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Opening doors to the future. Technology and gender equity in learning

Abriendo puertas al futuro. La tecnología y la equidad en género en el aprendizaje

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Abstract

This research applied an Interactive Survey is innovative and motivate program. Participants to field of science and technology. Female gender students and undergraduate level. Method.- quasi-experimental design, experimental field for new developments longitudinal group with three measurements (pretest, posttest and follow-up). Population 2,791 students and random sample 930 female students are studying the third year of high school belonging to 9 campuses of Universidad Autónoma del Estado de México. Material.- Platform for Educational Services (SEDUCA3) to implement the intervention of Interactive Survey and Learning Strategies Questionnaire for University (CEA-U). Results.- The Interactive Survey elevates learning strategies in: positive association, applicability, gradual approach, generative design and planning. Increasing enrollment in computer science area to 1.3%.

Female gender, Career counseling, Science and Technology

Resumen

La presente investigación aplico un Taller Interactivo como programa de aprendizaje innovador para motivar, acercar a los participantes en el campo de la ciencia y la tecnología para estudiantes del género femenino de tercer año de preparatoria. Metodología.- Diseño cuasi-experimental, de campo, tipo longitudinal con tres mediciones (pre test, post test y seguimiento). Población 2,791 estudiantes y muestra al azar de 930 estudiantes del género femenino estén estudiando el tercer año de preparatoria pertenecientes a 9 planteles de la Universidad Autónoma del Estado de México. Material.- Plataforma de Servicios Educativos (SEDUCA3) para aplicar la intervención del Taller interactivo y Cuestionario de Estrategias de Aprendizaje para Universitarios (CEA-U). Resultados.- El taller interactivo elevo significativamente las estrategias de aprendizaje observadas en las escalas de: asociación en positivo, aplicabilidad, aproximaciones graduales, elaboración generativa y planificación. Incrementando la inscripción en área de informática al 1.3%. 149

Género femenino, Orientación Vocacional, Ciencia y Tecnología

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Introduction

In this work I create and apply an Interactive Workshop (IT) for female students of the third year of high school. The Interactive Workshop is an interactive and innovative learning program that presents, motivates, and brings the participants closer to the field of technologies. Identifying and developing potentialities with and for technology. This allows to increase enrollment in careers where the main learning area is technology.

Why is this workshop directed to the area of technology?

Because at a global level it is reported which are the lines to follow for the development of countries as can be seen in what the United Nations Organization suggests. Where it specifies the teaching of the use of technology, essential basis for the development of countries (UN, 2013).

In Mexico the National Council of Science and Technology through the Scientific and Technological Consultative Forum held in April 2014 communicates that one of the pillars of development in Mexico is education in technology. Because it identifies the most important problem that needs to be addressed to achieve a better social welfare in our country.

This information is directed to legislators and governors to update educational policies and programs that are aimed at technological development, emphasizing that technology education is the axis of global competitiveness (Scientific and Technological Consultative Forum, 2014).

Why do we focus on the gender phenomenon?

Because since ancient times women have made a lot of effort and sacrifice to be able to stand out mainly in the development of sciences, since they were considered intellectually inferior. So many women saw how their work was attributed to male scientists, assigning them only the role of assistants. In many cases, their existence has even been denied by historians (Espasandín. 2013).

It was not until the twentieth century that the efforts of women began to be recognized worldwide with the Nobel Prize in 1901, awarded to Marie Curie. Since then, the prize has been awarded to fourteen women in the categories of Physics, Chemistry and Physiology or Medicine. In other multidisciplinary categories, three leaders have received this recognition (León, 2010).

What characterized these brilliant women was their drive and determination, often showing themselves as leaders of research teams for decades. Their fervent passion is in favor of knowledge, bringing fruits to humanity in several important areas of science for the development of their time (León, 2010).

Intellectual capacities for learning and technology development

Studies have shown that women are more capable than men in learning technology because they have 11% more neurons in the area of the brain than men dedicated to memory, language, following logical sequences, hearing and emotions. It should also be noted that women have better skills for the acquisition of new knowledge due to their capacity for concentration, dedication and perseverance in studying; this is due to high levels of progesterone (Brizendine, 2006). (Brizendine, 2006).

Which makes them a good candidate for women to dabble in technology apprenticeships

As evidenced by the following prominent women in the technology world such as Ann Livermore, Carol Bartz, Katie Cotton, Marissa Mayer, Meg Whitman, Mitchell Baker, Safra A. Catz, Susan Wojcicki, Ursula Burns, and Virginia Rometty who serve as team leaders at major firms such as Apple, Yahoo!, Google, HP, Xerox, IBM, Oracle and Mozilla.

