Active Learning Spaces In Schools And Higher Education

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Abstract
In today's world, globalization, technological and demographic changes make necessary and essential lifelong learning, while it is cooperative, global and universal. To achieve this challenge, is strongly required that schools and universities radically transform their educational systems and meet the demands to acquire the twenty-first century competencies. However, this can not be achieved without the necessary facilities (both, physical and virtual), the inclusion of the appropriate Pedagogy and technology, recognizing that people learn in different ways, motivating the students and accepting that learning is an inherent part of the daily life, therefore, permanent. This paper describes the importance of implementing Active Learning Spaces (formal and informal) in schools and Higher Education Institutions, which is justified through the collaborative Pedagogy, the needs and requirements of today's students, the involvement of educational technology and the use of Internet as a platform. Besides, it also presents the inclusion and adoption of these Active Learning Spaces by the schools of Mariano Galvez University (UMG), and its use by teachers and students.

Keywords: Active Learning Spaces (ALS), Collaborative Learning, Educational Technology, Pedagogy, Physical Space.

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Introduction

In the past two centuries, the world's population has grown considerably. As a result, global economies have experienced major changes. This, combined with other factors such as rapid technological development, the interdependence of modern societies and globalization make necessary for people to develop specific skills and expertise enabling them to enter in a social environment without training deficiencies. According to UNESCO countries whose populations acquire processing skills and knowledge construction applying them to work and daily life situations, may generate greater economic advantages over those countries that don't (UNESCO, 2002).

It is important to note that there are fundamental reasons to believe that to promote progress, development and modernization in societies, it is essential for people to have the abilities to build knowledge and the best form of use of this information. To achieve this, schools, universities and research institutions should be more involved in production processes, distribution and orientation of the use of this knowledge.

On the other hand, technological changes and the fact that modern societies should collaborate with each other, innovation and learning become essential (Chambers, 2010). According to this, it's necessary to change the traditional way of teaching, focusing in the learning process. However, classrooms are still relevant places where the teaching and learning process takes place. But learning occurs everywhere and at any time. Additionally, in the modern world, students are immersed in technology, computers and mobile devices, digital means and wireless communications, enabling them to create knowledge and share it with others no matter where they are. Nevertheless, the current educational system still uses classrooms in the traditional way. This is a contradiction when compared with the needs of the educational system that today's students require.

Methodology

Due to these reasons, Mariano Galvez University has considered three important aspects for their new Formal Active Learning Spaces: Technology and Physical Space to support Pedagogy, which integrated make up the framework used in the design of these new environments as well as a platform inside the classrooms to allow the teachers to develop in their students the skills, abilities and competencies that is required in today's society in any discipline.

Several experts and organizations worldwide have suggested many initiatives and frameworks in Learning Spaces Design. However, UMG is using the Pedagogy-Space-Technology Active Learning Eco-system (Corcorran & Scott-Webber, 2011).
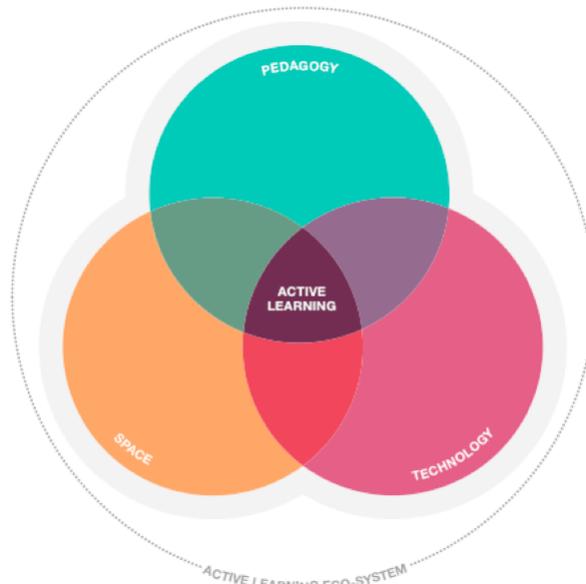
Figure 1: Active Learning Eco-System

It is important to note that Pedagogy always occupies the top position in this framework and should not change, since space and technology are the foundation on which Pedagogy is supported. In this model the Active Learning occurs in the intersection of the three areas.

The first important issue that UMG considered in the design of their Active Learning Spaces was the technology to support Pedagogy, as it plays a major role in the learning process of students of the modern world. The technological aspect has been so significant that some researchers have claimed that the thinking patterns of modern students have changed. They think and process information in a different way from past students (Prensky, 2001). With this in mind, UMG has been installing technological tools to support modern pedagogical strategies in every formal learning space. These tools are:

- An ultra-short throw projector that converts any plain surface into an interactive whiteboard.
- A document camera (digital presenter) to present any document in a digital way with videoconferencing and recording classes capabilities.
- A personal computer.
- Interactive software that makes possible to record what is written on the blackboard and to upload these educational files to the Learning Management System (LMS) to have a register of each class.
- Internet Access for everyone
- Sound
- An Audio and Video (AV) plate that permits to connect other mobile digital devices to the projection system such as tablets, iPads, netbooks, etc.

