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Journal of Critical Pedagogy

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Content Presentation

In the first article we present *From rubric to practice; daily experiences in the implementation of rubrics for assessment in a CBE model in science education*, by CARRANCO-DE LA PEÑA, Miriam, HERNÁNDEZ-SUSTAITA, Martín, GONZÁLEZ-SALAS, Javier Salvador and BERLANGA-RAMÍREZ, Edgar Oswaldo, with assignment at the Universidad Politécnica de San Luis Potosí, as a second article we present *Teaching the social service-learning unit with the use of ICTs*, by PINAL, Selene, GARCIA, Claudia, GONZALEZ, Aida y ALVAREZ, Nivia, with assignment at the Universidad Autónoma de Nuevo León, as third article we present *Transversal contrast of the U.T.A. curriculum with English language in the technical section of the Industrial Maintenance speciality*, by MARIÑO-AMANDA, Anita, with affiliation at the Universidad Tecnológica de Altamira, as a fourth article we present *Identifying the level of ICT use in the area of science at the UPSLP*, by HERNÁNDEZ-SUSTAITA, Martín, LÓPEZ-LEÓN, Claudia Mónica, GONZALEZ-SALAS, Javier Salvador, BERLANGA-RAMÍREZ, Edgar Oswaldo, with adscription at the Universidad Politécnica de San Luis Potosí.

Content

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From rubric to practice; daily experiences in the implementation of rubrics for assessment in a CBE model in science education

De la rúbrica a la práctica; experiencias cotidianas en la implementación de rúbricas para la evaluación en un modelo EBC en la enseñanza de las ciencias

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Abstract

This paper shows an overview of the evaluating process´ experiences in the Introductory Physics and Physics I subject, taught by the Academy of Sciences in the Universidad Politécnica de San Luis Potosi (UPSLP) during the first semester 2015. This analysis arises from the concern of students that perceive the rubric as an important element in their school performance. Results of a qualitative study on general students' perceptions inquiring about the causes they believe are related to the failure rates are presented. It was found that students say they don´t understand the evaluation criteria and professors´ criteria in writing exams evaluations, furthermore, the students lack study and interest. Supported by professors´ experiences, observation and an investigation presented by the students; various improvement´s areas are identified to redesign and adapt the rubric, as a result, it can serve as a real tool to support teaching, didactic and learning practice.

Rubric, Competency evaluation, Performance improvement

Resumen

En este trabajo se muestra una perspectiva general sobre las experiencias acumuladas en el proceso de evaluación de las asignaturas de Introducción a la Física y Física I impartidas en la Academia de Ciencias de la Universidad Politécnica de San Luis Potosí (UPSLP) durante el primer semestre 2015. Este análisis surgió de la inquietud de los estudiantes que perciben a la rúbrica de evaluación como un elemento importante en su desempeño escolar. Se presentan resultados de un estudio cualitativo sobre percepciones generales de los estudiantes indagando sobre las causas que ellos consideran están relacionadas con los índices de reprobación. Se encontró que los estudiantes dicen no comprender los criterios de evaluación y que hace falta un mejor criterio del profesor al evaluar el examen escrito departamental, además de la falta de estudio y desinterés de su parte. Apoyado en la experiencia de diversos docentes de la UPSLP y lo encontrado en el estudio planteado por los estudiantes de la universidad; se identifican puntos de mejora para que la rúbrica pueda fungir como una verdadera herramienta de apoyo a la práctica docente, didáctica y el aprendizaje.

Rúbrica, Competencias, Rendimiento, Mejora

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† Researcher contributing as first author.

Introduction

The current educational model implemented at UPSLP is based on measuring certain competencies that students must develop and demonstrate during their higher education training period; specific cognitive, procedural and attitudinal skills are evaluated through activities and evidence instruments that with specific rubrics give a weighting to the development of each student.

The competency-based model aims to contribute to the integral performance of the student as well as to his or her future professional development, as an integrated member of the work environment, where the student can manifest and apply the competencies acquired during his or her university education. To achieve these objectives, it is necessary to have efficient didactic and evaluation tools, as well as an integral curricular design.

According to the paper the educational model of Polytechnic Universities: a competency-based approach presented at the XXXVII National Conference of Engineering Year: 2010; in Polytechnic Universities, competency is understood as: the set of capabilities of a person, which are reflected in knowledge, skills, abilities and attitudes, which are required to perform a function in a professional context.

Based on this definition, the following is sought:

- Relevance of the contents of the study plans and programs, by having as references the functions performed by professionals in their jobs.

- That the knowledge acquired in school can be applied by mobilizing it in real work situations.

The competencies are divided into: Basic competencies:

They are associated with fundamental knowledge; among them we can consider reading and writing skills, oral and written communication, mathematical reasoning, the ability to understand, select information and the use of computer and communication technologies.

Generic competencies:

These are those that underpin lifelong learning and profession in diverse situations and contexts and refer to abilities for analysis and synthesis; to learn; to solve problems; to apply knowledge in practice; to adapt to new situations; to care for quality; to manage information; and to work autonomously and in teams.

Specific competencies:

These are those associated with the development of technical skills, specific to the exercise of the profession, which are defined according to the educational programs to be offered.

The development of these competencies can be achieved through the elaboration of didactic planning, evaluations and effective rubrics. "For this reason, it is fundamental to elaborate evaluations that allow the student to become aware of these achievements" (ARGUDÍN, 2005).

Despite the collegial work to develop evaluation techniques and methods that offer a support tool (both for teachers and students), an important setback to address is that academic performance and achievement in the areas of science has not been able to increase significantly.

For this reason, it is essential to evaluate the evaluation instruments and techniques from different perspectives, to analyze and understand them: directors, coordinators, teachers and students; as well as to take into account the needs of the academy and the competencies that are to be developed and evaluated in each area or subject, since: Students, by not understanding how they are evaluated and due to the lack of specification of rubric elements, (for students and teachers) it cannot serve as a support tool to help and improve students' school performance and teaching practice.

The objective of this article is to show the students' perspective towards the current method of evaluation in the subjects Introduction to Physics and Physics I, as well as to provide recommendations and models of didactic tools that help to improve the understanding of the rubric and the collegiate work.

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These recommendations are based on teaching experience and documentary research.

Students' perspective and misunderstanding of the current rubric

Evaluation should be understood as a significant element of didactics; it is an element that affects the relationship created between teacher-student-content and the rubric is directly linked to the evaluation method.

An important part of the problem regarding the academic performance of students taking Introduction to Physics and Physics I (among other subjects integrated to the Academy of Sciences) is the lack of understanding of the elements of the rubric, and as Dr. Alicia Vázquez Fuente mentions in her work En busca de la educación perdida, students should know the evaluation instruments well in order to be able to give a better performance. (1999)

According to (Hawes, 2004) "Assessment is a complex process with a strong load of subjectivity of the assessing teacher, standards and rubrics are resources that can and should be used at different levels of educational systems and in all branches of it. First, because they do nothing more than bring to light and share implicit convictions about what is understood as good performance. Second, because it allows for a relative comparison of evaluative judgments."

"Today it is demanded that the link between the processes of education and training, attend in a timely manner to the criteria of problem solving with quality, productivity and competitiveness" (Argudín, 2005:30), due to this, the techniques and methods of evaluation that mark the performance standards, must be understood in their totality. However, according to a study conducted by students of the Polytechnic University itself, 53% of the students who took the subjects Introduction to Physics and Physics I during the spring semester 2015, say they do not really understand the criteria of the rubric with which they are evaluated and 85% believe that it is necessary to give a review of the rubric at the beginning of each course even though it is the same for all subjects of the Academy of Sciences and it is explained to them at the beginning of their career and in each semester.

The results referred to in Figures 1-4 and those discussed in the text were obtained by students of the Core II course through a survey of a random sample of 125 students belonging to the Information Technology Engineering (ITI) and Telematics Engineering programs at UPSLP the rubric currently used.

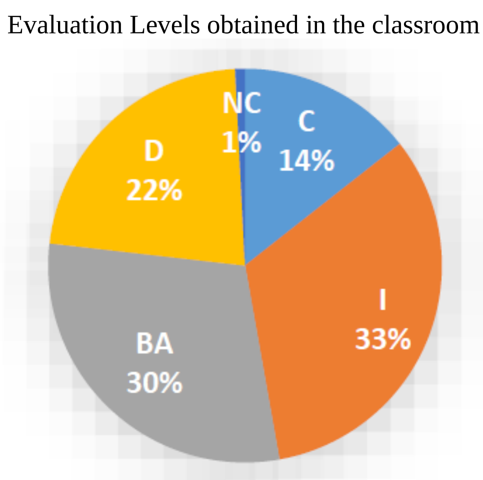
According to what the surveyed students say during the same study, the evaluation levels obtained by them most frequently are:

To evaluate the resolution of problems and practices in the laboratory is the following:

Figure 1 Current rubric used to measure performance in problem solving at the UPSLP Science Academy

Elementos	DESGLOSE DE ELEMENTOS DEL REPORTE DE PRÁCTICA
Hipótesis	Es concreta, clara y propone una respuesta al problema
	La respuesta que sugiere al problema es ambigua
	No propone una respuesta al problema
Justificación	Es concreta y basada en principios físicos.
	Escueta, falta explicación, tiene un error en el uso de principios y leyes.
	No presenta justificación, la justificación carece de argumentos.
Desarrollo	Es completo, correcto, ordenado y limpio.
	Es incompleto o faltan operaciones.
	Sólo anota resultados, no hay operaciones ni desarrollo.
Resultados	Correctos y completos con sus unidades correctas
	Resultados incorrectos por errores de cálculo pero con unidades correctas.
	No presenta ningún resultado.
Conclusión	Es correcta y coherente con la hipótesis.
	Es incorrecta pero es coherente con la hipótesis.
	No presenta conclusión adecuada al problema.

Figure 2 Levels of performance obtained by students in the classroom



Graphic 1 Current rubric used to measure laboratory performance at the UPSLP Science Academy

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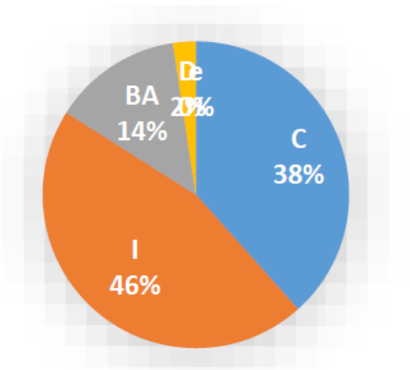
If students fail to identify and understand precisely the characteristics and elements that each performance level should contain, their grades in the whole subject will be directly affected, since despite evaluating qualities (ranges from proficient to not proficient), the final weighting is quantitative and is summarized in a passing or failing grade.

Evaluation levels obtained in laboratory

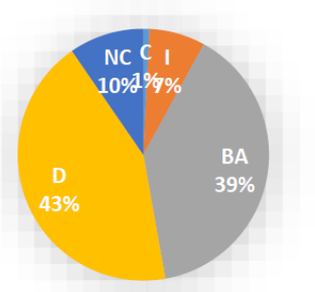


Graphic 2 Levels of performance obtained by students in the laboratory

The performance levels at UPSLP are:

- Proficient (C)
- Independent (I)
- Basic Advanced (BA)
- Deficient (D)
- Not Proficient (NC)

Levels of evaluation obtained in departmental exams



Graphic 3 Levels of performance obtained by the students in the departmental exams

- In the classroom: Independent (33%) and Advanced Basic (30%).
- In the laboratory: Independent (46%) and Proficient (48%).
- In the departmental exam: Advanced Basic (39%) and Poor (43%).

