variable "regarding reflects the achievements were" whose confidence in the assertion is

Variable dependiente (Y)	Variable Independiente (X)	Ha
Y14= Cambio de estrategia no efectiva en el proceso de búsqueda de información	X15=Se reflexiona con respecto a los logros alcanzados	**
Y19= Reflexionar los pasos para llegar a la solución de un problema	X39=Ver un video.	*
Y36=Consultar Blogs o foros de discusión	X38= Búsqueda en google	*

Table 11 Effectiveness of searching the wb

Dimensión	Definición	Variables involucradas	Unidad de medida
Plan de búsqueda en la Web	Plan: Se trata de un modelo sistemático que se elabora antes de realizar una acción, con el objetivo de dirigirla y encauzarla.	X1, X3, X6, X9, X11,X18,X20, X21, X22, X24 X25, X26, X27, X29	Escala de Likert.
Efectividad de Búsqueda en la Web	Efectividad: Capacidad o facultad para lograr un objetivo o fin deseado.	X5, X15, X38, X39, X40	Escala de Likert.
Autoevaluación del aprendizaje	Autoevaluación: Capacidad de juzgar sus logros respecto a una tarea determinada.	X2,X4,X7,X13, X16,X17,X28,X30 X33,X35	Escala de Likert.

Table 12 Autoevaluación

The self - assess the performance of its activities. The monitor the effectiveness of strategies, ask questions about it to seek and identify deficiencies in solving a task, determines the variable "Feeding back information in discussion forums.

Blogs, social networks, etc." in relation to the dependence that may exist between self - learning and self - learning in virtual environments, this statement is supported with proof of Ji 2 at the level of significance, as shown in the table No.3

Variable dependiente (Y)	Variable independiente (X)	Ha
Y10= Retroalimentar la información en foros de discusión, blogs, redes sociales, etc.	X13=Supervisar la efectividad de las estrategias.	*
	X16=Autoevalúa el despeño de sus actividades	**
	X30= Realiza preguntas sobre el tema a buscar.	*
	X35=Identifica sus deficiencias al resolver una tarea.	*
Y12= Aprender de los errores	X16=Autoevalúa el despeño de sus actividades.	*
	X30= Realiza preguntas sobre el tema a buscar.	*
	X33=Identifica los conocimientos útiles para solucionar un problema.	**
Y14= Cambio de estrategia no efectiva en el proceso de búsqueda de información	X17=Evaluar los resultados a mitad del proceso.	*
Y23= Cuando resuelve el problema se pregunta si había otra forma de hacerlo	X28=Confiar en que la información en la Web es verídica.	*

Table 13 Self learning

The "Self - assessment of performance of activities", "Ask questions about searching" and "Identifying useful knowledge to solve problems" determine the variable "Learning from mistakes" in relation to dependence that may exist between learning self - assessment and self - learning in virtual environments, this statement is supported with proof of Ji 2 at the level of significance, as shown in the table No.3

Variable dependiente (Y)	Variable independiente (X)	Ha
Y31= Comprende el problema ante realizar búsqueda	X33=Identifica los conocimientos útiles para solucionar un problema.	**
Y32= Conoce el tema antes de realizar la búsqueda	X33=Identifica los conocimientos útiles para solucionar un problema.	**
Y33= Identifica los conocimientos útiles para solucionar un problema	X35=Identifica sus deficiencias al resolver una tarea.	**
Y34= Diseña estrategias de búsqueda	X35=Identifica sus deficiencias al resolver una tarea.	**

Table 14 Self learning

Identify useful knowledge to solve a problem "determines the" Understanding the problem before search "and presents the No.4 table in a way which establishes the dependence of self - learning in virtual environments regarding the self - assessment of learning, somehow reliance on self -learning in virtual environments is established regarding the self - assessment of learning when the variable " Identifying useful knowledge to solve a problem" affects the "know your subject before search".

The " Identify useful knowledge to solve a problem" determines the variable "Identifying useful knowledge to solve a problem" in relation to the dependence that can exist between self - learning and self - learning in virtual environments, this statement is supported with proof of Ji 2 at the level of significance with a significance level, there is a dependency of the variable "Designing search strategies" with respect to the variable "Identify your weaknesses to solve a task", which determines the self - learning environments virtual regarding the self - assessment of learning

Discussion of results

According to the results obtained in the test of independence Chi 2, it can be said that the " self -learning in virtual environments" depends more on the " Self-learning" whose most recurrent variables in dependence are: X16: Capacity to evaluate themselves in the performance of their tasks, X28: Trust the information contained in the web and X30: Ask questions about the information about looking. These variables are significant in two statistical tests that determine the behavior of self - learning in virtual environments.

