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TRAINING STRATEGIES IN TEAM TEACHING TO FACILITATE THE CONNECTION OF LEARNING IN MOOC COURSES

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Abstract

The study training strategies are analyzed from the facilitators, participants and researchers in order to discern potential and challenges through the MOOC experience. The research was conducted on a course given via the Coursera platform, where 20,400 participants from 52 countries and 800 Spanish-speaking volunteers for the processes of learning facilitating connections were enrolled. In designing strategies, issues of connectivism, digital portfolios, socialization of knowledge with groups of self-study, invited experts and open educational resources were raised. The methodology was mixed with application of tools for self-diagnosis, analysis of evidence, focus group, self-assessment of skills and survey context. The results provide data on potential: previous experience, academic connection networks, institutional support and motivation for teaching and challenges. The findings show instructional design, communication, technological support, impact on training and knowledge transfer.

Keywords: MOOC, training, connectivism, knowledge transfer.

1 INTRODUCTION

Learning facilitation processes have benefited from the support of technology, with education environments surpassing the limits of the classroom towards open environments that involve hundreds or even thousands of participants, as the Massive Open Online Course (MOOC) phenomenon has shown. These massive experiences bring to the table all sorts of new questions, for example: How much can you build knowledge through a massive experience? Which teaching strategies favor the learning connections? How can support teams for the participants be formed?

This paper revolves around an experience with a MOOC, which was imparted trough the Coursera platform, on the topic “Innovation with Open Resources” (Fig.1).

Fig. 1. MOOC educational innovation with OER Portal. (https://www.coursera.org/course/innovacionrea)

20,400 participants from 52 Spanish-speaking countries enrolled in the course, and were moderated by two facilitator teachers, two support facilitators and 800 facilitator volunteers to encourage learning connections. The volunteers were selected via an initial survey that encouraged participants with previous experience in remote facilitation processes and those having some knowledge of the course’s topic to become facilitators.

The instructional design of the course spanned four weeks and covered connectivism strategies, digital portfolios, knowledge socialization with self-study groups, guest experts and open educational resources. The teaching team received special training to work with the contents and the learning construction processes, using sessions mediated through videoconference. The study analyzed

evidences of the teaching strategies, through the experience with the MOOC. The guiding question of the study was:

> What are the potentialities and challenges that can arise from the connection of learnings from the participants and facilitators of team teaching in MOOC courses?

2 THEORETICAL FRAMEWORK

2.1 Learning connection in MOOCs

The construction of learning has been one of the central points of the theories that support educational processes. Siemens (2010) [1] mentions that the learning theories that attempt to explain how a person learns: behaviorism, cognitivism and constructivism, have certain limitations; however, connectivism can be and alternative theory, having implications for different areas of life. In the words of this author, connectivism is the integration of principles explored by case theories, networks, complexity and self-organization. Learning is conceived as a process that occurs within undefined environments with ever changing central elements, but it is important to note that learning can come from outside of us, connecting specialized information sets, and the connections that allow learning are of higher importance in our current state of knowledge.

In this construction of learning, learning from "others" can become of substantial importance and the created networks aid in the joint and individual construction. Downes (2007) [2] wrote about different types of knowledge: qualitative, quantitative and connective (knowledge resulting from interactions and involves connection). Meanwhile, Tschofen and Mackness (2012) [3] also mentioned that connectivity has been put forward as a new learning theory for the digital age, with four key principles: autonomy, connectivity, diversity and openness. This connection [2] also involves interpretation, emergency, physicality, prominence, inference, association, distributed knowledge, meaning, shared meaning, organization, knowledge, social knowledge and public knowledge; all of which are important for understanding the concept of connective knowledge. From this perspective, the discussion of networks and their structure will be of help to understand how social learning occurs and how knowledge can be built through interaction.

Through their design, MOOCs attempt, at times, to support learning via connectivism, but the integration is not always entirely straightforward. For example, the researchers DeWaard, Abajian, Gallagher, Hogue, Keskin, Koutropoulos and Rodriguez (2011) [4], shared the experience of a course, the MobiMOOC, a course focusing on mLearning that lasted six weeks, as an open, complex and adaptable system; however, the technologies employed contributed to a chaotic environment of emergent phenomena. For their part, the authors Clara & Barbera (2013) [5] identified three important psychological and epistemological problems: (1) lack of a solution to the learning paradox, (2) lack of understanding of the concept of interaction, and (3) the inability to explain the development of concepts. While connectivism posits the construction through connection, further studies are still needed to help develop strategies for social assessment of learning.