Likewise, the students surveyed think that the failure rate is mainly due to: 1. the evaluation instrument (rubric) in 49%, the professor's criteria when grading the exam 15% (since being departmental exams the professor who gives them the class hour is not necessarily the one who grades the exam) and the lack of study in 14%.

These results not only show that it is necessary to improve the students' understanding of the rubric, but also show the need to establish better defined standards and criteria to reduce the subjectivity that they believe exists when evaluating a departmental exam, since 64% of the students surveyed perceive that their poor academic performance is due to issues related to the method used for grading (rubric and the professor's criteria).

As for the rubric, although students receive its explanation at the beginning of the semester, it is not fully understood; added to this, the perception about the influence of the teacher's individual criterion at the time of grading (especially the departmental exam) is negative since the student thinks that his classroom teacher is the one who should should be grading the exam.

In relation to the perception of the teacher's criterion, it is worth mentioning that since it is a departmental work, the teacher is the one who should grade the exam. In the case of departmental work, the classroom teacher is not only not necessarily the one who grades the written exam, nor is he/she necessarily the one who designs it. During the semester, only a few teachers perform the task of designing exams, and most teachers only know their content up to the moment of grading. It should be clarified that the process is this way with the objective that students are evaluated by a teacher outside the classroom but who is part of the Science Academy and who is fully trained in CBE.

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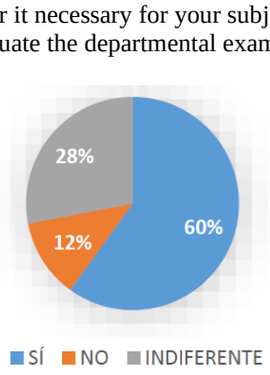
However, the fact that the teachers do not participate together in the whole process can be an important factor of discrepancies when evaluating even with a rubric in hand; since, not knowing the evidence of learning (written exam), it is not possible to know exactly the intention of it and the specific competencies to be measured. This situation does not allow adapting the rubric to the specific needs of the problems posed in the exams, when there is a possibility that not all problems need to measure the same performance standards. Likewise, when dealing with exact sciences, it is recommended that all teachers be familiar with the evaluation tools in their entirety in order to create a collegial agreement on the criteria and competencies to be evaluated in an exam.

It is also necessary to comment that even when there is fluid communication between teachers and students, the persistent belief that their academic performance would be better if the same teacher would evaluate their written exam is not eradicated. Hence, the following figure shows the above.



Graphic 4 Students' perception of the importance of having their departmental exam also evaluated by the professor in class

It should be remembered that rubrics for students should constitute a tool that reduces subjectivity in evaluation; if this tool is well designed, clear and concise, and both students and teachers fully understand it, the result should be an increase in school performance.

Recommendations in the implementation of rubrics for evaluation in a CBE model in science education

"The educational institution is an organism that is kept alive by the actions of teachers" (AYALA, 2004).

Teachers, in turn, are committed not only to act as advisors, but also to identify the need for innovation to improve their practice as teachers and therefore the educational process that allows students to develop cognitive, procedural, and attitudinal skills that will enable them to become involved in the workplace.

Among the functions of a teacher in higher education we can name:

- Generate conditions similar to reality in order to put skills and competencies into practice.

- To guide the student's development so that he/she can establish a relationship with knowledge and the need to possess it.

- Facilitate the integration of the student to productive life, through the practice and application of theory from its development in the classroom (generate competencies).

Therefore:

The creation of evaluation tools and techniques should be carried out in a collegial manner in order to achieve a better understanding and standardization of the development of skills desired from students. The collegial work should not only be between members of the same department or area; this work should be multidisciplinary to truly achieve an integral development. By elaborating evaluation rubrics in a collegial manner, it is possible to encompass a greater number of performance skills needed by students, create agreements among teachers regarding evaluation methods and techniques, analyse the performance of these tools and if it is not adequate, implement improvements and adjustments to the rubric in order to improve performance.

If multidisciplinary (work between teachers from different areas and specialties) is also implemented to the collegiate work, the results can be even better, since by combining the knowledge, skills and abilities of each participant, the competencies of the teaching staff increase and therefore the evaluation products offered to the students can be of better quality and more efficient, thus increasing the performance and achievement of the students.

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It is necessary to have a rubric with standards and specifications not only in performance levels but in all its components

Having standards allows educational institutions to guarantee and certify accredited competencies to their students and graduates. In addition, the specific performance criteria that will be used to carry out the evaluation should be described as well as possible.

These specifications should establish how much the student has learned and the relationship he/she has created between theory and practice to achieve actual performance. This involves identifying the competencies and sub-competencies associated with learning and describing them in detail.

The adaptability of the rubric is essential, depending on the problem to be solved, cognitive and procedural skills are different, therefore, performance must be measured differently in each case

Rubrics are useful elements that allow guiding the evaluative judgment, however, there are contextual conditions of performance that teachers must take into account when establishing such judgments.

In addition, the evaluation method should allow for the capacity to analyze and manage information, and should not be a totally methodical action, neither for students when trying to follow the rubric, nor for teachers when grading according to the rubric's standards.

Below is a model where recommendations II and III are explained in more detail. The current rubric implemented by the Academy of Sciences of the UPSLP is taken into account, to which a series of indications are added that can improve the understanding, specification and adaptation of the rubric and therefore its functioning.

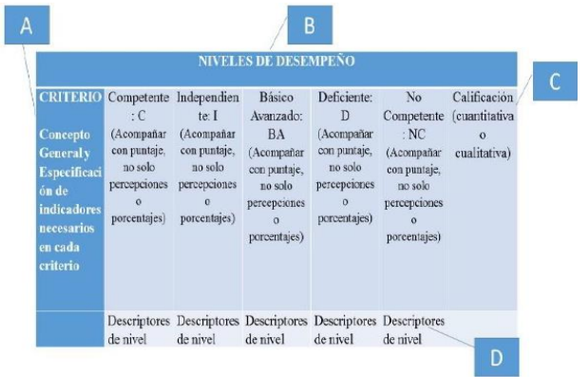

Figure 3 Example of rubric and components

- Criteria: Necessary knowledge or skills with which the expected performance is evaluated. Work with clear and specific concepts. The criteria should be weighted in relation to the importance or complexity within a problem to be solved; the weighting of each criterion should vary depending on the problem to be solved, the skills and knowledge to be measured, the priority of each criterion in relation to another, etc.

The criteria can vary even with a standard rubric, it is not always necessary to qualify all the criteria, it depends on each particular case and the complexity of the problem to be solved.

- The level of performance: it must be a very well defined and delimited standard. The delimitation between one level and another must be very clear and specific to reduce subjectivity. In the exact sciences, it is recommended to mark and list precise indicators per level that show the teacher key elements that each indicator must have in order to belong to a certain level. A collegial agreement should be created and the points to be evaluated should be analyzed for each particular case. The scale should be very well designed so that it allows students to reach real and feasible standards.

- Rating: Indicates the performance obtained from the scale of performance levels, presented quantitatively and qualitatively.

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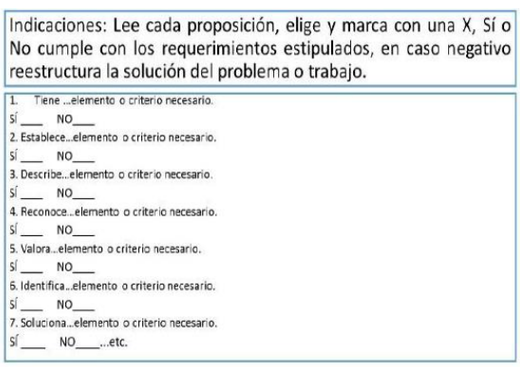
- Level descriptors: Specifications of each performance level. Enumeration of attributes that according to qualitative and quantitative elements belong to each level and can be measured in a specific way. Establishment of clear and specific indicators. The number of successes required to accredit each level must be specified. Each element to be graded at each level is equivalent to one item; the number of items must be the same for all teachers grading the departmental exam.

The use of tools to support students to better understand the rubrics and apply self-assessment can improve attitudes and school performance

The implementation of a checklist that can be provided to students for the completion and review of assignments, class activities, projects, quick exams and laboratory activities can be a useful tool that improves the understanding of the rubric and allows the student to self-evaluate, decode the elements of the rubric and improve their performance. Checklists allow students to evaluate and make a final review of their work prior to submission.

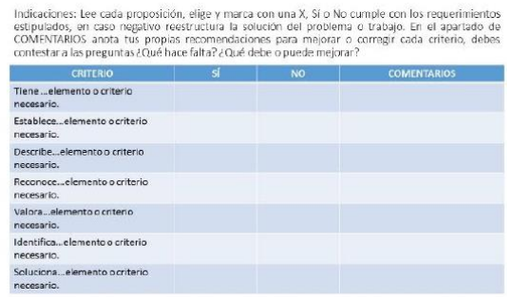
Whether it is an activity in class or at home; individual or group, decoding each element of the rubric allows both the student and the teacher to verify the specific elements to be evaluated.

Below are two models of checklists that can be adapted to each activity to be evaluated, as well as recommendations for developing a checklist.


Indicaciones: Lee cada proposición, elige y marca con una X, Sí o No cumple con los requerimientos estipulados, en caso negativo reestructura la solución del problema o trabajo.

1. Tiene ...elemento o criterio necesario.
SÍ ___ NO___
2. Establece...elemento o criterio necesario.
SÍ ___ NO___
3. Describe...elemento o criterio necesario.
SÍ ___ NO___
4. Reconoce...elemento o criterio necesario.
SÍ ___ NO___
5. Valora...elemento o criterio necesario.
SÍ ___ NO___
6. Identifica...elemento o criterio necesario.
SÍ ___ NO___
7. Soluciona...elemento o criterio necesario.
SÍ ___ NO___...etc.

Figure 4 Model 1 checklist


Indicaciones: Lee cada proposición, elige y marca con una X, Sí o No cumple con los requerimientos estipulados, en caso negativo reestructura la solución del problema o trabajo. En el apartado de COMENTARIOS anota tus propias recomendaciones para mejorar o corregir cada criterio, debes contestar a las preguntas ¿Qué hace falta? ¿Qué debe o puede mejorar?

CRITERIO	SÍ	NO	COMENTARIOS
Tiene ...elemento o criterio necesario.			
Establece...elemento o criterio necesario.			
Describe...elemento o criterio necesario.			
Reconoce...elemento o criterio necesario.			
Valora...elemento o criterio necesario.			
Identifica...elemento o criterio necesario.			
Soluciona...elemento o criterio necesario.			

Figure 5 Model 2 checklist.

Considerations:

- The criteria should be verbs in the indicative, in the positive mode, be clear and concise.

- Qualitative and quantitative criteria can be listed. If there are many qualitative elements, we recommend the use of model number 2, which allows you to write comments.

