Challenge-based Learning: An Innovative Model for Learning Design and Competency Assessment

America Martinez Sanchez

(Management and Leadership Department, Business School of Tecnologico de Monterrey, Campus Monterrey, Mexico)

Abstract: This study has two main results: Firstly, a ground-breaking learning design model with an innovative educational approach called Challenge Based Learning (CBL), which is derived from self- learning management and the competence approaches. This model is the basis for an online course designed for professional level students of a private Higher Education Institution in the Northeast of Mexico. The second innovation is the design process of innovative competency assessment. The main features of this innovative evaluation process are that it relies heavily on both self-assessment and on the evaluation of third party agents who participate and contribute to the student's learning process in the academic field. The professor is also a core agent in the assessment process, but not a key player in the student's assessment process. The foregoing is possible if there is a solid course design work based on the three components of the aforementioned innovative learning design model.

Key words: Innovation in competence assessment, Challenge Based Learning, Self-learning management, competence approach.

1. Introduction

The innovative learning design model with a ground-breaking education approach called in English Challenge-based Learning (CBL) is presented. Said approach composed of Self-learning management and the Competence approaches, as well as the design of the ground-breaking competence assessment process. Both elements have been the foundation for designing an online learning course (Cognitive Science) in an educational institution located at the Northeast of Mexico; said course is addressed to professional level students.

This learning design invites students to learn and develop their competences by means of challenge posing and the generation of strategies and actions to achieve them, and therefore, an innovative manner of assessing the competences that they have obtained. Herein below, under the heading Development, a theoretical framework is presented which provides the foundations to the General Description of the innovation, the Innovation Implementation Process as well as the evaluation of the results and finally, its conclusions.

América Martínez, Ph.D. in Educational Innovation, Instituto Tecnológico y de Estudios Superiores de Monterrey, Business School, Management and Leadership Department; research areas/interests: educational innovation and learning, human capital management and knowledge management. E-mail: ammartin@itesm.mx.

2. Development

In this section, the theoretical framework, the innovation's description, its implementation process and the evaluation of its results are presented.

2.1 Theoretical Framework

The model for the learning design consists of three conceptual axes: Challenge-based Learning (CBL), the competence approach and the self-learning management approach. In the following paragraphs, the main elements of each of these approaches are described.

Challenge-based Learning (CBL) derives from the idea of experiential learning (OET, 2015[T.N.:]), its fundamental principle is that students learn better inasmuch as they actively participate. CBL implies that the students apply what they learn in real problems and situations that imply a challenge for them. The foregoing includes the principles of interdisciplinarity, collaboration, decision making, challenge solving in the real world, to design solutions with a conceptual basis, broad connection and communication of a global vision with a local social impact making a difference in an immediate context as learning axis for the student (Apple, 2011). Meanwhile, CBL is an educational approach that implies that the role of the teacher is the one of a facilitator, mentor and coach, promoting the connections between the relevant course content and world events from a global perspective, as well as facilitating the challenge definition process and the joint construction of concrete innovating solutions, which are local, grounded and linked to the relevant stakeholders of the challenge.

The competence approach is a conceptual and referential axis which completes the educational CBL approach since the development of competences is one of its fundamental objectives. Competences may be transversal (basic, regardless the essential knowledge area of a professional career) or disciplinary (which belong to the specialty of a discipline of professional field) and, ideally, competences are the former both types to form wholesome profiles. A definition broadly known and accepted is that competences, from a holistic perspective, are defined as a group of knowledge, abilities and values compromised in an effective and efficient performance (Conocer, 2007).

The self-learning management approach (Knowles, 1990) promotes an active role of the student participating, co-responsibility of their own learning process. It is the process in which the individuals take the initiative with or without the help of the others, in the diagnosis of their learning needs, formulation of learning goals, identification of material and human resources necessary to learn, selection and application of learning strategies appropriate and the evaluation of learning results (Knowles, 1975). Some principles giving rise to the student's co-responsibility in their own learning process coherent with CBL are: the assumption of the concept of the student as an individual with an independent personality or a personality in an independence process, the experience as a valuable resource for learning, guidance for study focused on opportunity areas which are necessary to develop real life problem and task resolution (Knowles, 1990).