However, there is gender inequality in the IT professions as evidenced by a study of women currently working in the technology sector. Catriona Davies, comments on the existence of a survey conducted by Berry in 2011. Berry found that women experience invisible barriers to career advancement that put them at a disadvantage compared to men.

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"Almost two-thirds of the women surveyed had more than 10 years of experience in the technology sector, but only 26% of them had reached managerial or executive levels.

Cascading effect. Opening doors to the future

Regardless of the ability women have to learn technology, and how successful they have proven to be in this area, we must not forget the influence it has on the family and their children. It is known that the children of these great women who have won the Nobel Prize have all made outstanding incursions into science, the arts and the business world. As can be seen in:

Marie Curie (Nobel Prize in Physics in 1903) influenced her two daughters by pushing them to be leaders, one took over her laboratory Irene Joliot Curie, who also received the Nobel Prize in Chemistry in 1935 and the other was an outstanding woman in the arts. Maria Goeppert-Mayer (Nobel Prize in Physics, 1963) she also had two brilliant children, Maria Ann Wentzel, and Peter Conrad, outstanding graduates in economics. Gerty Radnitz Cori (Nobel Prize in Physiology and Medicine, 1947) she had only one son, Tom Cori Chemist extraordinaire chemical entrepreneur (Leon, 2010).

Institutions worldwide have proven that the mother's education influences her children because the more educated the mother is, the more likely she is to develop successful children. Based on the first level of learning, which is imitation, it can be said that a mother educated in a specific area transmits by example her abilities and her way of seeing and solving life. UNICE reported in González, 2013.

It is also worth commenting on the study of socioeconomic factors that affect learning carried out with a higher level population of the Universidad Autónoma del Estado de México where it was found that at the undergraduate level the influence of the mother's educational level was observed (González, 2013).

The mother represents the family roots is the indelible imprint in the education of children, which is consolidated as the years go by, where the mother exercises her irreplaceable role of educating the children. In these times, future mothers are required to develop in science but also in technology, both are spearheads in education and in the development of the country.

Background on higher education in technology in Mexico

Educational institutions are the transmitters of knowledge, and higher education in particular is considered as a generator of knowledge. Higher education is now recognized as a fundamental means for the sustainable development of nations. This recognition has been granted by the governments of the world and by international organizations where they point out that technological learning is an essential element of world development.

The fundamental challenge today is to rethink higher education, to reflect collectively on the great challenges that accelerated development imposes on Mexican society in a globalized tenor, as one more element of a whole in constant movement and transformation.

The statistics reveal that the insertion to the higher education in Mexico in the area of technology is occupied mainly by the masculine gender 72% and that the feminine gender begins to incursion showing only a score of 28%. INEGI I.

Knowing that women in our country are the fundamental basis of the family where the basis of education is found. Preparing women in the area of technology will impact education from its beginnings within the family. The family is the nucleus of society and education within the family causes a domino effect that will be reflected in education at all levels up to higher levels and in society in general.

The woman as an axis of social development as demonstrated by studies that highlight the positive relationship of women for their innate vision that she possesses towards the common good. However, it is still significantly more difficult for women than for men to gain access to these managerial positions. Several prestigious institutions regularly highlight in their studies the relationship between women in decision-making positions and economic performance. Even between the presence of women in the labor market and the development of countries.

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Important companies are clear about this, but, as a whole, the private sector must understand that diversity in general, and gender diversity in particular, brings a great deal of wealth because of the variety of opinions and solutions it implies and because it responds better to the common good "Women Matter: Gender diversity, a corporate performance driver," published in 2007.

In this context, the discussion on open and distance education as an alternative and/or complementary modality acquires singular importance, not only in our country, but also worldwide, as evidenced by the value given to it at the World Conference on Higher Education, convened in 1998 by the United Nations Educational, Scientific and Cultural Organization (UNESCO),

In its world declaration, the role of open and distance education and new information technologies in support of educational processes such as diplomas, workshops and courses is expressly pointed out, highlighting the way in which technology has modified the forms of elaboration, acquisition and transmission of knowledge, creating new pedagogical environments capable of bridging distances and with virtual learning modalities that allow for high quality education.