- Allows you to write comments.

- If necessary, add criteria such as: cover page elements, bibliography, spelling and wording, use of titles and subtitles, sections, conclusions, etc. (As in the delivery of projects).

- The criteria used in the checklist can be modified according to the characteristics requested of the students to ensure the identification of errors and to carry out the necessary corrections.

- The checklist should be completely related to the rubric that will be used to evaluate so that it is a complementary tool.

Complementary tool

By following these tips, the educational quality requirements and objectives of the UPSLP can be achieved and fulfilled with greater ease and efficiency, among which are:

- Strengthen academic capacity and competitiveness.

- Strengthen academic cooperation and linkage with the environment.

- Strengthen the attention and integral formation of the student.

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- Consolidate an institutional management and evaluation system based on the quality approach... (UPSLP:2015).

Conclusions

The impact that the rubric, methods and techniques for grading have on the overall performance of students is of great importance, since, despite evaluating competencies, numbers continue to be the indicators of approval. In addition, when a student receives a low grade, it not only represents a failed subject, but also shows his "incompetence" in the evaluated area; affecting his capacity for self-criticism and evaluation, which is directly reflected in his school performance and achievement.

The total understanding of the evaluation methods and techniques, rubric, is elementary to forge a good performance both in the teaching activity; by knowing specifically the competencies that must be helped to develop and evaluate; as well as in the student environment; by understanding how to be evaluated and knowing and identifying the competencies and skills that must be developed.

The development of a rubric should be a collaborative process among the members of a collegiate to clearly establish the expected acceptable performance. Collegial and multidisciplinary work allows the creation of complex but at the same time concrete and specific evaluation rubrics that encompass the cognitive, attitudinal and procedural competencies necessary for students to develop in a comprehensive manner and be able to establish themselves and develop in the workplace quickly and efficiently.

Evaluation techniques and rubrics should be understood, redesigned and adapted to the needs of the subject matter and specific problems to be solved, as well as to the competencies to be evaluated by areas, so that they may serve as support tools that help and improve students' school performance and teaching practice.

The use of checklists can be very useful not only for the students but also for the teacher when verifying the criteria to be considered, the activities to be performed and the knowledge and skills that should be reflected when solving a problem or working in any educational didactic.

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Teaching the social service-learning unit with the use of ICTs

Enseñanza de la unidad de aprendizaje de servicio social con el uso de las TIC

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Abstract

Nowadays, in any type of process, the information and communications technology (ICTs) are involved. The scientific and technical evolutions, enable the introduction of new technologies for development of the formation of the youngest generations. The contemporary college cannot be conceived without and implication of ICTs, which exist in every substantive process that operate in the inside. (Quiros, 2005). This paper has the main objective is to analyze the impact of ICTs in the context of educational orientation, focusing in the social service subject. The applied methodology combines exploratory, descriptive and purposeful studies. The relation of the questions in the students' reports is analyze, as well as those of the responsibles of each area.

Information and communications technology, Social Service, Skills

Resumen

En la actualidad en cualquier proceso en los diferentes órdenes las tecnologías de la informática y las comunicaciones (TIC) necesariamente se involucran. Los grandes adelantos científico-técnicos permiten introducir novedosas tecnologías a favor del desarrollo de la formación de las jóvenes generaciones. La universidad contemporánea no se concibe sin una implicación determinante de las TIC que encuentran aplicación en todos los procesos sustantivos que en ella se desarrollan. (Quiros, 2005). El presente trabajo tiene como objetivo analizar el impacto de las Tecnologías de la Información y la Comunicación (TIC) en el ámbito de la Orientación Educativa específicamente en la unidad de aprendizaje de Servicio Social. La metodología utilizada se corresponde con un estudio que combina lo exploratorio, lo descriptivo y a su vez propositivo. Se analiza la relación que muestran las preguntas de los reportes emitidos por los estudiantes, así como de las personas responsables del área.

Tecnologías de la Información y Comunicación, Servicio social, Competencia

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Introduction

Background

The new educational model of the Universidad Autónoma de Nuevo León (UANL) incorporates the guidelines of the institutional guiding documents, as well as the educational trends and proposals formulated by national and international organizations. One of its characteristics is that it must respond to the needs of the social and institutional context. This is achieved with good quality educational and academic programs. For this reason, the Social Service is organized as a subject for ninth semester students of the educational programs, Systems Administrator Engineer (IAS), Software Technology Engineer (ITS) and Electronics and Communications Engineer (IEC).

The social service in the different educational programs mentioned above is carried out through the NEXUS platform, which was implemented at U A N L in August 2006 with a population of around 30,000 users. (DGI, 2015).

The transformation of educational spaces are characterized by the inclusion of the virtual aspect. According to authors such as (Adell, 1997), (Moreira, 2003), (Graells, 2012) and others, the most remarkable modifications because of the action of ICT in this context refer mainly to the following aspects:

- The introduction of new educational media and resources: computers, digital screens, educational software, ICT-based curricular materials.

- The transformation of the space and time in which educational processes take place: virtual and distance training, flexibility of educational moments.

- The assumption of new roles for teachers and students: the teacher abandons the role of main actor to become a mediator in the teaching-learning process, adopting new methodologies; the student, with the help of the teacher, becomes the manager of his or her own learning process.

- The consideration of new curricular contents, focused on digital literacy and information processing and its transformation into knowledge, attitudes and values.

Implementation of the Social Service with the use of ICTs

The study took into account the perspectives of the student, the tutor teacher, as well as the use of technology for the Social Service course. A diagnosis was made of the vision that teachers have as well as the practice they develop. This analysis allows fulfilling the requirement that "teaching professionals must be able to create didactic materials for the new demands of education in the society of the 21st century" (Preduelo, 2007). (Preduelo, 2007)

As is well known, the introduction of ICT in the classroom brings to light a new definition of roles, especially for students and teachers. The former, thanks to these new tools, can acquire greater autonomy and responsibility in the learning process, which forces teachers to transcend their classic role as the only source of knowledge. This generates uncertainties, tensions and fears; a reality that forces a creative readjustment of the school institution (Lugo, 2010).

Students who take the Social Service course in conjunction with the completion of the online course must develop the general competencies of their academic program. The activities to be carried out are structured for this purpose.

One of the supports in the implementation of the Social Service is cooperative learning, which as mentioned by (Jonson & F. Jonson, 1984). "It is the set of instructional methods for the application in small groups, training and development of mixed skills (learning, personal and social development) where each component of the group is responsible for their own learning as well as that of the others".

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Development of engineering competencies through the use of ICTs

According to the National Association of Universities and Institutions of Higher Education (ANUIES), comprehensive training means "incorporating in the design new models focused on learning, the construction of general and specific competencies that consider from multidisciplinary perspectives, knowledge, skills, attitudes and values that are built in accordance with the historical, cultural, economic and political context, also attending to the physical and moral development of the individual" (ANUIES, 2012).

Based on Article 4 of Chapter II of the Regulations of the Social Service of the UANL, approved on November 30, 2011, Social Service is understood as: "the set of theoretical and practical activities, of a temporary nature, executed and provided by interns and students for the benefit of society, the State and the university community." (UANL,2014).

Social Service is one of the main connections that the university has with society. Likewise, it gives openness to university level students to have an active participation in the solution of various problems that affect that environment. In this way, they can apply the knowledge acquired throughout their academic training by generating alternatives that contribute to solving them. It also allows the fulfillment of the university's commitment to society.

For ANUIES, Social Service is an educational strategy that should be oriented to the achievement of tangible impacts on society that promotes social, cultural, economic, civic and environmental development. (ANUIES, 2012)

In this same sense, the Social Service represents the possibility for young students to acquire multi- and interdisciplinary knowledge linked, in a relevant and effective way to the country's priority problems at the national, regional and local levels for the benefit of their integral formation.

The student on the dates established for the final registration by the Directorate of Social Service and Professional Practices of the UANL, perform the registration of their place, to start on the dates established thus beginning their activities to develop, must meet a total of 480 hours during the semester and must also comply with 6 community activities that are carried out one per month thus fulfilling 4 hours per month. (UANL, 2014)

The Social Service has a curricular value of 16 credits.

In the curricular design it must be considered that the credit load of the semester in which this activity is performed will be defined by the value of credits of the social service, plus the credits corresponding to the learning units that are taken, but they should not exceed, as a whole, 22 credits.

The Social Service subject is part of the integral formation that aims not only to instruct students in the specific knowledge of the sciences but also to offer them the necessary elements for them to grow as persons seeking to develop all their characteristics, conditions and potentialities.

Social service as a subject can contribute a lot to the formation of students, as well as to the development of the competencies that are part of the social service program.

Characterization of the development of Social Service and its relationship with competencies through ICTs

The undergraduate academic model of the UANL, contemplates in its academic aspect different learning units that are classified as: fundamental, obligatory and optional.

Fundamental Learning Units:

These are mandatory and must be included in all degree programs.

Within these learning units is the Social Service course, in addition to the fact that the student must comply with activities assigned by the receiving organizations, for which they must complete a total of 480 hours and 24 hours of community activity.

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This learning unit is studied through the NEXUS platform, where the mentor teacher assigns monthly activities, which the student must apply in the area where he/she is performing social service.

The activities applied by the tutor teacher will also be directed to the formation and development of the students' competencies as well as the fulfillment of the objective of the social service as a subject.

During the period of social service, the student makes monthly reports. These include a series of questions addressed both to the student and to the person in charge of the program working in the receiving agency.

In this report, each of the questions asked by the student are pertinent to the different competencies that the Social Service allows to promote. On the other hand, the report of the person in charge of the on-site program reveals the development that the student is acquiring.

All students who perform social service capture their activities by means of monthly reports through the School Service Information and Administration System (SIASE). (SIASE). As mentioned above, the activities of the Social Service are considered, as well as the different competencies included in the student's career. That is why the report is structured based on: Autonomous learning strategies, logical, critical, creative and proactive thinking, and leadership committed to social needs. These competencies are evaluated through a series of questions distributed in the 6 monthly reports, which gradually increase in complexity.

Methodology

The methods used to carry out this study were the following:

- Analysis and synthesis: for the characterization of ICT development, as well as for the characterization of the object and field of action of the research.
- Historical-logical: for the characterization of ICT, trends and their application in the educational teaching process.
- Systemic-structural: to design and exemplify the methodological proposal.
- Diagnostic survey and analysis of monthly reports.

A sample of 2014 students was taken, which was provided by the Direction of Social Service and Professional Practices of the UANL. This information is with respect to the evaluation of those responsible for each of the receiving units where the competencies developed were evaluated.

Results

The following are some of the results obtained in this study. First, a descriptive analysis is made of some of the characteristics of the social service-learning unit, in particular the reports that the students must cover, as well as the relationship of the questions that these contemplate with the different competencies to be developed.

On a monthly basis, social service providers fill out a report in SIASE to evaluate their progress with respect to the competencies to be developed.

The monthly report is evaluated considering the questions and according to the educational program. This relationship is shown in Table 1.

Competencies	Number of questions
Instrumental self-directed learning strategies.	1
Instrumental logical, critical, creative and purposeful thinking.	2
Develops instrumental academic and professional proposals.	3
Leadership committed to integrating social needs.	4
Maintains an attitude of commitment and respect, personal and social interaction.	5
Practice values promoted by UANL, personal and social interaction.	6

Table 1 Relationship on which the structure of the monthly report is based (Own elaboration with information provided by the Direction of Social Service and Professional Practices of the UANL).

