

Analysis of Assessment Strategies in Health Area Careers

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Abstract: This research procures an approach to the analysis of the different forms of assessment that teachers use in their daily activity in the classroom.

A survey was designed to know the teaching and assessment strategies that NS teachers in the health area of the IPN use to develop the student learning process. According to the results, it was found that prevail teaching strategies of instructional type, where teachers must “give the class”, and although in some cases it is said to use strategies such as ABP or analysis of cases, which are strategies aimed at metacognition and self-regulation, there are few teachers who apply them. This leads to the conclusion that teachers may not know the full range of strategies that current exists, or they do not know how to implement them correctly.

From this perspective it is, therefore, necessary to involve teachers in new and innovated workshops about new teaching and assessment strategies in order to apply more specific and adequate strategies in the students’ learning process. In this way, students could achieve a more active and innovated interaction in the acquisition of knowledge.

Regarding the assessment, it can be concluded that some teachers are also incorporating strategies that stimulate metacognitive skills so that students become aware of their own learning process and the actions that have made them progress or those ones that have led them to error. Nevertheless, not all teachers carry out this practice. And they not only have continued applying the traditional assessment but also they have been giving a high level of importance to exams.

Key words: assessment strategies, teaching strategies, achievement

1. Introduction

Due to the impact that forms to apply assessment have and the manner students perceive it in learning, the assessment has social importance since the educational and formative perspective as well as for the teaching-learning process itself. This research procures an approach to this topic based on the analysis of the different forms of assessment that teachers use in their daily activity in the classroom.

It is very important to comment that it was identified that most of the teachers in health area careers do not carry out didactic planning, in spite that it is a normative and compulsory task. This allows establishing that schools should regulate and look out its elaboration and, although academic freedom exists, planning each course for the higher education of IPN it is very important.

On the other hand, according to an investigation to teachers in order to know which teaching and assessment

strategies they are currently applying with their students, it was observed that prevail teaching strategies of instructional type, where teachers must “give the class”, and although in some cases it is said to use strategies such as ABP or analysis of cases, which are strategies aimed at metacognition and self-regulation, there are few teachers who apply them. This leads to the conclusion that teachers may not know the full range of strategies that current exists, or they do not know how to implement them correctly.

From this perspective it is, therefore, necessary to involve teachers in new and innovated workshops about new teaching and assessment strategies in order to apply more specific and adequate strategies in the students' learning process. In this way, current students could achieve a more active and innovated interaction in the acquisition of knowledge.

Regarding the assessment, it can be concluded that some teachers are also incorporating strategies that, as it was mentioned before, stimulate metacognitive skills so that students become aware of their own learning process, their advances, their stagnations, and the actions that have made them progress or those ones that have led them to error. Nevertheless, not all teachers carry out this practice. And they not only have continued applying the traditional assessment but also they have been giving a high level of importance to exams. An exam is a useful tool, but it should be different each time and it is important to wonder what the purpose of the assessment is. So the assessment turns into an instrument in hands of the students to be conscious about what they have learned, what processes have allowed them to acquire new knowledge and how to regulate those processes as well.

2. Theoretical Framework

2.1 What is Strategy?

Etymologically, the word **strategy** refers to the knowledge of how to direct military operations and have them carried out successfully. Progressively, in a wide sense, it refers to the knowledge about the direction of a project that allows taking decisions oriented or focused to accomplish goals. In a pedagogic meaning, didactic strategies are an organized and sequenced series of actions whose goal is the solution to a problem or a set of problems related to the educational field (Uría, 1998).

De la Torre (2000) states that **strategy** is the sequenced organization of the action, conscious, farsighted and planning activity; a sequencing or ordering of the steps to be taken. A strategy seeks the good result of the action.

On a didactic point of view, the instruction consists of a set of learning activities, which are usually articulated in certain strategies.

Likewise, UNESCO (2000) in its speech about politics, legislation and school management defines didactic strategies as a combination and organization of the set of methods and chosen materials to achieve academic goals in order to develop meaningful learning in students. In the same way, Dorrego & García (2001), quoted in Ronald, J. (2000), they define didactic strategy as an important part of the instructional design, which includes a set of events, activities, techniques and instructional means aimed to achieve the teaching and learning process goals.