In this sense, as also pointed out by the National Association of Universities and Higher Education Institutions (ANUIES) since the year 2000, "it is necessary to build an open higher education system, of intense cooperation that favors the mobility of academics and students, and the permanent innovation of educational processes", therefore the social relevance, with appropriate proposals, that serve to meet the demands of young people, actions that bring with them a greater articulation with the productive sectors and institutions of society.

Educational policies in technology of the institution under study

The Autonomous University of Mexico in the proposals of the Institutional Development Plan (PRDI), calls for the instruction and management of technology to facilitate the inclusion of university students in the labor sector.

The PRDI states that: "Significant progress has been made in the use of technology in the classrooms and in the Educational Services platform (SEDUCA), mainly as a support to face-to-face activities. Expected results, more than 1 033 multimedia projects will be generated to support teaching, this translates into 5, 716 students and 656 teachers using the SEDUCA portal" (PRDI, 2013-2017: 67).

Also calling for participation, for the formation of the university of tomorrow, taking this as a reference, the Interactive Workshop will be held with students of the female gender.

The entire implementation of the workshop from its evaluations to its development was carried out on the platform Educational Services, SEDUCA3 belonging to the UAEM,

To cognitively measure the impact generated by the Interactive Workshop located on the SEDUCA3 platform, the Questionnaire of Learning Strategies for University Students (CEA-U) was used because it measures strategies that are used when facing the study task such as: 1) the motivation to study (involvement, positive association, applicability, self-effort and gradual approach), 2) the cognitive process (organization, generative elaboration, anchor elaboration and memorization) and 3) the actions before learning (planning and revision).

Background of the population of the institution under study

In the UAEM it can be observed that 18 study centers (faculty, university centers and academic units) that teach careers that are focused on technology, where the enrollment of women is reported with 33% and men with 66%. Distributed respectively in: Computer Engineering women with 26.3% and men with 74.7%; Administrative Informatics women with 49% and men with 51%; Systems and Communications Engineering women with 26.8% and men with 74.2%; Intelligent Systems Engineering women with 29% and men with 71%; Software Engineering women with 26.3% and men with 74.7%.(Statistics 911, 2012-2013).

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According to the average annual income in careers focused on technology is: from 2009 to 2013 is 0.93% for both genders. For the female gender it is 0.82%. In 2013, there was an enrollment of 16, 925 high school students, divided into 7, 750 male and 9, 175 female students belonging to 9 campuses and one distance baccalaureate.

The campuses are located in I Amecameca, II Atlacomulco, VI Tenancingo, XI Texcoco and XII Toluca. Statistics 911, 2012-2013)

General Objective

Apply the Interactive Workshop in female students of the third year of high school to increase learning strategies in technological areas and thus increase enrollment in careers in the area of science and technology, focusing on engineering careers in systems, communications and computer science within the UAEM.

Goals

Incorporate the female gender of the third year of high school to science, technology and innovation in order to present, approach, motivate and teach the field of technology. Identifying their abilities and potential in this area. This will lead us to increase enrollment in careers where the main learning area is technology. Having the vision for the future of acceleration in the incursion of these areas because women are an essential axis for learning within the family nucleus of society.

Methodology

Quasi-experimental, field design for nine experimental groups with longitudinal evaluation observed in pre-test, post-test and 12-month follow-up measurements.

Population 2,791 female students in their third year of high school belonging to 9 campuses of the Universidad Autónoma del Estado de México.

The sample size was obtained according to the formula for complex studies (Tamayo and Tamayo, 2010, p.84). The sample was selected randomly using the random table and through their account numbers. Obtaining 930 female students from both schedules.

Statistical procedure: Descriptive to know the characteristics of the sample and inferential to know the impact of the interactive workshop.

Material: Educational Services Platform (SEDUCA3) to apply the intervention of the Interactive Workshop and the Questionnaire of Learning Strategies for University Students (CEA-U).

Materials

1) SEDUCA3 Educational Services Platform Technical Data Sheet.

The SEDUCA portal is a technological tool developed by the Autonomous University of the State of Mexico (UAEM), created in 2002 and adapted in 2004 to serve the various educational modalities offered by the UAEM.

Its objective is to facilitate communication in academic and research aspects, using computer technology at the forefront of current educational needs.

Using a Learning Management System (LMS) that organizes its services in virtual communities, which may correspond to groups in school curricula, education or continuing education, as well as groups of people organized for the development of research work or educational communication.