Table 1 shows the number of questions and their relationship with the corresponding competency to be developed by each of the students. Each report contains a total of six questions.

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Competencies	Number of questions
Instrumental self-directed learning strategies.	1. In the place where you perform your Social Service, do you develop an autonomous and continuous learning?
Instrumental logical, critical, creative and purposeful thinking.	2. Do you analyse the activities assigned to you in your Social Service?
Develops instrumental academic and professional proposals.	3. To what extent did you apply the skills and knowledge of your professional training to your performance of the activities of the Social Service?
Leadership committed to integrating social needs.	4. Do you feel committed with the social needs?
Maintains an attitude of commitment and respect, personal and social interaction.	5. Do you participate with a civic and ethical conscience in the assigned activities?
Practice values promoted by UANL, personal and social interaction.	6. Within your social service, to what extent do you apply the following values: Solidarity, Responsibility, Freedom, Justice, Equity and Respect?

Table 2 First report questions

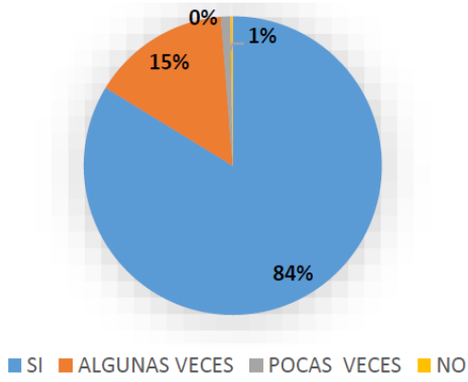
Table 2 shows the questions contained in the first monthly report that each student must answer through SIASE.

Graphic 1 shows the number of students per educational program and the analysis regarding the first question, "In the place where you perform your social service, do you develop autonomous and continuous learning? This corresponds to the competency: "Autonomous Learning Strategies".

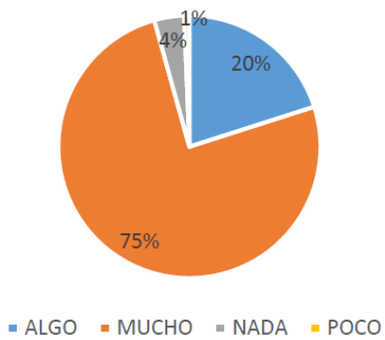
Engineer Manager (IMA), Electronics and Communications Engineer (IEC), Materials Engineer (IMT), Manufacturing Engineer (IMF), Computer Control Engineer (ICC) and Electronics and Automation Engineer.

The other question included in the monthly report is: "Do you analyze the activities assigned to you in your social service?", which is related to the competency "Logical, Critical, Creative and Propositive Thinking".

The result obtained according to the students' answers is shown in Graphic 2.



Graphic 1 Analysis of the competency "Autonomous Learning Strategies"



Graphic 2 Analysis of the competency "Logical, Critical, Creative and Propositional Thinking".

RESPUESTAS	IAS	IA	IEA	IEC	IMT	IMTC	IMA	IME	ITS	ICC	IMF	TOTAL
SI	139	23	73	60	12	95	130	93	27	0	7	659
ALGUNAS VECES	34	3	10	17	3	22	13	11	4	1	0	118
POCAS VECES	4	0	1	0	0	1	1	0	1	0	0	8
NO	0	0	0	0	0	1	0	1	0	0	0	2

Table 3 Sample of the results obtained for the competency "Autonomous Learning Strategies".

In Table 3, only the educational programs Mechatronics Engineering (IMTC) and Mechanical and Electrical Engineering (IME) responded that they did not develop "Autonomous Learning Strategies". In the other educational programs, the majority of students responded that they did develop this competency:

The above graph shows the overall results for all educational programs. Seventy-five percent of the students answered "Very much", 20% "Somewhat", and 4% "Not at all".

The following table shows question 1 of each of the monthly reports with its respective percentage, which is applicable to all educational programs.

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Question	First question of reports 1, 2, 3, 4, 5 and 6	Report	Percentage (%)
Learning Strategies autonomous instrumental	1.- In the place where you perform your Social Service, do you develop an autonomous and continuous learning?	I	10
	1.- Do you consider that the Social Service activities motivate you to an autonomous and continuous learning?	II	25
	1. Does the Social Service help you in your integral formation (aptitudes, knowledge and skills)?	III	25
	1.- Do the activities carried out in Social Service allow you to develop, suggest, improve and develop, suggest, improve and implement the existing processes?	IV	10
	1.- Do the activities performed in the Social Service allow you to develop, suggest, improve and implement existing implement existing processes?	V	20
	1. During your Social Service, did your professional learning increase?	VI	20

Table 4 Competency "Learning Strategy Autonomous Instrumental"

Table 4 shows the competency developed by the student during his social service with its respective question from the different reports and a percentage was assigned to indicate the development of said competency.

The percentage that appears in Table 4 was provided for greater importance of the question and thus to have an evaluation and evidence of the development of the competencies.

The activities that the students perform month by month can have the vision of the development of this competency, based on these evaluations it will be possible to visualize by means of the percentages if they apply this competency through the daily tasks.

The following table 5 shows the second competency and its respective questions, these questions correspond to the second question of all monthly reports. It is applicable for all educational programs.

Question	Second question of reports 1, 2, 3, 4, 5 and 6	Report	Percentage (%)
Logical thinking, Critical, Creative and Prepositive instrumental	2.- Do you analyse the activities assigned to you in your Social Service?	I	5
	2.- Are you developing your critical capacity?	II	5
	2.- Were you allowed to solve problems?	III	25
	2.- Did you show initiative towards the activities assigned to you?	IV	15
	2.- Did you implement improvements to existing processes?	V	25
	2.- Did the activities performed in your social service help you to develop your logical, critical, creative and prepositive thinking?	VI	25

Table 5 Competency "Logical, Critical, Creative and Propositional Thinking Instrumental"

Table 5 shows the competency developed by the student during his/her social service with its respective question from the different reports and a percentage was assigned to indicate the development of said competency.

The percentage that appears in Table 5 was provided for greater importance of the question and thus have an evaluation and evidence of the development of competencies.

These questions are oriented to the student's ability to solve problems presented in the receiving unit, development of critical and creative thinking. This development helps to propose improvements during their stay.

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Table 6 shows the monthly report of the SIASE system. The monthly report can be visualized as well as the student's answers.

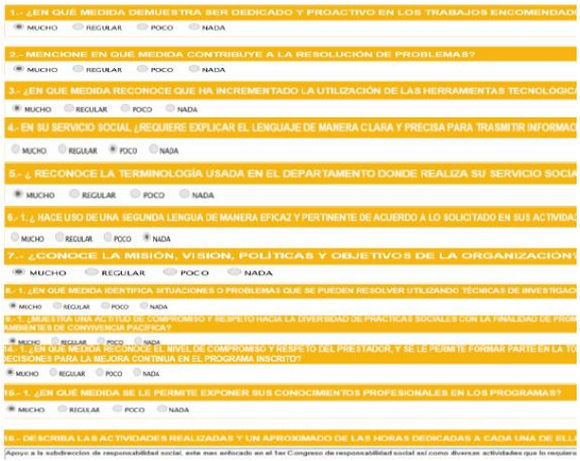

Table 6 Questions of the monthly report

According to the information analysed, it can be considered that the students do develop the competencies foreseen by the Social Service-learning unit according to the student's self-assessment. The evaluations made by the persons in charge in each of the institutions where the students carry out the activities in a general sense show coincidence with the students' self-evaluations. This result is obtained through the answers of those responsible to the same questions to be answered by the students. This fact corroborates that the Social Service constitutes a way for the integral formation of the student. It can be affirmed that ICTs constitute valuable tools to contribute to the achievement of the desired graduate profile.

Methodology for the development of the Social Service-learning unit

Based on the above analysis, a methodology is proposed that favors a systematization and organization of the work of the tutor teachers. It also contributes in a more effective way to the fulfillment of the purposes of this learning unit. The following is a synthetic description of the proposed methodology.

Phases:

1) Identification of learning needs.

The students who take the social service course, apart from covering their needs, carry out their activities in the business or public sector, in order to make a contribution to society.

The material must have a benefit for the student and society.

It is necessary to identify the needs of the social or business sector, whether public or private.

2) Target group profile

This second phase covers the profile of the target group, which in this case is the students.

An approximate profile can be used as that which is reflected in the prerequisites for access to the course: previous knowledge or qualifications, technological availability, level of pre-specialty, etc. as mentioned in Figure 1.

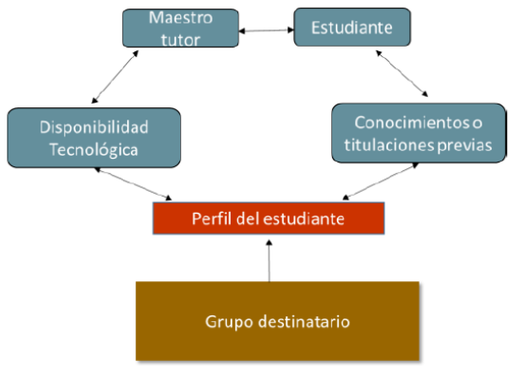

Figure 1 Target Group Profile

All students who take the Social Service course comply with the requirements established by the UANL Social Service and Professional Practices Department. They develop one of extra-classroom activities. The tutor teacher can have a vision of the profile of each one of the students that make up his group since he handles the SIASE.

According to this analysis and follow-up, the tutor teacher can make an assessment of the development of the students, as well as the technological availability they have to fulfill their activities.

3) Initial proposal of objectives and contents

In this third phase, phases 1 and 2 will be taken into account, as well as the analytical program of the learning unit to analyze the content and fulfill the proposed objectives.

4) Selection of the means of presentation of the contents

In this phase the tutor teacher will use the Teaching and Learning Platform of the Universidad Autónoma de Nuevo León (Nexus), where they will be able to use the portfolios and upload the material. Students can consult the information, as well as the suggested links. On the other hand, the teacher has access to a calendar where he/she will schedule the progress of the project and the delivery dates of each of the products to be delivered by the students. Each student has a username and password to access this platform.

5) Feasibility

Feasibility indicates the availability of human, material and economic resources that condition the development of a course.

6) Selection of the authors who will develop the materials

The teachers in charge of developing a specific material for a course must be experts in the contents to be studied. They must write clearly and communicate their knowledge correctly, trying as far as possible to put themselves in the place of the student who must assimilate these materials through interaction.

7) Project design

In this phase, the content of the Social Service course is specified, adjusting the objectives and content to the student's training needs.

The initial needs analyzed in the first phases will largely determine the objectives. They are usually structured as general objectives and specific objectives.

a) Contents

The content includes the theories, laws, methodological procedures that the student must master related to the object of study of the learning unit.