- An automation plate managed over the network that integrates all these resources. Besides, with these automation plates it is possible to control the projectors and to administrate all these equipment.
- A Learning Management System to support face-to-face classes.

Another aspect UMG has considered was the replacement of the old and traditional school desks by new flexible, confortable and ergonomic furniture that could be used in different ways. These attributes were appreciated using the "Node Chairs" that promote sharing information between peers in a very easy way and can be used in any pedagogical style. This flexibility is crucial since the change from a transmissive approach to the collaborative method, which cannot be completed from one day to the next, but can be done through time.

The University also needs security for the hardware installed in every environment. So, in every Active Learning Space there was placed a lectern or an IT table with adjustable LCD arms which hides away the PC monitor when not in use.

Besides the two preceding issues, UMG considered the 21st Century Pedagogy for today's students. At the present time, learning is based on understanding and development of new skills necessary for critical thinking and solving complex problems. Additionally, Pedagogy has evolved from a transmissive to a collaborative model, framed by constructivist theory, which holds that each student constructs his own understanding of knowledge adding new information to his current knowledge. This theory also dictates that learning is best when it is contextual, active and social, i.e., student´s understanding and engaging them in activities that use analysis and review through group discussions with partners and possible interventions with experts.

With this in mind, it is necessary to consider several pedagogical features in this modern educational world:
- Today's students are social. They like to get in touch with peers and therefore have preference to do group activities.
- Students are inclined to discover, explore, experiment and analyze critically.
- Modern learners are inclined more to "do" than to "listen".
- Learning must be student centered.
- Work must be interdisciplinary and project-based.
- Learning must be linked with reality.
- There are multiple intelligences and different learning styles.
- Learning should be comprehensive, permanent and meaningful.

All the technology and furnishing installed would be incomplete without the proper faculty training. With this in mind, UMG decided to design, develop and deliver continuously training for teachers. These courses were designed with three major pillars in mind (Brown & Long, 2006):

a) Active and social learning strategies

b) An emphasis in human-centered design

c) Technology that enrich learning

Taking this into account, each course has four units:

- Concepts of Active Learning Spaces and the use of the technology installed in every classroom
- Concepts of Pedagogy and Collaborative Learning
- How to use the learning management system as a support to face-to-face classes
- Web 2.0 tools.

To implement this project, Mariano Galvez University didn't hire external companies. Instead, the University used six teams from its Department of Innovation, Information and Technology. These teams are:

Technical Support: They are responsible for installing the pipelines, the data network and audio and video wiring. It is also a function of this team the installation, configuration and maintenance of the hardware.

Electrical Installation: For security reasons it was decided to make a new electrical wiring, thus this team has the responsibility to install the electrical pipelines and its respective wiring. They also made the electrical panels with the proper groundings.

Telecommunication: These are the people responsible for network configuration.

Infrastructure: For security and cosmetic reasons, it is required that the pipes and wiring should not be visible, so there is a team responsible for the installation of dry walls and finishing touches.

Development: Their function is to create web interfaces to use the Learning Management System and to keep the system working.

Center for Innovation in Learning: This unit is responsible to design and develop faculty-training courses.

In this way, Mariano Galvez University has transformed over 450 traditional classrooms into real Formal Active Learning Spaces to enhance student's learning, to facilitate a real commitment among students and teachers, students and peers, collaborative work in pairs and small groups, development of team projects, presentations by students to their peers, content creation and evaluation through problem-based curriculum. These new environments are used not only by the University but also by the schools that are part of UMG.

As mentioned before learning occurs anywhere, it means, learning not only happen in formal learning spaces, but also occurs in places where students gather to work in groups and share information. One of these places is the computer lab.

Although there is currently a tendency to reduce the use of computer laboratories, these are required, among other reasons, it is in these places where students have access to specialized software and which generally have an acquisition cost that is very high. Moreover, these informatic tools require very large features in the configuration of the computer equipment, making them too hard to come because of its high cost for the students. However, most of these laboratories are installed as traditional classrooms, made up of rows and columns of small desks equipped with computers arranged in a rectangular format and designed for the transmission of knowledge. This makes it very difficult to work in groups and collaboratively, as is required in the modern educational approach.