Recurrence of variable X33: Ask questions about the knowledge used to solve the problem, before the search is consideration as to define the behavior of self-learning in virtual environments by having significance in three statistical tests.

And the variable X35: Identify knowledge gaps to solve the task, greater impact presents four tests with significance and which defines the self-assessment of learning, which in turn has outstanding impact on self-learning in virtual environments.

The variables that define better the Plan Web search, with respect to self - learning virtual environments, are determined by X11: Planning the Web searches, X18: Check if the solution corresponds to the objectives, X25: In discussion forums find information and X26: Find in information networks for jobs.

Conclusions

In view of the research problem raised, which concerns the management of their own knowledge of graduate students online MTIE, and consistent with the overall objective of research which is to determine the main factors influencing self-learning. In virtual environments graduate students online Master of Information Technology Education of the Autonomous University of Zacatecas, one can conclude that the variables that determine the self-learning in virtual environments are: a).Correct errors while searching, b) is performed. Blog and forum feedback, c). Learning from mistakes in the search process, d). Changing strategies are not effective in the search process, e).Reflecting on the steps taken to find information on the Web, f). Raise the possibility exists another way to search for information, g). Understand the problem before search, h). It is known on the subject, i). Select only what he brings to the task. J).

Identify the deficiencies in the search y k). Use blogs and forums to analyze information.

In conclusion we can say that the self - learning in virtual environments for the case of students graduate MTIE develops when searching for academic information on the Web when "He knows and understands the subject of the task, is to reflecting on the steps, comparing the possible ways to search and identify individual limitations in skills of computer technology and learn and correct mistakes, selected only what really is important to the task at hand and use blogs and forums for feedback."

As for the specific purpose of describing the search skills academic papers on the Web graduate students online MTIE we can say that these skills are comprised of: a). Planning searches, b).Compare the results with the objectives, c). Find solutions in discussion forums d). Find information on social networks. As to identify effective search strategies we conclude that are defined by a). After the task is aware of the achievements, b). By using the Google search engine is analyzed, processed and contrast the information obtained c). The video is an effective strategy to find valuable information.

When it comes to self - assessment of own school performance skills and their relationship with independent learning in virtual environments can be seen that the most significant variables are: a).The ability to evaluate themselves, b). Relying on information found on the Internet, c).Questioning on the information from the Web, d). Prioritize the knowledge acquired in the search, and e). Accurate knowledge of deficiencies in search skills to perform the task, we can conclude that the objectives were met.

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According to the research hypotheses posed which states that independent learning in virtual environments is determined by the planning searches on the Web, effective strategies and assess themselves in the performance of their school activities we can say that this assertion is accepted.

Independent learning in virtual environments is defined as an independent variable mainly by the habit fed back into blogs and discussion forums should be noted that further precisely how this dependence is between the study variables, we can say with proof of independence Ji 2 with a level of significance that the self - learning in virtual environments graduate students online Master of Educational Information Technology it is determined mainly by the Self - Assessment in the performance of their own school activities, as regards the precise knowledge of deficiencies individual search skills to perform the task and rank the knowledge acquired in the search.

With regard to planning and effective strategies of search, the variables involved have a standard of behavior that has no advantage of one another that is simply self - learning dependence is given about them.

In general we can say that promote Self learning with individual self-diagnostic technology skills in finding information on the Web, such as encouraging students to learn to prioritize their knowledge acquired such searches, teach yourself on students the postgraduate course in virtual environments, would consolidate and impact the quality of online education that is offered today at the Autonomous University of Zacatecas.

For future research related to this research topic (self-learning in virtual environments), according to this experience, we can recommend that in addition to the instruments of data collection with accurate design and scales viable measurement, research is complemented by technical qualitative depth interviews and focus groups that provide a support that pays more research results.

One of the advantages of online education is undoubtedly the power to create non - curricular continuous courses that strengthen student learning is therefore suggested following the results of this research, develop and make available two courses of continuing education, one that is designed to inventory personal abilities of each student, ie a self - diagnosis of the individual skills of the students, and another course where they teach students how hierarchizes knowledge about a particular topic.

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