The materials must respond to the following characteristics: programmed, adequate, accurate and current, comprehensive, open and flexible, coherent, transferable and applicable, interactive, meaningful, valid and reliable, allowing self-evaluation.

b) Requirements for the development of materials

In the case of materials for self-study, they must assume all the functionalities, including those of a good conventional teacher:

Motivate, transmit information effectively, clarify doubts, maintain a permanent dialogue, guide the student, establish the necessary recommendations to focus the work, and monitor and evaluate learning.

c) Preparation for development

It is necessary to organize the main ideas of each one of the topics, elaborate a conceptual map or a scheme to show the relation and sequence of these ideas and compile information on each one of them, by means of the elaboration of summaries.

d) Production of the material

Teachers who elaborate the material to be used should consider, among other issues:

- Clarity in the statement of goals and objectives.
- Coherence between objectives and content.
- Avoid redundancy, overlaps and omissions.
- Progressive advancement of content.
- Key concepts should be adequately supported and definitions should be clear and rigorous.

e) Evaluation of materials

Depending on the objective of the evaluation of the materials, two options appear. If the objective is to carry out a project to improve the material for the Social Service course, a formative review will have to be carried out every month. If what is intended is the accreditation of the materials with a certain seal of quality, it would have to be submitted to a summative evaluation.

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The activities that are guided by the teachers are uploaded by the student to the NEXUS platform on a monthly basis. These activities have a score of 70% if the student complies with everything established. The remaining 30% is obtained by completing 6 community activities and 6 monthly reports. These results determine the student's final evaluation.

The reports made by the students as well as those issued by the receiving agency regarding the student's performance during his/her stay in the business or public sector are considered.

This evaluation is carried out by the direct supervisor of the area where the student is performing the assigned activities. Each month the student must complete a minimum of 80 hours in order to cover the total of 480 hours as established in the regulations (UANL, 2014).

The main objective of the project developed by the student during the semester is to implement an improvement in the area where he/she is located.

The project consists of the parts that are usually known. The cover page, statement of the Problem, structuring of the Agenda or Work Plan. (Specific Objectives), Theoretical Framework or Conceptual Framework, Justification, Methodology, Processing and Analysis of the information, Presentation of the Results, Glossary, Annexes, Bibliography.

The objective of the Social Service allows the student to be linked, from his professional training to social problems. It indicates the "need to establish as part of the curriculum an authentic social service for the good of the community". (Mir Montes & Reparaz Abaitua, 2003).

With the project to be developed, which in this case is one of continuous improvement in the unit, it is possible to specify expected learning results in each activity, that is, observable results. In this way it will be possible to establish what type of evidence is produced and how it can be collected in order to analyze the level of achievement of the competencies described.

Conclusions

Information and communication technology contributes a lot in relevant education that considers knowing, learning to be, learning to know, learning to do and learning to live. ICT is a means of information access to knowledge and as a tool for the construction of new knowledge as well as fostering attitudes and values.

Social Service contributes to the integral development of the student because, among other things, they carry out a project through which they have the opportunity to visualize the improvements that their own experiences can contribute to the unit where they carry out their social service.

The SIASE system is shown to be an effective way to fill out each of their monthly reports. The use of the Nexus platform also offers ample possibilities for guidance and feedback from the tutor teacher. One of the most important activities is the evaluation of the project to be developed by the student.

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Transversal contrast of the U.T.A. curriculum with English language in the technical section of the industrial maintenance speciality

Contrastación transversal del curriculum de la U.T.A con idioma inglés en su apartado técnico de especialidad en mantenimiento industrial

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Abstract

This work on higher education and further improvement in the preparation of students of the Technological University of Altamira, has contributed and contributes to building a more robust and accessible scaffolding empowerment knowledge of foreign language (English) in the student body of the university. The aim is to reorient the teaching of the language through an alternative methodology in implementing the English language in its special technical section of the study area, rearranging the EA approach and applying transverse contrast of the curriculum. Getting a meaningful learning relevant to industry requirements and a wide range of educational nuances of change and advancement. The new internationalized reorganization of work calls for changes in the personality of the individuals who have new powers in the application of that knowledge and materials together with their technical expertise, innovation promotes the acquisition of knowledge of the foreign language through this teaching method and achieve a steady and continuous development to compete in international labor markets.

Education, Contrasting, Reorientation, Skills, Internationalization

Resumen

Este trabajo sobre educación superior y mejora continua en la preparación de los educandos de la Universidad Tecnológica de Altamira ha contribuido y contribuye a construir una andamiaje más sólido y accesible en el apoderamiento del conocimiento del idioma extranjero (inglés) en el estudiantado de dicha universidad. El objetivo es reorientar la enseñanza de dicho lenguaje a través una metodología alternativa en la aplicación del idioma inglés en su apartado técnico de especial del área de estudio, reacomodando el enfoque de E-A y aplicando contrastación transversal del curriculum. Obteniendo un aprendizaje significativo pertinente a los requerimientos del sector industrial y con una amplia gama de matices pedagógico de cambio y avance. El nuevo reordenamiento internacionalizado del trabajo exige cambios en la personalidad de los individuos quienes al contar con nuevas competencias en la aplicación de dicho conocimiento y aunado a sus materias de especialidad técnica, propicia innovar la adquisición del conocimiento del idioma extranjero a través ésta método pedagógico y lograr un desarrollo constante y permanente para competir en mercados internacionales de trabajo.

Educación, Contrastación, Reorientación, Competencias, Internacionalización

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Introduction

Contemporary education in Mexico faces great challenges, as language teaching methods have not fulfilled the task of meeting the needs of the higher education level to produce a noticeable impact and improvement. Very longitudinal methods and techniques have had little success in terms of learning with a technical purpose, linking the productive and service sectors in a forceful way. However, as Mexico enters international markets, it needs to rethink methods and programmes for teaching a foreign language, particularly English, as it is an auxiliary language for communication between nations that do not have the same mother tongue. (UNESCO, 1998)

The Technological University of Altamira has an important presence in the southern part of the State of Tamaulipas, and its courses are linked to the productive sector, and it has had to identify the points to be improved in teaching so that its students can be inserted into the productive sector and the labour environment, both nationally and internationally. The content of higher education includes the subject of foreign language (English) as a subject in every degree course. The UTA curriculum offers flexibility to make an easy didactic linkage of improvement with the study plan and this allows preparing students to internationalise their learning and insert themselves in the industrial globalisation of the moment. The Higher University Technician in Industrial Maintenance has five semesters. The proposal of continuous improvement in the performance of the students of the industrial maintenance career has been achieved in an experimental way, executing the union of English as a vehicular language from the technical section of the same, applied to the speciality of the series of subjects.

This has awakened the interest of the students, since 2005 this project has been implemented with the aim and purpose that the new generations of students take hold of the continuous improvement in the learning and applicability of this language in their working life both nationally and internationally.

In order to integrate the vehicularity of this language, the transversalisation of this language with the subjects is carried out. The observance of this alternative methodology encourages the learner to learn the foreign language through its applicability in something real and perceptible, which is their competence in the workplace. By making this link between subjects and English, they understand, learn, apply and have the opportunity to use the language as a vehicular language that gives them the opportunity to be hired by foreign companies and in some cases to travel with them and the profit of being linked to important industries that allow global mobility.

The State of Tamaulipas, bordering the State of Texas, U.S.A. with more than 3000 kilometres, obliges our universities to prepare themselves to be in tune with their northern neighbours. The interdisciplinary nature of higher education content has led to continuous improvement, the internationalisation of programmes and the globalisation of young people's studies, enabling them to compete in the world of work. The Technological University of Altamira, being located in the Gulf of Mexico and being a port of loading and unloading connected to the world through many important companies settled in this municipality of Altamira, Tamaulipas, has carried out situational analysis of work and therefore has been concerned about projecting its students to the world.

The problem that originated this work begins with the ethnographic environment of the collective that makes up the students of this institution, since the rurality that frames this area lacks the necessary preparation to face the rigour of the learning that is expected of them. This problem has had to be analysed, seeking real solutions to real problems, since the industrial sector demands a product (student) with very specific characteristics, and this has favoured the search for answers to the problems of study and performance of students in order to increase their competitiveness in the labour market.

Toffler quotes that "All economic systems rest on a knowledge base. All enterprises depend on the prior existence of this socially constructed resource. Unlike capital, labour and land, it is often disdained by economists and executives when the inputs needed for production are finished.

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And yet this resource is the most important of all". (Toffler, 1995). Therefore, it is necessary to work on this new era of scientific and technological knowledge, which has a great relevance in the preparation of higher technicians. Enrique Peña Nieto has enacted reforms to the Law on Science and Technology, with which greater dissemination is given to scientific research and academic content. This means that the technological portals of research and innovation through access platforms are open to the entire knowledge society. The amendments to the Law on Science and Technology establish as a principle the integration of public policies on scientific and technological matters and the dissemination or transmission of scientific, academic, research and innovation content without restrictions for the population.

"Open access" means having a digital platform with no subscription, registration or payment requirements for research, educational, academic, scientific, technological and innovation materials financed with public resources. Luis Videgaray Caso, Secretary of Finance and Public Credit, assures that today is a good day for science, technology and innovation in Mexico with more and better investment in this area.

This work is in favour of changes in higher education for those who have the idea of studying and being able to occupy a place in the society that surrounds them, in the society of knowledge, which is perceived to often have its doors very tightly closed so that not everyone can access it, and cannot shine as brightly as they would like to in life.

Theoretical and methodological framework

The programmes of the technological universities in Mexico are based on constructivism and the competence model. It is said that constructivist pedagogy is a current that affirms that knowledge of all things arises from the intellectual activity of the subject who achieves his development according to the interaction he engages in with his environment. (Lev Vygotsky). For all of the above reasons, technological universities apply constructivism in their teaching programmes, since their rules and regulations require 70% practice and 30% theory.

Therefore, knowledge is generated by the capacity, ability and skill of the learner through the application of this E-A method. In addition to the above, Transversality has been incorporated, which is the name given to the integration of the subjects with the English language to improve the standards required by companies.

The actions taken have been firstly the restructuring of the educational programmes, taking advantage of their flexibility, linking them with the subjects of each four-month period and the English language, leading to a practical learning of this language through the subjects they see during the period of study, and which will later be applied in their working life by the university higher technicians.

As part of this restructuring, the students are separated into groups so that the groups are homogeneous and all students have the same amount of knowledge of the foreign language and develop in a more equal way and with balanced performance and in the same frequency. The teacher and the pupil therefore enjoy a privileged situation in that there will not be the problem of some having more knowledge than others.

This project is complemented by the elaboration of manuals, which contain information on the subjects taught by the university professors. These work guides contain the subjects that are taught in the classrooms, plus exercises and questions related to them. In order to understand these manuals, students are undoubtedly taught strategies for reading and understanding technical texts, vocabulary, and grammar through which they are taught to analyse sentences, recognising each word that makes them up. Syntax and semantics are very important elements in reading comprehension, as they induce students to reflect not only on the subject matter but also on how it is written, understood and comprehended. The readings in some way try to give them a very close horizon to the performance they will have in their areas of work.

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Trying to coincide with what is programmed by the English coordination of the technological universities, the follow-up of grammar and other points of the English programme is applied as much as possible so that together with this project all the premises are fulfilled: the teaching of English under the guidelines of the technological universities, the link of this language with the subjects that the students are acquiring during their learning period. Since 2009, the technological universities have also added to their teaching-learning programme the model of competences that includes generic, disciplinary and professional or work-related competences, which prepares students to apply the following: The four pillars of education: Knowing how to do, Being and Knowing how to live together.