To be specific about the **didactic strategy** description is indispensable to know its essential components, also, recognize its relevance specifically in the didactic sequence as the main axis of the whole instructional design. The strategy with instructional orientations will have a hierarchy to organize and structure the pedagogic actions from teachers, in the moments and events of the didactic sequences always oriented to solve the students learning requirements.

Monereo (2005) states that *didactic strategies* are neither a beginning nor a performance, but a mental process projected on the practice of the school problems that need to be solved. In a broad sense, a strategy is a flexible and adaptable way of proceeding, in which it starts from the contextual variables, altering the process, depending on how those variables are modified.

Nowadays, teachers seek students to be autonomous, independent, with self-regulated learning, able to learning to learn, with principles in building strategic thinking; to propitiate this, the teacher must propose didactic strategies.

In this way, didactic strategies are one of the fundamental pieces of the teaching and learning process because depends on them the orientation and the operativity of the process, they imply a constant interaction with the other elements of the teaching design, such as the objectives or competencies to develop, the contents, the characteristics, behavior, students' abilities, instructional media, and the assessment.

Therefore, *didactic strategies* could be defined as:

- 1) Teaching strategies, where the pedagogical meeting takes place in person between teacher and student, establishing a real didactic dialogue relevant to the needs of the students.
- 2) Instructional Strategies, where the face-to-face interaction between the teacher and the student is not essential for the student to be conscious of the school procedures to learn, this type of strategy is based on printed materials where a simulated didactic dialogue is established. These procedures are generally accompanied by non-mandatory counseling between the teacher and the student, in addition, they are supported in an auxiliary way in a technological instructional resource.
- 3) Learning strategy, it can be defined as all those procedures that are done by the students in a conscious and deliberated way to learn, that is, they use study techniques and recognize the use of cognitive abilities to enhance their skills in front of a school task, those procedures are unique and exclusive of the student as every person possess a different experience of life.
- 4) Assessment strategies are all the agreed and generated procedures that come from reflection about valuation and description of the students and the teacher's achievements in the learning and teaching goals.

2.2 Regarding the Assessment

There is no doubt that learning is the center of the educational activity. As it is reflected in different writings, the assessment conditions the classroom's dynamic in such a way that the moment of truth is not the learning but the assessments.

Currently, students' learning is valued in the process and in the product. The incidence of these two aspects in formal teaching is clearly reflected by the different norms that exist around this topic; by the incidences in the teacher's planning, in the classroom activity, and in the later reflexive activity. The summative and formative assessment is present in the whole school planning, in all the programming and in the classroom itself.

However, when we refer to the learning assessment the question is under what conceptualization we are talking to. In the last decades, the concept of assessment has suffered a deep and meaningful transformation in teaching and learning fields. By observing our surrounding we detect that innovations have come easily both in the use of learning strategies, didactic resources as in the assessment field. In this way, we may found in classrooms of educational and formative centers very innovated learning strategies accompanied by traditional assessment systems.

Regarding the traditional conception of assessment, located as a final act, nowadays is recognized that neither is a final act nor a parallel process, but something imbricated in the same learning process, creating interactive and circular relationships. The students, while doing their learning, carry out repeated evaluative processes of judgment and criticism, this serves as the basis to take decisions that guide their educational development. But is necessary to go further. Hadhi (1991) mentions that the point is not already giving an answer on how to rationalize and improve the assessment practices, but how to insert those practices as a learning.

It is precise to think different when talking about learning assessment. Assessment strategies neither can be understood nor used without a change of mind and attitude.

Now, learning and assessment must take into account the development of the student itself, that is, his or her expectations and initial academic level, learning styles, rhythm and interests, necessities and future projection. From this perspective, the assessment challenge is how it must be posed to be congruent with the theories that are advocated for a meaningful and respectful learning with the individual and cultural peculiarities of the student and his or her needs.