That is why Mariano Galvez University is implementing technological projects that develop in today's students the skills and abilities that are required in the new millennium as well as transform the way they learn. One of these highlighted projects is to implement multimedia in classrooms and laboratories in collaborative format which can be used for different functions, for example, computer-aided drawing classrooms. These classrooms and laboratories use a framework that promotes and develops learning in pairs, which integrates the concepts of teamwork, communication and co-creation, which revolve around collaboration supported by technology.
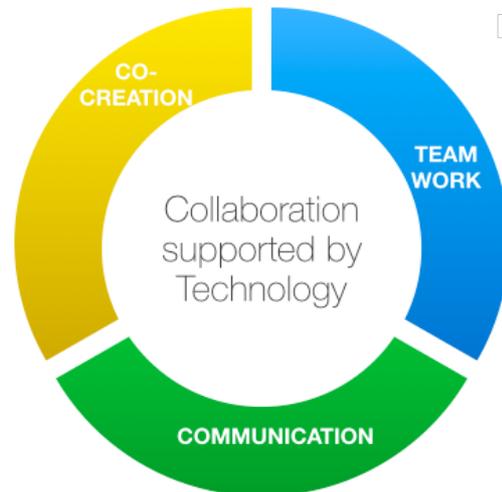

Figure 2: Computer Lab Framework

It should be noted that these new environments foster the transition from a transmissive to a collaborative teaching model, which can be used for formal or informal learning spaces, as well for individual work or for teamwork.

Nevertheless, students also need flexible spaces to accomplish their group activities. They use various areas across campus, such as corridors, libraries, gardens, cafes and areas room; it is in these places where the informal learning is done. That is why it is

necessary to provide in these areas, spaces with technology and furnishings that enable them to develop their activities according to their requirements.

For the design and implementation of these new spaces, the UMG also used a model (framework) in which the concepts of collaboration, socialization, and flexibility, supported by modern technological means, helps with the informal learning.
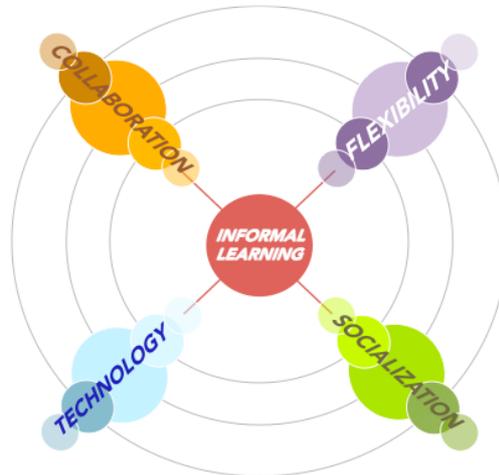
Figure 3: Informal Active Learning Spaces Framework

Results and Discussion

To evaluate these facilities about their use, two Web-based surveys were designed, one for teachers from high school and one for high school and University students. These questions are about their satisfaction and use of the new educational environments. Replies were received from 729 students and 37 teachers from high school. When asked the students about their satisfaction with the inclusion of these new environments, 84% of the students rated the new spaces between the ranges of "good" to "excellent". Additionally, 98% agreed they would not like to recover the traditional classrooms.

85% of the students from high school surveyed indicated that the inclusion of these Formal Active Learning Spaces has substantially improved their learning, and 55% stated they have changed the way they receive their classes considerably. This parameter reveals that teachers are changing the way they teach. In other words, they are migrating from transmissive pedagogical method to the collaborative.

The results showed that the majority of students from high school are very satisfied with these new environments and they have taken advantage of them in a good way. They also feel them comfortable and attractive.

When teachers took this survey the results were: 92% qualified the new Active Learning Spaces from ranges of "good" to "excellent" and 100% would not like to

recover the traditional classrooms. 88% said that these new spaces have improved student's learning and have changed the way they teach.

Other web-based survey was given to approximately 22,000 students from Mariano Galvez University (main campus only). Replies were received from 4,143 students with the following results: 67% rated the new educational environments from ranges of "good" to "excellent". 23% qualified the environments as "regular" but they indicated that the reason was of the old desks still placed in the classes because only the technology tools had been installed but not the new "Node Chairs", yet. 69% stated that they had improved their level of learning with the use of these new Active Learning Spaces.

Conclusions

Both surveys showed very similar results in all the questions and indicate that the majority of students and teachers are highly satisfied with the new environments. Additionally, both evaluations indicate that the new Active Learning Spaces have improved student learning and increased their sense of belonging to their institutions. However, the evaluations also showed that it is necessary to train teachers continuously not only in the use of technological tools, but also in Pedagogy and in didactic aspects.

This study was conducted with the inclusion of Formal Active Learning Spaces. Nevertheless, it is recommended a similar research for Informal Learning Spaces, which are located in libraries, corridors, cafeterias and places where students get together to work collaboratively.

For future perspectives for research it is highly recommended to make studies on the impact of the inclusion of these new environments within specific disciplines.

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