Once we have mentioned what the UTA curriculum is like, the next step is to explain the objective of this work, which is being applied experimentally in this institution. The objective is to reorient the teaching of this language through an alternative methodology of the application of the English language in its specialised section of the area, rearranging the E-A approach. In this way, a significant learning relevant to the requirements of the industrial sector and with a wide range of pedagogical nuances of change and progress is obtained.

And in this way apply these references to reorient the common core programme linked to the English language, with the competences to be developed in the students, considering the basic disciplines of the fields of knowledge and the generic ones. This part of the methodology will have to be linked to the technical-scientific English part of the speciality of their area (industrial maintenance).

In each of the thematic and work units, the basic and generic disciplinary competences to be developed in the students must be defined in accordance with the objectives of the contents, teaching-learning activities, tasks and other assessment elements, material resources, times, bibliographies suggested by the teachers in accordance with the area of knowledge in which it is taught. (s).

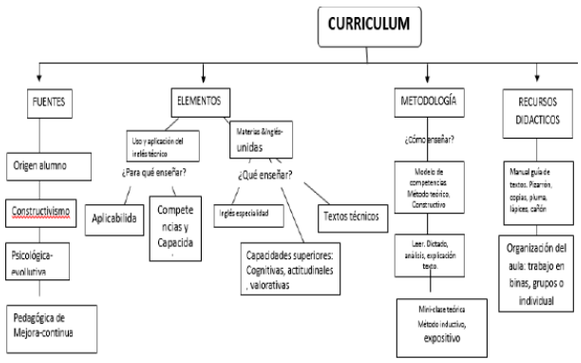

Figure 1 Presentation of the management of the curriculum with the alternative methodology for the incorporation of technical English and the subjects of the industrial maintenance course

Mission of the institution

The mission of the Universidad Tecnológica de Altamira is to train highly competitive and innovative University Technicians to satisfy the needs of the productive sector, goods and services through a quality teaching-learning process and a school-business link that leads to the regional sustainability of the country.

Vision of the institution

The Universidad Tecnológica de Altamira aims to be the best alternative for higher education through a process of total quality, committed to the demands of the industrial sector by offering Higher University Technicians with the capacity, efficiency and effectiveness to work in the industrial and service sectors.

Mission of the subject

To train Higher University Technicians capable of using the English language as a tool that allows them to enter the regional, national and international labour market. Offering quality and optimum performance in their careers.

Presentation of the subject

The subject of Foreign Language (English) aims to develop in the students of the Universidad Tecnológica de Altamira aptitudes and attitudes that will allow them to be trained as suitable university technicians, with integrity and responsibility, based on the foundation of the alternative methodology with which they will increase their abilities and skills in the use of this language through the complementary knowledge of technical English of the speciality in technological areas.

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This knowledge will enable them to solve the problem of communication in foreign companies inside and outside the country.

Justification of the proposed pedagogy

This new E-A pedagogy comes to solve the problem of teaching English in a traditional way, complementing the student's preparation with texts that include technical vocabulary focused on the needs of their work environment and that provides students with the opportunity to apply their skills and abilities in the acquisition of this language in an easier and more efficient way.

Overall objective

To achieve that the students of the Universidad Tecnológica de Altamira have the ability and skills to use the English language as a vehicle to enter the English-speaking world, to compete in the labour market.

Objectives

- To propitiate the action reaction in the student to use the English language in a fast and useful way both in the classroom and out of it.
- To use the knowledge of the English language in response to the needs of the work environment.
- To highlight the importance of knowledge of the English language.
- Observe and be discerning about this method which provides a new expectation.
- To perceive how the acquisition of this knowledge provides security in the workplace.

Specific objectives

- To substantiate the pedagogy of this methodology.
- To establish the teaching techniques of this method.
- To create didactic material that will open up their higher capacities.
- To establish the interrelation between the foreign language and the technical subjects in their field of study.
- To analyse and discuss the problems underlying the fact of learning a language interrelated with its learning, as this linkage will open up their integration into the environment of their field of study. Will open up their integration into the global knowledge environment required anywhere in the world.

Variables

Dependent variable

Methodology has a significant influence on the English language ability and proficiency of UTA students.

Independent variable

Alternative methodology of applying technical-speciality English for continuous improvement.

General competences

The Foreign Language course interrelated with the subjects of their degree course facilitates the following competences for students:

- Develop skills and abilities that enable them through acquiring the knowledge, understanding and application, to interpret all types of technical manuals written in English, making syntheses and evaluating their performance and ability.

- To raise theoretical discussions based on everyday situations in their possible working environment.

- Support any subject of their speciality that takes place in their professional practice, as well as in their daily life.

Contents per unit

Technical English Interrelated with Industrial Maintenance technical subjects.

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Table of contents with the elements that are required to form the interrelation of the subjects of coordination with those of English (IE). Each thematic axis concatenates the topics that teachers will proceed to their application, not without first giving the introduction to the Topic.

Competences to be developed:

- Identify the different applications of technical English.
- Appropriate the basic and general terminology of the subject.
- Identify the different strategies to be used for comprehension and application.
- Understand how it interrelates with the technical subjects of the course.
- Speak in order to communicate and establish a bridge of communication linking both languages in terms of discerning and articulating through words the message that is to be understood.

Teaching sequence

a) Students will do fifteen technical readings during the four-month period.

b) They will acquire knowledge of the technical subject in English.

c) They will apply the grammar of the topics indicated in the curriculum of the coordination of technological universities and will learn in an applied way during the reading.

d) d) They will solve exercises consisting of questions in passive voice considering the affirmative and negative form during practice, thus complying with the programme of these universities and applying the Alternative Methodology of Interrelation of Foreign Language with the technical subjects.

e) Translate from English to Spanish or from Spanish to English and/or English-Spanish.

f) Answer and communicate their ideas in English fluently in English.

g) Take dictation on the blackboard practising the spelling of technical vocabulary, and such dictation will be in the format of a memorandum, letter, note, report so that when they enter the global labour market, their skills and abilities are streamlined for better performance.

h) They will comply with the requirement to acquire and answer the New Destinations book in accordance with the provisions of the National Coordination of Technological Universities.

Sem.	Unidad/tema	Temas integradores	Métodos científico	recursos	hor as	bibliografía
1 2 3 4 5	Unidad 1 5.1.1 Passive Voice (Aff and Neg) 5.1.2 Part of speech (mind set) 5.1.3 Nouns, 5.1.4 verbs and pronouns practice and exercises 5.1.5 Reading skills (skimming and scanning)	1. Esfuerzo y deformación elástica. Welding 1. Fundamentos de la automatización 2. Sensores electrónicos 3. tipos de procesos 4. soldadura 5. subestaciones eléctricas 6.	Forma: Expositivo Inductivo Deductivo Lluvia de ideas	Copias Pintarrón Acetatos Cañón Computadora Laboratorio de idiomas	25	Grammar in Use Murphy Raymond. Introducción a la Mecánica de sólidos Popov:E.P Limusa Robotica Industrial Groover Mikell P. Economía Limusa. Editorial Procesos de Fabricación Edit. 1ECSA- Manual de Mantenimiento Mourrow L.C. CECSA. American Welding Society Manual de soldadura. Prentice –Hall

Modules of the three mid-term modules of the subject Foreign Language. (English)

	Gramática	Temas	Gramática	Temas	Gramática	TEMAS
Asignaturas Materias	Primera unidad.		Segunda unidad	Segunda unidad		Tercera unidad
Técnicas	Transversalidad	Primera unidad	Transversalidad de idioma extranjero y asignatura del cuatrimestre quinto.	Subtemas	Tercera unidad transversalidad de idioma extranjero y la signatura del cuatrimestre quinto.	Subtemas de asignatura para tercera unidad.
	De idioma extranjero de la asignatura del cuatrimestre quinto.	Subtemas		De asignatura para la primera unidad		
		De asignatura para la primera unidad.				
Material Strength			1.- Passive voice. (Aff-Neg)Presente & past		1. Passive voice(Aff-Neg) Future & Modal Verbs	1. Calibration and Certification
	1.- Passive voice(Aff-Neg)	1.-Strain and elasticity	2- Parts of speech: Article/Nouns/ Adj./Adv. Prepositions and conjunction. Analysis of Writing Text. (Scanning-skimming)		2. Syntax	
	Present & Past				3Sentences andclauses. Analysis or writing text.Scanning & skimming	2. General application package.
	2- Parts of Speech Article / Nouns / Adj. / Advs. Analysis of Writing Text. (Scanning& skimming)			1.Torsion		

Automate	1- Passive voice (aff—neg.), Future&Modal verbs.		1. 1- Passive voice (aff—neg.), Future&Modal verbs.			1. - Magnetic fields.
&	2. Parts of speech: article, nouns, adjectives, adverbs, prepositions, etc.	1. Electronic sensors automated.	2. Parts of speech: article, nouns, adjectives, adverbs, prepositions, etc.		1-1- Passive voice (aff—neg.), Future&Modal verbs.	2. - Elementals Circuits of A.C.
Robotic.	Analysis of writing text. (Scanning and skimming)		Analysis of writing text. (Scanning and skimming	2-logict and programable control.	2. Syntax	3.- Evaluations of maintenance area
					3. Sentences and clause analysis of writing text. (scanning and skimming)G	4.- Machinery Alignment
						5.-Lubrication
	1. Passive voice. Aff. Neg. Future and Modal verbs.	1	1. Passive voice. Aff-Neg.		1. 1. Passive voice. Aff. Neg. Future and Modal verbs	
Lean Manufacturing Process.	2. Parts of speech: articles, nouns, adjectives, adverbs, prepositions, etc. Analysis Writing Text. Scanning and Skimming)	1.Concepts and Budgeting Costs.	Future and modal verbs.		2. Syntax	1.Thermodynamic cycles. 2. pneumatic circuits de vises. And electro pneumatic 3- Memories and electronic temporized of power.4. Software of maintenance5. Mechanic behavior of materials.
			2. Parts of speech: articles, nouns, adjectives, adverbs, prepositions, etc. Analysis Writing Text. Scanning and Skimming)	3. Taxes Decreases and financiament.	3. Sentences andclauses.Analysis of writingtext.ScanningandSkimming.	
Industrial Installations.	. 1.Passive voice. Aff. Neg. Future and Modal verbs.	1.Automate electric sensors.	1. Passive voice. Aff-Neg.	4. Conventional machinery and tools.	11. 1. Passive voice. Aff. Neg. Future and Modal verbs	1. Beams and columns warping.2. Numerical control. Computerized robotic..3. Projects evaluation.4. Shear process.5Air conditioned service installation..
	2. Parts of speech: articles, nouns, adjectives, adverbs, prepositions, etc. Analysis Writing Text. Scanning and Skimming)		Future and modal verbs.		2. Syntax	
			2. Parts of speech: articles, nouns, adjectives, adverbs, prepositions, etc. Analysis Writing Text. Scanning and Skimming)	5. Distribution of electric systems.	3. Sentences and clauses.	
					Analysis of writing text.	
					Scanning and Skimming.	