The importance that is given to the metacognition since theoretical frameworks of meaningful learning, due to its incidence in the ability learning to learn, is another factor that requires new approaches in the assessment. Metacognition is a person's skill that allows being conscious of its own thinking process, review it and contrast it with others', do self-assessment and self-regulation. It is an "inner dialogue" that leads to the reflection of what we do, how we do it, and why we do it.

We must stimulate these metacognitive skills from the assessment to make students be conscious about their own learning process, their advances, stagnations, actions that have made them progress and those that have led them to error. In this way, assessment turns into a tool in hands of the students to be conscious of what they have learned, the processes that have allowed them to acquire new learning and regulate such processes.

- 1) In order to be possible, the assessment and assessment strategies posed in the classroom should facilitate the development of self-knowledge and self-regulation. For this reason, each strategy must facilitate:
- 2) The self-analysis related to the attitudes and control of the effort and devotion students put in the different tasks of learning.
- 3) The executive control of the assessment, that is, the ability to planning the actions that involve the assessment, in order to value if it has taken other directions and, if it is the case, adopt the necessary changes according to the possible deviations.
- 4) The control of the acquisition of knowledge and skills in order to identify initial status that hinders or facilitates the acquisition of new knowledge and be conscious of its own learning strategies (identification of the most effective procedures for its own style and rhythm of learning, source of mistakes, etc).

Next to these metacognitive strategies, it is necessary that students know the criteria and the assessment indicators which have to be taken into account to value their actions: procedures and products. It is precise to make explicit the aspects to be considered to issue the valorative judgment and the achievement level indicators. This is not an easy task in many occasions. In practice, these criteria and indicators are more implicit than explicit. It has to be analyzed how a teacher poses the assessment and what is its content to extract the criteria and levels of assessment used. The knowing of these criteria is key information for the student. In fact, in an authentic and meaningful learning, the student's participation is fundamental in the moment of establishing the criteria and achievement levels. If the student has this knowledge, they can guide their own learning, focusing on the basic

aspects and establishing effective discriminatory decisions.

The assessment strategies of metacognitive nature such as reflexive diaries, portfolio, self-regulation of learning through conceptual maps elaboration, self-observation and valuation of the acquisitions through the use of assessment templates (Juba & Sanmartí, 1996) are favorable resources of assessment centered more in the process than in the results.

From these perspectives, assessment turns into a powerful instrument so that the student learns to evaluate and “understand which his or her individual learning is” and, in this way, develop one of the key abilities of the “learning to learn”.

If formative assessment is an answer to the professor’s initiative, is focused on the teacher’s intervention, both in the offered information and the collected data; on the other hand, the self-evaluation starts from the learner itself, that is, it is based in the self-learning; formative assessment is an answer to the teacher’s initiative meanwhile self-evaluation responds to the learner’s initiative. The teacher’s performance of teaching does not guarantee the learning but it is a facilitator; meanwhile, the self-learning carries in an implicit way of its nature its achievement. Learning is guaranteed because arises from the subject itself. The reflection or appreciation that the subject makes about himself has the guarantee to be positive, thing that not always occurs when it comes from outside. Self-assessment comes from inside.

Numerous are the investigations that have shown the impact of the assessment on the quality of learning. Biggs (1996) states that the procedures of the assessment are more determinant of students’ learning than the objectives of the curriculum and the teaching methods. On the other hand, the bibliographic review that it was done by Hernández Pina (1996) about learning assessment in a university context concludes and states that in the models that have been elaborated from qualitative-fenomenologic approaches, it has been proven that the way teachers have posed the students’ assessment affects not only the learning approaches (superficial and deep) but the quality of such learnings. Some quantitative assessment strategies carry out a superficial approach of learning meanwhile, qualitative and self-assessment strategies may produce deep learning approaches and high performance.

Collecting the expressed ideas it is inferred that it is precise to use strategies in which student:

- feels like an active agent in their own assessment
- learns to assess its own actions and learnings
- uses self-assessment techniques and be able to transfer them in different situations and contexts
- knows how to adapt and/or define self-assessment models in function to values, contexts, social reality, moments, etc.

