# Ecosystems of Collaborative Learning in Educational Technological Mediations: Case Analysis

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**Abstract.** The current educational scenarios recognize the importance of interactions with each other in the acquisition of rhizomes of knowledge, knowing how to work in groups to achieve common goals appears as a transversal competence in all levels of education. At the same time, the digital technologies are in processes of expansion and generalization in the educational systems, allowing the communication between students and teachers. Hence it is necessary to think of new pedagogical practices that foster processes of knowledge, dynamising practices thought from the encounter in otherness and interactions with a multi located thought or group cognition; To bidirectional relationships between systems, virtual and human educational environments. It is necessary to take an epistemological, cultural, political, economic turn in which one starts from the co - construction of knowledge from experiences. Therefore, when talking about knowledge it is important to emphasize that science, technology and society has taken a leading role in the educational field in this XXI century, requires the management and appropriation of the same in the process of teaching and learning as a media resource And as a strategy of knowledge dialogue; It is through these resources that different spaces and times are made available for research, knowledge, and integration of models and educational strategies that lead to social and educational interpersonal and intrapersonal encounters.

**Keywords:** educational technology, collaborative learning, educational ecosystems, ubiquitous learning, mind maps.

## 1    Introduction

The contemporary world is characterized by the effects of scientific-technological transformations, and undoubtedly is the social, political, cultural and educational impact [2].

In the educational industry, the interactions that emerge by "learning in technological environments" in educational settings have increased considerably; Not only the demand for traditional means of education, now with the advancement of science and technology, is perceived a factor that is provoking educational revolution in the current society of learning called by Stiglitz; Towards the different learning

systems [3].

In this context, the information resource offers the teacher, not only consult the thematic content, but interact with environments that test their knowledge and implement guidelines that mark the theory [4]. Consequently, online learning technologies converge on methodologies, techniques, usage and tools with modern and interactive approaches supported as development technology [5]. Such is the case of b-learning mediated in learning objects in the periodontics theme with interface based on mental maps.

Therefore; The study analysis, which takes into account the characteristics in the b- learning mode of a learning object (case study, activities, resources with evaluation criteria), multimedia software called Hardware Flash Pro (HFP).

The aspect to be considered is the interface applying mental maps, according to the investigation of Tony Buzan (2006), facilitate the visualization and retention of information developing the creativity of the student [6], which makes of HTF a simple, practical and effective software. The research was developed in postgraduate students of periodontics with interdisciplinary management of software engineering.

## 2    Materials and Methods

The development of the present work; The scientific method of Mario Bunge [7] was applied. The design and development of software was used the learning model based on concept maps in learning objects based on a software development model cascade [8]. The development of the learning object is necessary to make the use case. With the purpose of identifying the roles of the actor, ie the activities of those who will participate. In identifying the interactions and actions of the actors, the O.A use case diagram was made, in order to identify the different interactions and actions of actors. The above based on unified UMD modeling language.

**Table 1**. Case Diagram of O.A. use. HFP based UML.

| Student | Teacher |
|---|---|
| Initial navigation | Evaluation of activities |
| Object analysis | Final evaluation of self-evaluation. |
| commended activities | |
| mpletion of activities | |
| Self-appraisal | |

The software was made in Macromedia Flash, which provides tools in multimedia that makes it attractive [9].

**Table 2.** Evaluation of the general MACODA process.

| Requirement level |
|---|
| Analysis level |
| Design level |
| Implementation level |
| Evaluation level |
| Feed back |

## 3 Development

Initially different learning objects are formed under the same established scheme, these objects later formed the granularity; That is to say the union and homogenization of each object, thus arriving at Hardware Flash Pro. HFP combines the characteristics of multimedia and the advantages of mental maps; The interface is managed based on images alluding to the subject, the corresponding text and background music according to the subject of interest. The software contains animations, background music and allows access to the main menu or exit the application.

The interfaces of the mental maps have a practical representation and distribution in such a way that the user becomes familiarized and conceptualized during the analysis in relation to the simplicity of the graphs. The subject matter (analysis of clinical cases, periodontics); Associates the image and the description of the clinical case referenced.

## 4 Results and Discussion

The present research is the product of a practical theoretical foundation generated in learning environments made with experts (interdisciplinary management) at the Cooperative University, Bogotá and Unicomfacauca, generating an exchange of knowledge applied in the experimental phase. The type of research is empirical analytic [10], with a sample [11] of 25 students the total of the second cohort in a two-year period.

The data collection instrument was carried out in a survey consisting of 20 questions, considering the evaluation in the subjects (subject, activity, content and resources) followed by questions with response on the Likert scale and entered into the SPPS version 12 system
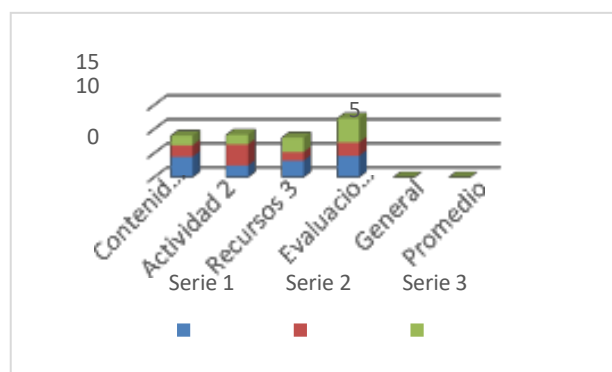


**Fig. 1.** Graph evaluation result for 25 students (own source).

The variables evaluated were: retention time and learning association were associated with independent variables such as: retention time, content and activities associated with learning, resources and evaluation.

The results obtained are: 80% on a 100% scale, ie greater than 60% of the highest value assigned on the Likert scale; It was concluded that the learning object represents an effective support tool in the teaching-learning process

## 5      Future Work

As a future work, the points with the lowest evaluation are improved: activities and evaluation. In addition, a final test with a larger master size of 30 students in 3 cohorts and correlating 2 or more specialties is carried out with the purpose of strengthening the results and checking Its functionality in different disciplines.

## 6      Conclusions

Technological mediations in virtual learning environments emerge in the construction and deconstruction of different bets in contemporary society such as network society (Castell), society of the spectacle (Debor), society of control (Foucault), society of learning (Stiglitz). The new forms of symbolic and material production transform the subject into his subjectivities; (Donna Haravan) in the so-called "subject cybor" to understand this phenomenon is an academic challenge for those who belong in the current academic community

Mind maps facilitate the visualization and understanding of elements in the interface allowing the student to become familiar with the elements.

The hybrid models of learning in virtual environments and the interface based on mental maps allows to generate comparison between the educational models in education superior according to the fruit of the learning ubiquitous.

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