Competences to be developed:

- Skill to assimilate and handle the concept of interrelation of the general objective.
- Understand that within the information model there is an underlying system of application of the foreign language (English).
- Differentiate and analyse the elements that make up the content.

Functional Map

The functional map are formative elements: teaching methods, organisational modalities, competence components, assessment strategies and areas of study.

Perfil de Ingreso	Diagnostico	Innovación y creatividad	Desempeño	Equipamiento	Funciones de aprendizaje	Termino de Carrera
Preparatoria terminada. (CBTIS, CONALEP)	Aplicación exámenes para establecer capacidad de conocimiento previo de inglés	Innovación: Agrupamientos por competencias. Creatividad: Incentivar mejores aportaciones y exposiciones en su entorno escolar y laboral en el futuro.	Trabajo equipo en diferentes actividades: Traducción, de ejercicios, interacción a-a hablando de temas clase escuela o familia.	Laboratorios: Idiomas Prácticas de sus área tecnológicas Manuales de inglés técnico, libro de lectura de inglés.	Inglés: Hablado, Escrito Aplicado a sus áreas técnicas. Traducción: Inglés-español o viceversa	Fluidez de expresión en inglés, capacidad unir escritura y habla durante exposiciones propias de área..

Pedagogical strategies that contribute to the achievement of objectives and competences

Under the framework of the development by competences which aims to integrate "knowing what", "knowing how to do" and "knowing how to be" the English course will be developed with the following methodological strategies:

Direct accompaniment of the student:

- Dialogical presentation of the subject with student-teacher, teacher-student, student-student interaction.
- Direct guidance of a work session with students in the classroom.
- Direct advice or tutoring to students about the subject matter interrelated with English.
- Explanation of procedures, models, strategies and comprehension techniques.
- Attending final assessment tests.
- Development of workshops or application exercises.

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- Grouping learners with equal competence and knowledge of English.

- Development of group work techniques.

Independent student work:

- Solution of problems proposed individually or in groups.

Individually or in groups:

- Research, organisation of information, analysis of specific topics.

- Internet consultations.

- Development of workshops.

- Directed reading and interpretation of bibliographical reference texts.

- Individual or group resolution of technical readings, questionnaires and work guides.

Teaching-Learning Method

Métodos	Finalidad	Objetivo	Características
Mini clase teórica	Exponer tema	.Aplicar la teórica, comprensión y aplicación de manera práctica y sencilla	Exposición teórica de diez minutos. Pasar a práctica cual puede ser en interacción de par o equipos de cuatro, maestro-alumno, ó alumno de manera individual. Revisión práctica y solución problemas de la clase.
Método inductivo-expositivo	Breve, fácil, asimilable		
Laboratorio de Idiomas. Método inductivo y práctico	El alumno se permee del idioma extranjero con facilidad.	.Aprendizaje autónomo	Salón con veinticinco computadoras, un servidor, asi como un software con una amplia variedad de prácticas.
Método teórico-práctico, constructivo.	Plan de prácticas previa elaboración, temas de gramática, vocabulario y audio	.Aprendizaje autónomo	El alumno recibe un código de acceso personal. Previamente se escriben los nombres de las prácticas en un pizarrón, las cuales son por semana, cubriendo dieciséis prácticas un mes.

Dimensions

Cognitiva	Actitudinal	Valorativas
Desarrollo de capacidades superiores, pensamiento crítico y de análisis en sus estudios	Sentimiento de pertinencia escolar, solidaridad en su diario hacer y respeto, entrega y responsabilidad consigo mismo y sus estudios.	Evaluación por parte de los estudiantes, de los estudios, esfuerzos y no perder el enfoque de porque estudia.

Resources

- Manuals whose content will be technical readings containing the topics of the subjects of their areas, with which the foreign language is interrelated.

- Language laboratory

- Books suggested by the coordination of technological universities in accordance with the general programme of the same.

- Workshops for the preparation of TOEFL and Trinity Exam accreditation.

- Classes with the use of a computer and projector.

- Library

- Computer centre for homework, personal computers and Internet service.

Evaluation

Assessment must be continuous and competency-based, with the aim of evaluating the skills and abilities acquired by the student, offering different strategies in accordance with the rules established in the Institution's student regulations. The evaluation instruments (exams) will contain topics proposed by the coordination of technological universities and paragraphs of technical readings with their respective questions. They will be held once a month. The evaluation items and criteria are set out below.

- Partial evaluation (50%). 3 partial exams = 50%.

- Final follow-up (50%) = 50%.

- Portfolio of evidence of the four-month period carried out in class = 30%.

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- Written work for the term = 10%.

- Conversation exercises = 10%

Parciales 50 %	Primero	Segundo	Tercero
Examen teórico	30%	30%	30%
Laboratorio de Idiomas	10%	10%	10%
Inglés técnico	20%	20%	20%
Proyectos: Exposición de Área Técnica (escrita y/o oral)	20%	20%	20%
Práctica en salón: Dictado, lectura, cuestionarios, etc.	20%	20%	20%
Evaluación final 50%	Portafolio 1Evidencias	Trabajo Escrito 2	Conversación 3
Seguimiento	30%	10%	10%

Pedagogical Proposal

It is stated in the IMEP thesis manual that the Pedagogical Proposal is a document commonly used in the educational field, with the particularity of being aimed at strengthening teaching and educational practice, considering the relevant facts of the pedagogical act. And that this modality is part of a broad spectrum of research work product of educational practice which aims to guide the solution to teaching-learning problems and has a high impact on the social sector. This document is the product of a continuous research activity carried out in the educational field and alludes to a specific field of study to address general problems and has the characteristic that it is an operational work project related to the teacher's field of competence.

That is why this work is presented in this congress exposing how through study, work and reorientation and innovation in the knowledge society it is possible to promote changes that impact on the industrial society, work and encourages the effort and encouragement to take advantage of the education reforms being carried out by Mr. Enrique Peña Nieto, to establish through the transversal contrast of the curriculum of the U.T. of Altamira the experience of how a public university participates with such decorum and dedication in the industry with continuous improvement and excellent learning performance.

The Universidad Tecnológica de Altamira to carry out this programme has a teaching staff that has the preparation and knowledge of the English language to increase the standards of competence and to be at the height of knowledge that their students will have at the time of finishing the career.

Conclusion

This work presents the effort to seek continuous improvement in higher education in places where rurality limits their collective to advance in a forceful way in the acquisition of a career that allows them to participate in the world of work, difficult because of the poor linkage that is often perceived in environments such as the one described here. Today, it is not only necessary to transmit knowledge to students, but also to promote academic mechanisms that place them in national and global competitiveness. The Universidad Tecnológica de Altamira and its teaching staff, in an effort to promote the success and achievement of its students, show great dedication in their work so that learning can be claimed and made concrete.

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Identifying the level of ICT use in the area of science at the UPSLP

Identificación del nivel de uso de las TIC en el área de ciencias en la UPSLP

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Abstract

As time goes by, the technology advances very fast. In a certain way in today's education we take advantage of this when it comes to implement in a very good way the teaching and the learning of the students at a worldwide level. In this job there is reference to some aspects that are being treated in the UPSLP to improve the learning and reduce the rating of failure. This is the first phase of a project in general that is identified first in the level of use of the ICT, and we got an idea for what they are utilizing, how they are being used, afterwards it will be analyzed what needs to be modified and improved about the planning and programs of study, among other aspects.

ICT, Sciences, Education

Resumen

Con el pasar de los años, la tecnología va avanzando rápidamente, de tal manera que hoy en día en la educación se ha aprovechado esto tratándose de implementar de una muy buena manera en la enseñanza y aprovechamiento de los estudiantes a nivel mundial. En este trabajo se hace referencia a algunos aspectos que se están tratando en la UPSLP para mejorar el aprendizaje y reducir el índice de reprobación, esto es la primera etapa de un diagnóstico en el estudiante de Ingeniería de la Universidad Politécnica de San Luis Potosí. En general que primeramente se identificó el nivel de uso de las TIC y nos dimos una idea para que se utilizan, como se están utilizando y posteriormente se analizará que hay que modificar y mejorar en los planes y programas de estudios, entre otros aspectos.

TIC, Ciencas, Enseñanza

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† Researcher contributing as first author.

Introduction

Nowadays we are so used to hearing news about the appearance of a new technological device that is applied to telephony, video games, or means of storing and presenting information or to our health care that we take it for granted that they are used in any area of our lives.

However, there are areas in which ICTs are posing significant challenges when implemented in a specific scenario such as classrooms in our country.

According to statistics from the International Telecommunication Union (ITU) in its Measuring the Information Society Report 2014, ICT penetration in all areas of our lives is improving considerably. Globally in 2014, 78% of households in developed countries had internet access compared to 31% in developing countries and 5% in the poorest countries. ITU also reported that there is still considerable inequality between rural and urban areas in terms of household Internet access.

Internet access and use in schools has also increased significantly over the last decade. According to the 2014 report, in developed countries, most schools have Internet access, so much so that some countries no longer examine this indicator, having reached 100% connectivity.

In developing countries, however, the average level of internet access in schools is lower, although significant progress has been made in recent years.

There are notable differences between countries, even within the same region and at similar income levels. In some developing countries, the proportion of schools with fixed broadband Internet access (among all schools with Internet access) remains low, indicating that in these countries, many schools only have connections at narrowband speeds. Internet connectivity in schools also depends on the development of national telecommunications infrastructures and whether service providers have reached rural and sometimes geographically difficult and sparsely populated areas. Rural areas tend to have much lower network coverage and therefore lower ICT uptake compared to urban areas.

About content, ITU also reported that the overall growth in Internet use has been accompanied by a parallel sharp increase in the volume of Internet content. The emergence of social networking websites and applications has contributed significantly to the growth in Internet use, with more and more people creating, sharing and publishing content through social networking and other Internet applications. For example, more than 6 billion hours of video are viewed every month and more than 100 hours of video content are posted every minute to YouTube, the leading international video-sharing website, which serves 61 countries and had more than 1 billion unique visitors per month at the beginning of 2014. Wikipedia, the largest and most widely used online encyclopaedia, had more than 30 million articles at the end of 2013, and articles are now available in 287 languages. At the same time, the authors of most of the Internet content continue to be content creators from developed countries.

About the current development of ICTs in our country and to situate ourselves in terms of the international ranking, it suffices to say that in 2013 Mexico was in 95th place in terms of ICT development and in 20th place among the countries of the Americas.

But something that is important to highlight is its great potential, given the size of its population, especially its young population, it can be noted that it is among the top countries in terms of the absolute value of digital natives. The absolute number of digital natives in each country (in alphabetical order, from top to bottom and from left to right) corresponds to the relative size of the box.