Needless to say that each used strategy has to be valid and reliable. For this reason, it is necessary to consider determined aspects in the stages of design and development of the assessment strategies. On the other hand, students as an active agent of their own assessment, and as a learner of the assessment content, has to know the aspects that carry such validity and reliability. Herman, Aschbacher & Winters (1997) write about it, focusing just on the teacher’s perspective.

3. Method

3.1 General Objective

Analyze the design and prevalence of the learning assessment strategies that teachers apply in the health area.

3.2 Specific Objectives

- Identify the learning assessment strategies used by teachers in the health area.
- Characterize the learning assessment strategies used by teachers in the health area.
- Analyze the learning assessment strategies used by teachers in the health area.
- Establish the design of the learning assessment strategies used

3.3 Design

According to Hernández Sampieri (2010), it is a descriptive transversal study.

3.4 Population

Teachers of Psychology, Optometry, Medicine, Nursing and Odontology careers of the Professional Center “Lázaro Cárdenas” of Instituto Politécnico Nacional.

3.5 Setting

Classrooms of Interdisciplinary Center for Health Sciences, Santo Tomás Unit, Higher School of Medicine, Higher School of Nursing and Obstetrics.

3.6 Procedure

In the original design of this project it was posed to get didactic plannings from the learning units of different careers, from which it would be obtained the information about strategy type and assessment type that teachers plan in the semester, nevertheless, doing the search of such material it was found that most of the teachers do not count with a formal planning, few of them use an activity schedule and others definitely have neither a planning nor something like that. So, from this finding, a way of obtaining data from a questionnaire designed specifically for this research was reconsidered.

3.7 Instrument

An instrument was designed, comparison list type (see annex 1), with a Likert scale which had as a purpose to know the kind of activities that teachers develop in class to assess both theoretical and practical knowledge, likewise the teaching strategies used.

4. Results

4.1 General Data

85 teachers were interviewed, 20 (23%) of psychology, 20 (23%) of odontology, 18 (21%) of optometry, 14 (16%) of nursing and 13 (13%) of medicine. In psychology 15 women and 5 men answered; in odontology 7 men and 13 women; in optometry 8 men and 10 women; in nursing 6 men and 8 women; in medicine 8 men and 5 women. Having a total of 51 women (60%) and 34 men (40%). As it was observed, there was a greater presence of women.

About the academic degree, 23 teachers count with a bachelor degree, 19 with a specialty, 37 with a master degree and 6 with a Ph.D.

About the years of experience, 43 teachers have more than 14 years working as a teacher; 19 have between 10 and 14 years of experience; 13 have between 4 and 7 years; 6 between 8 and 10 years and 5 between 1 and 3 years of experience as teachers.

4.2 Teaching Strategies

Performing the analysis of the teaching strategies in the different learning units it was obtained that the strategies mostly used by career are:

The exposition of a topic by the teacher, is used almost always by 71% in nursing, 50% in odontology and 45% in psychology, the rest performs it sometimes between 40% and 50%.

Related to the strategy of *organizing students to expose in class*, an average of 56% of teachers in optometry, psychology, nursing and odontology careers use it sometimes, and the same average, but almost always, in medicine.

A debate of an *exposed topic* is used almost always in 53% by optometry, nursing and medicine. In psychology and odontology it is used sometimes in 50%.

Use of *diagrams* is used in optometry, nursing and medicine in 55%. In psychology and odontology it is used sometimes in 50% as average.

Demonstrations in class are almost always used by psychologists in 73% and in medicine 54%, and 50% of odontology teachers use them always. Nursing and psychology teachers just use them in average 40%.

Analysis of cases is almost always used by 50% of the teachers as an average; in optometry it is used in 73%.

Problem-based learning is almost always used by 49% of the teachers on average.

Ask about a topic in class, 40% of the teachers of psychology, optometry and odontology almost never use it, meanwhile in medicine and nursing it is used almost always.

The strategy of *theory dictation* has stopped being used on average by 69% of teachers.