2.2 Strategies to facilitate MOOC learning processes

MOOCs bring opportunities to create open educational practices, with resources and activities in line with joint construction. In their analysis, authors Cormier & Siemens (2010) [6] found that, indeed, the interplay of teachers, students and curriculum in this new open environment can bring changes, since both the role of the teacher as facilitator, and the role of the learners as active entities, should contribute to curriculum development through conversations, discussions and interactions. Meanwhile, Glance, Forsey and Riley (2013) [7] present the concept of learning mastery, which is related to the opportunity for students to master a concept before moving on to the next. Furthermore, these authors argue for the advantages of peer assessment and self-assessment, short videos and discussion forums in massive remote courses. It can be emphasized that strategies in MOOCs involve an active role of the participants and various strategies for interaction and participation for collective construction.

Teaching strategies also play an important role in the MOOC courses when advocating for attention to the diversity of participants. Maringe & Sing (2014) [8] make a very interesting account to propose adding eight pedagogical strategies to address the issues of size and diversity of the classes, which are related to increasing the participation and commitment of students; increase curriculum access and the teaching's language; increase staff with an intercultural understanding; increase opportunities

for deep learning for all; continuous monitoring of student satisfaction; increase opportunities to achieve objectives; diversification of evaluation; and the merit of MOOCs. These strategies bring research opportunities to investigate the cultures of global learning, reviewing global assessments, and teaching practices and promising processes.

Finally, we should not ignore that participation in a massive course is not an easy task and the strategies used in the MOOC courses should support in the facilitation of admissions, activation and retention processes. Mackness, Waite, Roberts & Lovegrove (2013) [9] presented empirical evidence of a design that was used for learning in a MOOC, the difficulties met and how autonomous learning presented itself on the platforms, as well as the implications of diversity, openness and interactivity in learning. The authors provided data to facilitate learning using aggregation (meetings), to encourage co-creation and creativity via the mixing and reuse that occurs in the MOOC. Meanwhile, Nyoni (2013) [10] indicates that the virality of the MOOC cannot be stopped, but there is a need to understand how pedagogy and an organizational approach to online and classroom learning can lead to better quality of the results, control and experiences of students and teachers. From this perspective, there are still several tasks pending for the planning of strategies to help how to handle uncertainty, how to build a virtual identity and the pedagogical issues still to be addressed (the social construction of knowledge, learning in virtual platforms, open academic practice and uncertainty).

3 METHODOLOGY

The methodology was mixed (Onwuegbuzie, Burke, & Collins, 2011) [11] with application of tools for self-diagnosis, analysis of evidence, focus group, self-assessment of skills, survey context, observations and interviews, both with the participant students and with the team teaching. The analysis design was exploratory, with quantitative aspects considered first for qualitative interpretation, where the latter was more important (Creswell & Plano, 2011) [12].

The MOOC, our object of study, was designed and implemented with two associate professors and supported by the facilitation processes of two mentor teachers and 800 volunteers who were selected based on a diagnostic survey. The course had open educational resources, open access ebooks, self-management and self-esteem activities, digital portfolios activities, peer evaluations and self-evaluations.

The population was comprised of 20,400 participants and 23% (4,747) of the participants who answered the instruments were considered for sampling purposes. From this perspective, the qualitative, atypical, not random sample based on metainferences and stratification of part of the population (Collins, 2003) [13], was cemented on the representativeness and availability of those involved. The active participants of team teaching were considered as well.

The data was statistically analyzed using categorical sums of incidents [12], depending on the nature of the instruments, using graphs, tables and formulas. Based on the aforementioned comments, the iterative sequences of quantitative and qualitative analysis complemented these results, deriving on reasoned interpretations. Creswell, Klassen, Plano, & Smith (2011) [14] mention that there is a point on these iterations where an interference of the methods that could corroborate the findings in each phase occurs. At that point it is crucial to focus on the approach with more weight and to base the analytical interpretations on the objective and nature of the study.