As an LMS, SEDUCA is a virtual component or software that provides teachers and students with administrative and academic functions; among other activities, it allows them to communicate, transfer information, evaluate and be evaluated. This last specification allowed the uploading of the Learning Strategies Questionnaire for Undergraduates (CEA-U) within the portal to distinguish, evaluate the skills, aptitudes and abilities developed by the student when using technologies.

Portal architecture

The internal structure of the portal is defined by a hierarchy of profiles and a horizontal organization that relates the tools to the themes defined in the structure of each community.

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The community implemented for this study was the interactive workshop. The profile of each of the registered students was recorded so that they could access the use of the information and communication tools.

Tools used in this workshop were: 1) Administration, activities carried out by technical support staff belonging to the Directorate of Continuing and Distance Education of the UAEM. 2) Communication of the workshop used e-mail, discussion forum, electronic messengers (chat and wiki). 3) Internal evaluation of the workshop was with learning activities, portfolio of evidences and bank of reagents. 4) Information used were the work agenda, didactic guide, thematic index and support material.

Cognitive impact evaluation: the Cuestionnaire of Learning Strategies for University Students (CEA-U) was installed within the Educational Services Platform, SEDUCA3 .

2) Intervention methodology of the Interactive Workshop

The workshop is based on self-managed learning, which implies active and continuous participation. In this process, self-management and self-regulation of learning is encouraged in the student.

The teaching and learning strategy was based on problem solving, which guided the student towards the objectives of acquiring knowledge about careers in the area of science and technology, focusing on engineering careers in systems, communications and computer science.

Starting with the reflection and problematization of the learning needs in Information and Communication Technology (ICTs) as a tool that supports the learning of technological careers.

During the workshop, an advisor will assist you in providing feedback on the work done and will follow up on the activities until you achieve the desired objectives in terms of design and implementation of the activities.

General purpose of the interactive workshop

a) To know the competitive advantages of entering this type of careers in the area of science and technology, focusing on computer engineering, systems and communications, its characteristics, profile of income and graduation, in which companies and organizations you can work, how much income you will receive if you study this type of careers instead of others of social issue.

b) Distinguish, evaluate and show the abilities and aptitudes as well as the capacities to denote and support the tendency to use technologies.

c) To develop skills for the design of works elaborated with technological resources.

Intervention procedure of the Interactive Workshop

Duration: Total 24 hrs. distributed in 12 sessions of two hours, one session per week.

a) Block 1 Introduction

Objective: To teach the use of the SEDUCA 3 platform as a support tool for learning.

Support material: Educational Services Portal, SEDUCA 3 and student tutorial.

Activity: To provide on-site training on the management and use of the SEDUCA3 portal.

Product: Use of technological tools: E-mail, Discussion Forum, Chat, Wiki and Portfolio of evidences.

Duration: three sessions of 2 hours, total in hours 6 hours.

b) Block 2 Pre-test Evaluation

Objective: To evaluate the Learning Strategies capabilities to measure and support the tendency to use technologies.

Support material: Questionnaire of Learning Strategies in University Students (CEA-U) (García, Torbay, and Rodríguez, 2007).

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Activity: Apply and evaluate CEA-U.

Product.- Qualification and personalized diagnosis of Learning Strategies for careers in the area of science and technology, focusing on systems engineering, communications and computer science.Feedback to the student through the platform.

Duration: one session of 2 hours, total in hours 2 hours.

c) Block 3 Learning in careers in the area of science and technology

Objective: To teach the learning needs required in careers in systems engineering, communications and computer science.

Support material: Interactive exercises and readings of the topic located in the Educational Services Portal, SEDUCA 3.

Activity: To provide face-to-face training on the different institutions and modalities that exist in Mexico to offer careers in the area of science and technology, focusing on systems engineering, communications and computer science.

Show exercises and activities to be carried out on the use and application of ICTs in systems engineering, communications and computer science.

Show exercises and activities to be performed on careers in systems and communications engineering.

To show exercises and activities to be carried out in situations that lead to the success in the learning of the student in engineering in systems and communications.

Show technological and didactic tools they can use that you could use. Show appropriate learning strategies for the area of technology that you could use.

Use of technological tools: E-mail, Discussion Forum, Chat, Wiki and Portfolio of evidences.

d) Block 4 Pot- test evaluation and feedback.

Objective: To evaluate the Learning Strategies skills acquired for the careers of systems, communications and computer science.

Support material: Questionnaire of Learning Strategies in University Students (CEA-U).
Activity: Apply and evaluate CEA-U.

Product: Personalized evaluation of learning strategies for careers in the area of science and technology, focusing on computer science.