4.3 Assessment Strategies

An average of 46% of teachers of optometry, nursing and medicine, almost always use extra-class jobs for assessment, known as tasks. While in psychology and odontology are used sometimes in 55% and 40% respectively.

Regarding the use of portfolio of evidence, teachers of optometry, nursing and psychology use it almost always while teachers of odontology use it sometimes and teachers of medicine, never.

In optometry, 67% of the teachers almost always use conceptual maps to assess knowledge and 39% use them in medicine. Teachers of the other careers use them sometimes in a 46% average.

Students' exposition as an assessment resource is used almost always by teachers of optometry (67%) and medicine (46%) and sometimes by teachers from the other careers but in an average of 50%.

Nursing, medicine and psychology always use the participation in class for summative assessment; in the case of optometry and odontology they use it almost always.

Almost always all teachers, except psychology's, use the review of medical records to assess.

The exam remains a resource used always (medicine 30%) or almost always (odontology 35%, optometry 50% and nursing 50%) by teachers to assess both theoretical or practical knowledge with an exception of 45% of psychology teachers that do not use exams.

In optometry, the quantity of delivered jobs is a very important resource used for assessment, while in odontology only 50% of the interviewed people consider it for assessment, nursing and medicine just do it in 43% and 31% respectively. In psychology only 20% of the teachers have used it sometimes.

5. Analysis of Results

5.1 Psychology

5.1.1 Teaching strategies

Respect to the most used strategies by teachers, the debate of an exposed topic prevails as the most used resource, likewise the use of diagrams. On the contrary, the less used resource in psychology is the theory dictation both perhaps for the time it consumes or because it is a little practical.

It is observed that student's exposition is more used than the teacher's exposition, because it may be used to achieve goals related to the theoretical knowledge learning or information of different types.

5.1.2 Assessment Strategies

In psychology the most used assessment strategies were tasks, use of maps or organizers and exams; followed by the students' exposition, participation in class and review of medical records. Spite of the variety of used resources it must be recognized that it is about compensating the form of assessment, it seems that the combination of these strategies favors students since most of the learning styles are applied by them.

5.2 Odontology

5.2.1 Teaching Strategies

Obtained results show that odontology teachers use with more prevalence the diagrams, followed by both student and teacher's expositions, at the same time they integrate the debate. Due to its characteristics, this bachelor gives importance to the practice, therefore, demonstrations are an important and indispensable strategy for teaching.

Regarding the strategies of analysis of cases and problem-based learning are almost always used by a little bit less of the middle of the interviewed teachers.

5.2.2 Assessment Strategies

Assessment is mainly focused on the quantity of students' delivered jobs and their participation in class. Regarding the number of required jobs, they refer to practical jobs such as amalgams, incrustations, surgeries, etc.

40% of the interviewed teachers say to use a portfolio of evidence as a way of assessment, which is a current and factual assessment strategy, likewise using graphic organizers, the exposition and delivered tasks. The exam has been already used less, only 35% use it almost always. In this way, we can see that it is used as an assessment complement not as the unique way of assessment.

To conclude, some of the odontology teachers are leaving behind the preponderance of the use of assessment and teaching strategies which were only centered in the memory learning such as the exam, or dictate chair, and although another same number of teachers continue using them, it is convenient that teachers be trained in order to add to their educational practice more diversity in the forms of teaching and assessment.

5.3 Optometry

5.3.1 Teaching Strategies

In the optometry career, from the interviewed teachers, 40% says they use the strategy of exposition in front of the group only sometimes while the rest of the teachers point that both they never use it or almost never. This result has to do with the type of learning unit they teach since they are mainly practices using most of the times the explanation diagrams, demonstrations and analysis of cases, using questions about the topics as a reinforcement of the acquired learning.

5.3.2 Assessment Strategies

In correspondence to the teaching strategies, it was observed that assessment strategies have to do more with the number of jobs done by students, in this case are diagnosis and/or treatments, likewise, participation in class has a significant weight as a resource of assessment. Followed by written evidence such as portfolio and graphic organizers. Exams and medical records are also considered but in a relative way.