4 RESULTS

The members of the MOOC's team teaching had different professional profiles, most of them having university and graduate backgrounds. The stated motivations for volunteering were an interest in collaboration, dissemination, innovation and shared learning. When asked regarding what degree of knowledge or experience they had in competences training, most of them considered themselves as being novices, followed by those with an intermediate and advanced knowledge (Fig. 2).

Fig. 2. Knowledge and experience of team teaching in skill training.

The profile of the participants reflected higher incidence when considering themselves novices or beginners. Their profile was diverse, but most of them worked in teaching, followed by research work. Their ages ranged between 25 and 44, of which 75% reported having previous experience in online courses or distance education programs. When asked about their degree of competence when using information and communication technologies, most of them considered thsemselves to possess an advanced degree of competence, followed by those who considered themselves to belong to an intermediate level (Fig. 3).

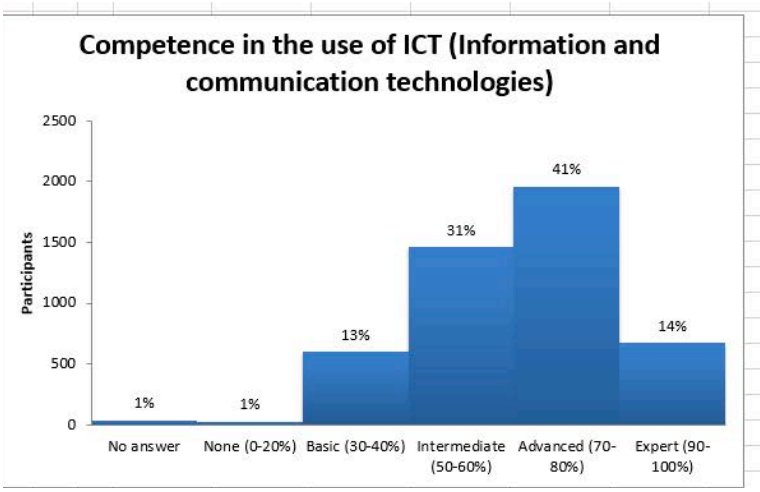

Fig 3. Competences of the participants when using information and communication technologies.

During diagnostics, the participants expressed they had developed digital materials to aid in educational activities, such as articles, essays, concept maps, illustrations, to name a few. Close behind, they also prepared slides, blogs, wikis and video capsules. During the development of the course, participants expressed they developed the competence to create resources using information and communication technologies, particularly those who had identified themselves as having intermediate competence, followed by those with advanced skills (Fig. 4).

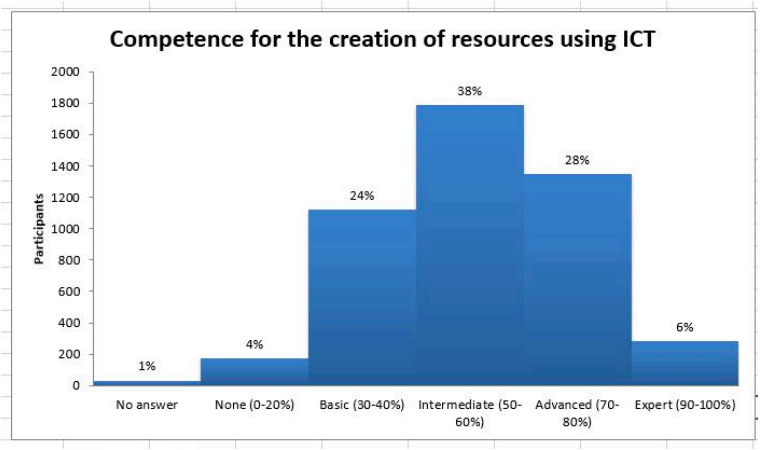

Fig. 4. Competence developed by participants to create resources using information and communication technologies.

Moreover, in relation to the learning position of MOOCs, the learning achieved was mentioned, according to the results obtained after the peer evaluation performed at the end of the course. The behavior of this variable among participants who passed the course is shown in Table 1.