Feedback to the student through the platform and face-to-face to close the workshop.

Duration: two sessions of 2 hrs, total in hours 4 hrs.

3) Technical sheet of the Learning Strategies Questionnaire for University Students (CEA-U)

Questionnaire developed by Martín, García, Torbay and Rodríguez (2007), a reduced version for university students of the original HEME, ECA and ECE questionnaires by Hernández and García (1995), developed from the NOTICE model (Hernández & García, 1994, 1998).

The CEA-U consists of a total of 57 items that refer to different strategies that can be used when facing the study activity.

The response format is a Likert-type scale, where 1 means not at all, 2 means little, 3 means sometimes, 4 means often and 5 means always. The CEA-U consists of three scales: 1) Motivational Strategies (27 items); reliability coefficient α=0.82; scale ranges: high=135- 108, medium=107-81, low >81; with five Subscales: involvement, positive association, applicability, self-effort and gradual approach. 2) Cognitive Strategies (22 items); reliability coefficient α=0.73; scale ranges: high=110- 88, medium=87-66, low >66; with four Subscales: organization, generative elaboration, anchoring elaboration, and memorization. 3) Control Strategies (8 items); reliability coefficient α=0.81; scale ranges: =40-32, medium=31-24, low >24; with two Subscales: planning and revision (Garcia, Torbay, & Rodriguez, 2007).

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Hypothesis

H1 The application of the Interactive Workshop in high school students will increase their learning strategies in the area of technologies.

H0 The application of the Interactive Workshop in high school students will not increase their learning strategies in the area of technology.

H1 The application of the Interactive Workshop in high school students will increase enrollment by 2% in the area of technology at UAEM.

H0 The application of the Interactive Workshop in high school students will not increase enrollment by 2% in the area of technology at UAEM.

Study procedure

1. Random selection of a sample of 930 female students of the third year of high school belonging to the Autonomous University of the State of Mexico.

2. Random selection of randomly (use of random tables) selected by account numbers.

3. Designation of nine experimental groups corresponding to the nine high school campuses.

4. Application of forms: a) knowledge, consent and responsibility to be signed, in study and b) personal data protection form.

5. Registration of sample in the Interactive Workshop community of the Seduca3 platform.

6. Pre-test evaluation application with the Questionnaire of Learning Strategies in University Students CEA-U located in the Interactive Workshop community of the Seduca3 Platform.

7. Application of the Interactive Workshop intervention, which was carried out in computer classrooms and class schedules of the Educational Guidance subject in group form.

8. Execution of the Interactive Workshop intervention, with similar beginning and end. Executors: three psychology graduates, two systems engineers and nine teachers of the Educational Guidance course belonging to the nine high school campuses. They were previously instructed in the application of the intervention. Intervention time was 12 weeks; one 2-hour session per week. Total time of each procedure, 24 hours.

9. Post-test evaluation application with the Questionnaire of Learning Strategies in University Students CEA-U located in the Interactive Workshop community of the Seduca3 platform to measure the impact of the Interactive Workshop intervention on learning strategies.

10. A 12-month follow-up was conducted to determine the impact of the Interactive Workshop intervention on enrollment in the area of science and technology, focusing on engineering careers in systems, communications and information technology.

Statistical procedure

Application of descriptive and inferential statistical analysis in the SPSS-19 program.

1. Application of descriptive statistics to know the characteristics of the sample.

2. Application of Student's t-test (independent samples) to determine whether the assignment of the students in the nine groups was similar.

3. Application of ANOVA test ($p<0.05$) to determine the significant difference between pretest and posttest evaluations.

4. Application of descriptive statistics in the 12-month follow-up evaluation to know the characteristics of the sample enrolled in careers in the area of science and technology, focusing on engineering careers in systems, communications and computer science.

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Results

1. Characteristics of the sample: average age 17.3 years (see Table 1).

Planteles académicos	Población total	Población en mujeres	Muestra	Edad promedio en años
Atlacomulco	39	18	6	16.8
Cuauhtémoc	654	385	128	17.2
Dr. Ángel Ma. Garibay Kintana	568	310	103	17.5
Dr. Pablo González Casanova	293	156	52	16.6
Ignacio Ramírez Calzada	556	360	120	17.3
Lic. Adolfo López Mateos	828	469	156	17.9
Nezahualcóyotl	811	460	153	18.2
Sor Juana Inés de la Cruz	681	312	104	17.1
Texcoco	542	321	107	17.6
Totales	4,972	2,791	930	Edad promedio17.3

Estadisticas 911. 2012-2013. UAEM.