5.4 Nursing

5.4.1 Teaching Strategies

In this career it is observed that most of the teachers have a preference for traditional exposition teacher-student since it is a method that allows fostering critical thinking in the manner to face problems and the ability to choose a method to solve them and due to the characteristics of this career this is very useful. Likewise, teachers of nursing career serve themselves of the students' intervention in class, using the students' exposition and the questions about the exposed topics.

5.4.2 Assessment Strategies

The assessment in this career is mainly dominated by the participation of the students in class, this means that teachers procure to verify that exposed topics are widely understood; in second place of prevalence there is the exposition of students and the exams which supply an objective source of evaluation to know if the students really count with the theoretical knowledge needed. Nevertheless, it is observed that teachers do not count with a variety of strategies to assess the practice field, this means that possibly these teachers are still very attached to traditional education.

5.5 Medicine

5.5.1 Teaching Strategies

As reported by the teachers of this career, it is observed more use of problem-based learning (ABP), which it is not an instructional strategy, this means that the student is the biggest responsible for its learning and the teacher has the function of facilitator, besides, teachers include the development of critical thinking in the teaching-learning process, they do not incorporate it as something additional, what it is extremely useful for the students of this career because of the importance to incorporate both theoretical and practical knowledge in a fluid way.

After ABP it is observed that teachers of medicine include more traditional teaching strategies such as exposition and demonstrations. They also give importance to the students' academic comfort and procure graphic explanations to facilitate the understanding due to the nature of this career. It is curious that only 30% of the teachers use diagrams as a teaching method, since it is one of the easiest ways to show and explain graphic content, for example in anatomy teaching.

5.5.2 Assessment Strategies

Participation in class is the most used strategy by teachers. This allows them to assess the students' acquired knowledge. In this way, teachers have the possibility to adjust teaching techniques. In second place of dominance, it is found students' exposition involving the predominant ABP teaching strategy, in this way, students are more involved in the acquisition of their own knowledge. After that, it is observed that students are assessed with a little bit more objective evidence such as tasks, graphic organizers and medical records, these last ones as a fundamental part of their professional formation.

6. Conclusion

It is really important to comment that it was identified that most of the teachers in health area careers do not carry out didactic planning, in spite that it is a normative and compulsory task. This allows establishing that schools should regulate and look out its elaboration and, although academic freedom exists, planning each course for the higher education of IPN is a crucial role.

On the other hand, according to an investigation to teachers in order to know which teaching and assessment strategies they are currently applying with their students, it was observed that prevail teaching strategies of instructional type, where teachers must “give the class”, and although in some cases it is said to use strategies such as ABP or analysis of cases, which are strategies aimed at metacognition and self-regulation, there are few teachers who apply them. This leads to the conclusion that teachers may not know the full range of strategies that current exists, or they do not know how to implement them correctly.

From this perspective it is, therefore, necessary to involve teachers in new and innovated workshops about new teaching and assessment strategies in order to apply more specific and adequate strategies in the students’ learning process. In this way, current students could achieve a more active and innovated interaction in the acquisition of knowledge.

Concerning the assessment, it can be concluded that some teachers are also incorporating strategies that, as it was mentioned before, stimulate metacognitive skills so that students become aware of their own learning process, their advances, their stagnations, and the actions that have made them progress or those ones that have led them to error. Nevertheless, not all teachers carry out this practice. And they not only have continued applying the traditional assessment but also they have been giving a high level of importance to exams. An exam is a useful tool, but it should be different each time and it is important to wonder what is the purpose of the assessment. So the assessment turns into an instrument in hands of the students to be conscious about what they have learned, what processes have allowed them to acquire new knowledge and how to regulate those processes as well.