2.2 Innovation General Description

Two innovations are presented; both of them are interrelated and consistent with each other. The first innovation is the articulation of a model for learning design making up the innovative educational approach called Challenged-based learning (CBL) which consists of the competence and the self-learning management approaches. The second innovation consists of the design of an evaluation process of the competences involved, coherent with

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[T.N.:] OET stands for Observatorio Estratégico Tecnológic translated as Strategic-Technological Observatory

the aforementioned educational approach. In the following section, each one of said innovations is described.

2.3 Innovation Implementation Process

The innovation implementation process considers, on the one hand, the construction of the learning design model and on the other hand, the design of the evaluation of the competences involved in the course. In the following paragraphs, the implementation of each of these innovations is described.

The incorporation of a model for learning design integrated in the Challenge-based learning approach (CBL) along with the Competence and self-learning management approaches are an innovation in the academical field. This model for learning design responds to the need of forming new generations of students and to the features of XXI century education, which implies and demands great dynamism and flexibility. The model for learning design in this Project is aimed at an elective Cognitive Science course at professional level. The general structure and sequence of the course is planned from the generalities to specificities, to wit: Stage (5 stages), momentum (16 momenta), activity (16 activities). The stages of the process, coherently with the process of the Challenge Based Learning model (Stages of the CBL Process (Apple 2015) are: 1. from the big idea to the greater challenge; 2. establishing the foundations for the Solution; 3. generating the solution; 4. Implementing and Assessment and 5. publishing and reflections. Coherently with the foundations of the model, the students are presented with a challenge that sets into play all their capacity, will and knowledge; it involves them in a integral way because it challenges them to apply the rest of their knowledge and develop their competences.

The design includes two information elements that are fundamental at the start since they denote the student's involvement process. These elements are: The big idea and the Challenge. The big idea's characteristics are that it is broad, general, global, relevant, and important. Its function is to detonate a reflection process, an involvement and commitment process of the student, in such a way that it leads the student from the abstract and global, to the concrete and local. Similarly, better conditions in the design are foreseen so in the student's process emerges the posing of a challenge intimately linked to their motivations, in such a way that the student assumes it as something that poses a challenge for them, something that attracts them, that the student cannot "let go", leading them to assume it with an attitude aiming at "how to achieve it", the preceding leads the student to overcome its limitations and wholesomely develop their competences. A list of Challenges is proposed from which the student chooses, combines and adds, the intention is to aid the student to focus on and detonate their ideas and interest, but not to limit or constrain them. The Challenge leads to an action, to a local scope, to the specificity and to concrete results. It connects the student to their surroundings and moves them to capitalize the use of technology that they do not use on a regular basis. By so doing, the challenge is defying, since it motivates the student to achieve a resolution, it demands from them, it is connecting since it implies that the student contact agents of their surroundings; it is interdisciplinary since it requires the integration of the competences of the student's profession and the ones of the Cognitive Science, as well as, transversal competences. The challenge also involves designing innovation, non-conventional solutions and also generates value since the solution's process and result also have an impact in the student's learning process as well as in the surroundings in which the challenge occurs.

Concurrently, the second innovation of this Project is the design of a competence evaluation process. The innovation of competence evaluation is consistent with the innovation of the learning approach, constituting synergies and moving forwards at the same time.

It is important to mention that the course designed with the model for learning design described is aimed at developing both disciplinary as well as transversal competences. The competences related to the course's areas,

that is to say, the disciplinary competences (the ones belonging to Cognitive Science) consist of the student explaining the fundamental cognitive processes and applying them in the design and display of a sensibilization strategy and action that foster an authentic improvement of the social context, combining said competences with competences of the student's professional field. In like manner, the students develop transversal competences, specifically social mortgage payment and collaboration.