Table 1 Sample characteristics

2. In the Student's t-test (independent samples) where no significant differences were observed among the subjects in the nine groups in terms of Pre-test evaluation scores.

3. In the ANOVA test ($p<0.05$) ten significant differences were observed between the pretest and posttest evaluations in the subscales of the Learning Strategies Questionnaire in University Students CEA-U. Showing greater impact in the Motivational Strategies scale with five significant differences, followed by the Cognitive Strategies scale with three significant differences and finally the Control Strategies scale with two significant differences (see Table 2).

Escalas de aprendizaje	Sub escalas de aprendiza-je	Entidades académi-cas	χ^2	$p<0.05$
Estrategias Motivacionales	Asociación en positivo	Lic. Adolfo López Mateos	0.423	0.036
		Atlacomulco	0.374	0.047
	Aplicabilidad	Dr. Pablo González Casanova	0.344	0.046
		Atlacomulco	0.389	0.048
	Aproximación gradual	Lic. Adolfo López Mateos	0.554	0.032
Estrategias Cognitivas	Elaboración generativa	Ignacio Ramírez Calzada	0.383	0.047
		Sor Juana Inés de la Cruz	0.745	0.028
	Elaboración de anclaje	Texcoco	0.804	0.02
Estrategias de Control	Planificación	Lic. Adolfo López Mateos	0.323	0.045
		Ignacio Ramírez Calzada	0.328	0.046

Table 2 ANOVA test, significant difference between test and post-test evaluations

In the descriptive test in the 12-month follow-up evaluation, it was observed that enrollment in systems engineering, communications and computer science increased by 1.03%, where the increase in the female gender was 1.30%. (UAEM 2014, Statistical Agenda 2014).

Discussion

Given the results obtained in this study, it is observed that there is no significant intra-group or inter-group difference as shown by the Student's T-test, so there is a good consistency in the groups. This helps us to generalize our results.

Hypothesis one is only partially accepted because there are six significant differences that increase learning strategies in the area of technologies.

Divided as follows:

1) Motivation (three subscales), which denotes that the selected students are satisfied with the activities they perform within the platform.

Positive association: The authors of the test tell us that this subscale is fine because it measures the sensitivity to the students in the predisposition towards learning and thus the study group, leaving a feeling of satisfaction.

Applicability - This scale measures the usefulness of learning. It opens expectations of use and income of what has been learned.

Gradual approaches: The scale shows us the progress that is being obtained with the subject under study and the mastery that is being acquired in the novelty.

2) Cognitive (two sub-scales), which denotes that the selected students have the necessary tools to achieve success in the elaboration of processes and generation of knowledge.

Generative elaboration: From what they have learned, they can generate new relationships by creating their own knowledge, which will help them to fix and evoke what they have learned.

Anchor elaboration: It is the associative learning that supports to follow processes and memory.

3) Cognitive (one subscale), which denotes that the selected students have the necessary tools to organize their study and learning methods

Planning: It is the regulation of learning by dividing it into small steps, hierarchizing according to the level of difficulty, which allows them to evaluate each step when it is finished.

The above acquired learning strategies support the students to cover the profile of entry to higher level within the careers in the area of science and technology, with a systemic bias because it is implemented in electronic platform so that they know the use of systems and their benefits in daily life (Razo, 2008).

Hypothesis two accepts the null hypothesis because it was formulated that the increase in female enrollment was 2% and only 1.3% was achieved.

Although it is worth mentioning that it did increase because the increase between 2009 and 2013 was 0.82%, taking into account that the total increase from 2013 to 2014 was 1.32%.(statistics 911-2012-2013), which shows that the progress in female enrollment in the area of computer science is adequate. It is known that school performance in different educational areas at the university level is superior the female gender stands out in the achievement due to their innate abilities of concentration and minority (Echavarri, Godoy, Olaz, 2007).

The only thing to do is to focus these skills in the area of development and use of ICTs, an activity very appropriate for the roles that women play in the care of their children, an inseparable and natural binomial. Taking care of children and performing a productive activity is, I think, a mother's dream (Arellano, Márquez and Pérez, 2013).

This achieves the proposed goal, the development in science and technology of the present generations, triggering the domino effect, the expected impact of acceleration in education, taking advantage of the natural role of influence that women have in the education of their children. This allows us to be in line with what is dictated as a basis for development. Key to the development of countries is the training and use of science and technology.

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