Regarding the most used strategies by teachers it was obtained that expositions in class prevail as the most used resource, accompanied of other strategies, as a complement to enrich the class, such as the debate, whose purpose is the controversy of ethics, politic, social, scientific, human, moral, technical problems that contribute to form own conceptions in students, which are associated with reflexive thinking and ways of thinking, assessment and criticize facts, students’ phenomena and conceptions. The use of diagrams, which is useful to visualize and specify real situations that are beyond of the possibilities of the senses (Eggen & Kauchak, 1999). Organizing students to expose a topic, whose goal is that students build the knowledge since the looking of information related to the topic to be reviewed where the student is responsible for their own learning, decentralizing from one way or another the presence of the teacher in front of the group, and lead the student to practice the learning by discovering. Analysis of cases and the ABP (problem-based learning) consist in favoring students’ learning through the close up in cases and real situations, which in many occasions, is the only way to achieve it. Is the most economical way to face the students to real situations according to their profession and into a lesser extent, demonstrations are used, whose goal is to show the students, as a model, the use of certain techniques applied to the object of knowledge.

References

- Delors J. (1996). “La educación encierra un tesoro. Informe a la UNESCO de la Comisión Internacional sobre la educación para el S. XXI. (Report to UNESCO from the International Commission on Education for the 21st Century)”, Santillana, UNESCO editions, Mexico.
- Díaz Barriga A. (2006). “La didáctica una disciplina conceptual que mejora la comprensión de los proyectos de reforma educativa y de la intervención docente”, in: *VI Congreso Internacional de Didáctica Universitaria (the 6th International Congress on University Teaching)*, Los saberes de la docencia universitaria, U Universidad Pedagógica Nacional, Ajusco. Mexico City.
- Díaz Barriga F. (2006). *Enseñanza Situada: Vínculo Entre la Escuela y la Vida*, McGraw Hill Interamerican, Mexico.
- Díaz Barriga F. and Hernández G. (2002). *Estrategias Docentes Para un Aprendizaje Significativo. Una Interpretación Constructivista* (2nd ed.), McGraw Hill: Mexico.
- Díaz Barriga F. and Hernández G. (2010). *Estrategias Docentes Para un Aprendizaje Significativo. Una Interpretación Constructivista* (3rd ed.), McGraw Hill. Mexico.
- González M. (2001). “La evaluación del aprendizaje: tendencias y reflexión crítica”, *Revista Cubana De Educación Media Superior (Uppermiddle Education Cuban Magazine)*, Vol. 15, No. 1, pp. 85–96.
- García-Cabrero, Cabrero B., Loredó J. and Carranza G. (2008). “Análisis de la práctica educativa de los docentes: Pensamiento, interacción y reflexión”, *Revista Electrónica de Investigación Educativa, Especial*, accessed on February 29th, 2012, available online at: <http://redie.uabc.mx/NumEsp1/contenido-garcialoredocarranza.html>.
- García Herrera (2001). “Propuesta de evaluación y acreditación en el proceso de enseñanza-aprendizaje desde una perspectiva grupal”, *Revista Perfiles Educativos*, Vol. 27, pp. 9–25.
- Hernández S., Fernández C. and Baptista L. *Metodología de la Investigación* (5th ed.), México: Mc Graw Hill.
- IPN (2003). *Materiales Para la Reforma. Un Nuevo Modelo Educativo para el IPN, Book 1*, accessed on February 12th 2012, p. 15, available online at: http://www.secacademica.ipn.mx/WPS/WCM/CONNECT/69E9C3804FBE9CFEAAAC5EBD8E9C5E1B/MPLR_I3BCD.PDF?MOD=AJPERES.
- Perrenoud P. (2004). *Diez nuevas competencias para enseñar. Invitación al viaje*. Grao. Col. Biblioteca del aula. No. 196. Introducción, Barcelona, España (Classroom’s library number 196, Introduction, Barcelona, Spain, pp. 7–16, 147–155).
- UNESCO (2012). “Estadística, evaluación e innovaciones”, en: *Informe mundial de la UNESCO*, Ediciones UNESCO. Santiago, Chile
- Zabalza M. A. (2007). *Competencias Docentes del Profesorado Universitario. Calidad y Desarrollo Profesional* (2nd ed.), Narcea, Madrid, Spain.
- Available online at: <http://educra.cl/estrategias-de-evaluacion-de-leos-aprendizajes-centrados-n-el-proceso>.