Based on these competences, there derives the definition of evidence that is the reference of performance to carry out the evaluation. Said evaluation is considered ground-breaking in the academic field due to its principal features which characterize the evaluation process, to wit, a strong emphasis in self-assessment, performing self-evaluation processes at the end of each of the stages of the process, that is to say, each of the terms on which the learning process is based (in this case, said terms are weeks). In order to facilitate this process, the course design provides self-evaluation formats for each of the corresponding momentum and based on the definition of the competence being developed in a specific momentum and on the evidence of the competence specified. Likewise, a distinctive feature of the evaluation process design is the emphatic participation of third parties and stakeholders participating of the student's learning process. In other words, the evaluation is enriched by means of the evaluative judgments of all the participating agents based on the evidence of the competence previously defined as reference. The teacher is also a fundamental agent in the evaluation but not a key or a defining agent.

Furthermore, it is important to reiterate that the course's learning sequence is designed considering an CBL process consisting of five great stages, in turn, each stage is composed of several momentums which are the time segments of the course (weeks). In each momentum, only one learning activity is carried out which leads to the development of the competences and to the challenge resolution. Each learning activity designed synthesizes and integrates different evidence of the competences corresponding to a determined momentum. The definition of competence is built by means of the description and definition of evidence (performance, attitude, knowledge) of the competences involved and the specification of the activity's product evidence or deliverable contributing to the generation of the expected evidence, and thus, to the contribution of the competence development. Typically, there is more than one competence evidence being integrated in one single learning activity leading to challenge resolution and to competence development.

2.4 Result Evaluation

The innovative learning design based on CBL, Self-learning management and Competence approach as well as on the design of a ground-breaking evaluation process is the results of this project. Their conceptualization as well as their applications on an online Cognitive Science graduate course in a higher education institution of the Northeast of Mexico are considered encouraging indicators since they provide an innovation in learning design and evaluation in the academic field. Moreover, the innovative model for learning design as well as the ground-breaking evaluation design process may be translated into different knowledge areas and an array of learning formats.

Some of the additional results presented are data of the general opinion of some students participating in the first group on which the aforementioned course was applied and taught based on the innovative learning design model and the ground-breaking evaluation process design. The foregoing shows the enrichment of the learning process due to the benefits perceived by the students, the main differences that they find in their learning experience.

As for the benefits that the students have perceived as a benefit to their experience in the course, the answers

are the following: Greater participation in their own learning process (70%), social contribution by means of challenges (70%), greater learning (40%), connection with other organization as and persons contributing to their learning (30%). As for the principal differences found by the students in the learning process of the course, they responded: Greater participation since by means of posing and solving challenges, the students take on a greater commitment and involvement since they recognize the importance and value of the challenge (23%), a greater social contribution since the challenge has a true sense (45%), more learning since by means of posing and solving a challenge they are required to obtain more information and apply it keeping a sense and objective (45 %), more personal involvement since the challenge arouses greater interest in the student (45%).

3. Conclusions

The innovative model for designing Challenge-based Learning, Self-learning management and Competence approach as well as designing the evaluation process are concrete innovations applied and are promising regarding the greater possibilities of application and transfer to any knowledge field and learning format. They are an innovative educational approach coherent with the features of a demanding, global and educational context that requires an authentic learning process, of a high quality, flexible, with individual educational impact and contextual contribution. Likewise, it is an approach that nurtures and demands active, committed and co-responsible participation of the students, these elements are the basis for the students to achieve authentic and effective learning. Similarly, it is interesting the contribution possibility generated by means of this educational approach, both making valuable and pertinent social contributions as well as extending it to other fields in which this type of approach may make an impact, such as technical, technological, instrumental fields, etc. An innovation line is built to continue with its application and research.

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