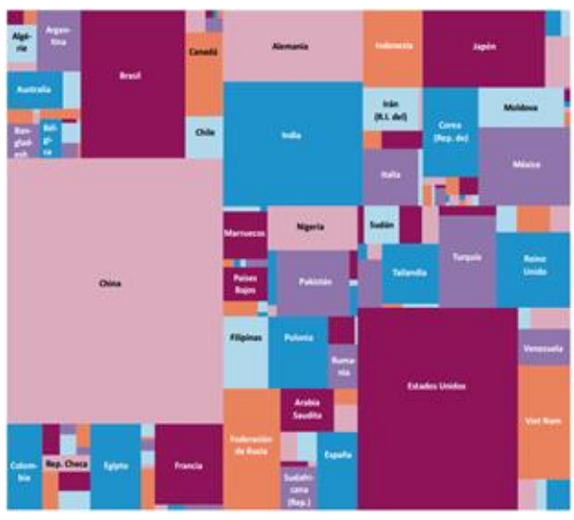

Figure 1 Distribution of digital natives in countries (absolute numbers), 2012 source ITU

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In this sense, this can be an encouragement and a commitment to young people who are or will be studying and who already have a high level of interaction with information technologies in all areas of their lives.

In our country, the government has promoted the following national strategies through the National Development Programme and as an instrument:

2.6. Take advantage of information and communication technologies to strengthen upper secondary and higher education Lines of action.

2.6.1. Boost the development of open and online education provision, both for complete programmes and for specific subjects.

2.6.2. Promote the incorporation into teaching of new technological resources for the generation of skills specific to the knowledge society.

2.6.3. Carry out and encourage investment in the technological platforms required for online education.

2.6.4. To work with the teaching communities on dissemination and training programmes for the use of ICTs in educational processes.

2.6.5. Promote the relevant regulations for open and distance education to provide services and support for students and teachers.

2.6.6. To promote collegiate and multidisciplinary research into the use and development of technologies applied to education.

2.6.7. To implement a strategy for monitoring and evaluating the results of the academic programmes in operation in non-school and blended modalities.

2.6.8. To use technologies for the training of teaching, management and support staff involved in the school-based, non-school-based and blended modalities.

2.6.9. Establish generally applicable criteria to facilitate the development of online learning units.

To respond to these challenges, institutions must be committed to providing students with a quality education where they can develop the competences and skills that will equip them for their future employment.

That is why the Polytechnic University of San Luis Potosi (UPSLP) promotes a flexible academic model based on innovations in academic training and links with the social and productive environment, among which we can mention.

And in the mission of the UPSLP is to have a relevant academic offering oriented to current and future needs and incorporating the development of science and technology.

The University makes effective use of technology for academic work, staying at the forefront in the incorporation of new technologies and using them intensively in their training processes, research and management.

And among the Educational Quality Objectives that the UPSLP promotes and that allow to promote the use of ICT are:

6. Consolidate a system of institutional management and evaluation based on the quality approach, aimed at continuous innovation, promoting a culture of transparency and accountability.

In the Academic Model of the UPSLP we also find that the academic offer should be relevant and oriented to current and future needs and incorporate the development of science and technology.

Regarding the Plans and study programmes that strengthen the mastery of mathematics, science, information technology.

In this way and starting from our area of attribution, which are the subjects of the Academy of Sciences of the UPSLP

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(Introduction to Physics, Physics I, Physics II, Chemistry, Electrical Circuits, etc.) this research work has been developed with the aim of carrying out an analysis of the access, use and appropriation of information and communication technologies in the university community (students and teachers) of the Engineering degrees of the Polytechnic University of San Luis Potosi. For this purpose, the partial results of the application of a questionnaire on ICT to students of the University who took Physics I, Introduction to Physics and Physics II in the summer courses of 2014 are presented.

At UPSLP during the first semesters of the degree, engineering students take some subjects from the Mathematics and Science Academies.

The UPSLP uses as strategies the use of Mathematics and Science laboratories, where students, through the use of Information and Communication Technologies (ICT), reinforce the learning of their skills in these disciplines. However, failure rates have not been reduced. The question then arises as to what is the impact on the learning of UPSLP students when using these strategies. The present project proposal arises as the first stage of a more general one which aims to improve the current strategies so that they have a positive impact on the pass rate. It is well known that nationally and historically educational institutions have a high rate of failure in basic subjects of Science and Mathematics where the UPSLP is no stranger to this problem. In order to increase the pass rates, various strategies have been tried at UPSLP, such as the implementation of Mathematics and Science Laboratories where the use of ICT is a fundamental part of these processes.

Therefore, there is a natural need to identify, classify and measure the direct impact of ICT use on the development of students' skills and competences, in order to develop educational strategies for the improvement of academic performance.

ICT has been having a strong impact and will continue to have a strong impact over the years, which affects both positively and negatively in education, in the business sector, in our daily lives, in what surrounds us, etc., and are issues that are being addressed internationally, nationally, state, local and within institutions, which analyse the environments and situations that are experienced on a daily basis to have a better perspective of what is happening and the needs that exist in terms of ICT and education.

Methodology

This work was carried out during the summer of 2014 in which the UPSLP was giving summer courses and that is where we based our sample, which we decided to conduct surveys to make an analysis to identify the use of ICT and also adding some key questions to give us some idea of what and how they use them, and to know what they think about ICT and physics.

Firstly, a baseline survey was designed and applied to a small sample (5 people), with the results obtained some adjustments were made for a better design and understanding of this, then it was applied to students to the entire available population (172 of 185, having a confidence level greater than 95%) studying the subjects of Introduction to Physics, Physics 1 and Physics 2, the careers that these students are divided into 4, which are:

Industrial Systems and Technology Engineering (ISTI), Information Technology Engineering (ITI), Telematics Engineering (ITEM) and Manufacturing Technology Engineering (ITMA) and they were divided into 5 groups of Introduction to Physics, 1 group of Physics 1 and 2 groups of Physics 2, these are students who took these subjects for the reasons that they owed them or wanted to advance them, The application of these surveys was carried out between classes and observing that they were carried out correctly and as already mentioned, this was done in order to have a greater number of confidence and without excluding anyone of those present, also within this activity, observations were made in some classes, the laboratories were visited and the person in charge of the laboratory was interviewed.

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The infrastructure of the UPSLP is very well equipped from the classrooms, auditoriums, audio-visual rooms, computer rooms, library, etc.

Within the UPSLP there are several laboratories in different areas, of which the science laboratory is very well equipped for the different practices that can be performed, in the laboratory teachers receive training by the person in charge of it so that in turn they can properly instruct students and thus have a better interest and use for the subject. The SPSS programme was used to compile the results.

Results

The following results were obtained from the above.

A total of 78.5% of men and 21.5% of women were surveyed and they were distributed among 4 different degree courses. The ages of the students surveyed ranged from 17 to 29 years. With an average age of 19.34 years.

How capable are you of using a technological device? On this question, on a scale of 0 to 10, where 10 is the most capable possible, the students perceive themselves with an average of 8.69.

On a scale of 1-10 the students feel able to make use of some technological device with a value of 8.70 and also on a scale of 1-10 the students are interested in making use of some technological device with a value of 9.23.

91.3% of the students have internet at home and 100% of the students have an email account. Table 1 shows which technological devices they have and have access to.

	¿Tienes acceso a? %		¿Cuentas con? %	
APARATO	SI	NO	SI	NO
Computadora	95.3	4.7	82.2	17.8
Laptop	91.9	8.1	82.2	17.8
Celular	97.7	2.3	97.6	2.4
Tablet	55.8	44.2	37.3	62.7
	El 4.1 % mencionó que contaba con otros aparatos, por ejemplo Reproductor de Audio, consola de video juegos y Pantalla Inteligente			

Table 1 Percentage of ownership and access to some technological device.

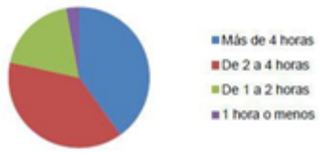
Of these devices mentioned the priority of use is in the following order, they are used for social networking, homework, listening to music, watching videos, playing games, research, reading, learning applications etc.

Graphic 1 shows the most used social networks.

Of these social networks, what they use them most for is to chat, share personal and/or academic information, find out about an event, for entertainment, socialising, etc.

Another of the things they use ICT is in some simulator, learning application and MOOC, this in the development of their learning, among which we can mention Maple, Wolfram Alpha, Visual Basic, Mathematics, Duolingo, etc., these are used to facilitate the management, understanding, understanding and solution of some type of physical and mathematical problems, also in the learning of another language, etc.

The time spent per day using a device is shown in graphic 2.



Graphic 2 Time spent per day using technological devices

91.9% of those surveyed consider the study of physics to be important in their professional training, as it is an indispensable subject in their degree course and is also related to other subjects, it is seen and applied in our daily lives, we have a better understanding and analysis of physical phenomena, etc.

Among the physics subjects that they consider interesting to use ICT are vectors, Newton's Laws, Kepler's Laws, Work and Energy, etc., but basically, if we put all the data together we can see that they could be used in all the subjects in one way or another, we also asked them how they would use ICT in these subjects and what they told us was to make tutorials, slides or show a video in class.

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Use simulators and/or software in which they are given a task and at the same time they are explained and instructed, use social networks to upload information and do group dynamics to discuss a topic, etc.

When asked if ICT are used in physics classes, 45.5% answered YES, and the way they are used is by showing videos or slides on the subject, making graphs and simulations, among others, which is why we mentioned above some of the things that they would like to do more with the use of ICT and not just these, which as we can see are very limited.

Also, 89% believe that it is appropriate to use ICT in class as it helps to have a better perspective, understanding and comprehension of the subject, helps to make the class more dynamic, generates greater interest and attention, etc. They also mentioned that the use of ICT has helped them in some way to better understand some concepts and problem solving, graphing, etc.

Conclusions

The partial results show that at UPSLP there is a frequent use of ICT by students, but not in an adequate way in the field of study.

The students give their opinions and take an interest in their academic process by contributing their own ideas and suggestions about how they think the classes would be more profitable and in a more pleasant environment.

It is also an area of opportunity to use social networks for activities such as dissemination of teaching material, communication about informative aspects of the academic activities, etc. Since these new forms of intercommunication are now widely used.

Students are also of the opinion that they would be more motivated to study with more motivational and counselling activities when using these.

Extensive use should be made of these technologies since the necessary infrastructure is available at the UPSLP to develop educational strategies with the use of ICT in the teaching of science.

Classroom teachers should be advised on the use of ICT so that they can make better use of these technologies and improve the academic performance of their students.

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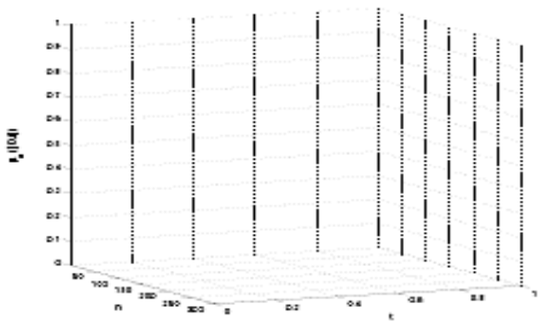

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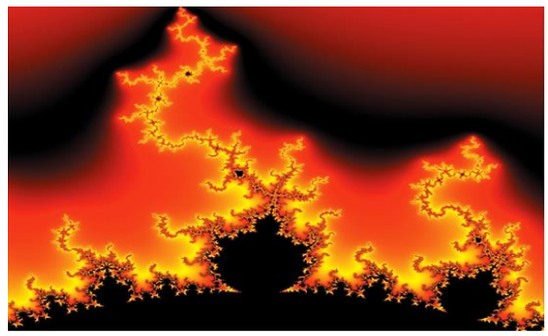

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