Table 1. *Distribution of scores.*

Score Range	*f(i)*	*%*
7-8	15	15%
8-9	25	25%
9-10	60	60%
Total	100	100%

This data was collected through a document provided by the coordinating teachers, whose contents were presented in a spreadsheet with the final report of the participants who passed the course. By using statistical measures of central tendency, this document enabled the identification of values where the scores of the participants selected as sample concentrated and could also determine the homogeneity and heterogeneity in the distribution of the data by using measures of dispersion (Alea et al., 2001) [15]. These calculated values are shown in Table 2.

Table 2. *Measures of central tendency and dispersion.*

Measures of central tendency	
Mean	8.908
Median	9
Mode	10
Dispersion Measures	
Typical deviation	0.9892
Interquartile range	2

The values of the measures of central tendency shown are the Median (9), Mean (8.9) and Mode (10). These indicate the central value of the distribution. In this case we can see that the three statistical measures are an approximate match, which means that the distribution is largely symmetrical. When compared to the distribution shown in Table 1, it follows that scores on peer assessment are among the range of the higher grades assigned, i.e. the range between 9 and 10.

An important aspect is that the standard deviation (0.9892) analyzed on the Mean (8.9) indicates that the dispersion of the data in relation to this measure is moderate, therefore in this study the Mean is representative, since the standard deviation is much lower compared to the value of the Mean.

In a comparison of initial and final perceptions, regarding the learning that they considered relevant, the "very important" response was collected through the MOOC initial survey answered by 11% of the participants against the perceptions shown in the final instrument, answered by 5% of the participants. These responses tabled students' opinions regarding learning promoted by the MOOC through connectivism (Table 3).

Table 3. *Comparison of "very important" learning involved in the course.*

Item Evaluated	Initial	Final
Construction of learning through course materials	82%	84%
Self-assessment of knowledge	75%	73%
Individual Learning	68%	N/A
Development of digital portfolio	67%	76%
Learning with fellow students	63%	N/A
Socialization of digital portfolio	61%	46%
Collaboration of facilitators	55%	64%
Participation in self-study groups	47%	49%

Regarding accessibility and interaction of the course contents, the results of the initial survey show considerable inclination towards the use of mobile devices like tablets and smartphones. Although the alternatives inquired were not mutually exclusive, the percentage of participants who used these two types of devices was of 65% relative to the total, which used PC as a means of access. In that sense, one of the teachers surveyed made note of the various technological resources provided to facilitate access to knowledge from remote sites, promoting flexible learning.

The initial survey addressed the topic of belonging to a community, group learning or social network, mainly because in a MOOC learning focuses on connectivity in environments where technology dominates. This was corroborated by one of the interviewed teachers, who mentioned that the mutual experience is enriched in these groups or communities. In this regard, the majority of the participants admitted to not actually belonging to any community or academic research networks (Fig. 5).

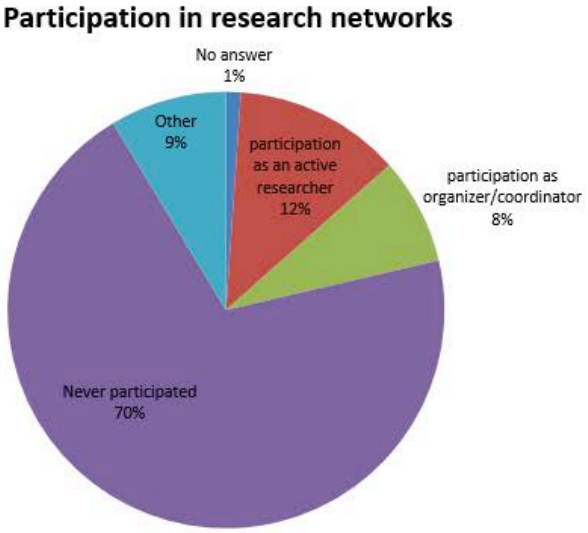

Fig. 5. Participation in academic communities or networks.

In addition to these results, one of the coordinating teachers voiced his opinion regarding the opportunity to offer free and open courses in order to disseminate knowledge with the support of reputed educational institutions. In this regard, a significant percentage of participants responded favorably as Very important (48%), followed by Important (40%), to the questioning related to sharing their digital portfolio in social networks and the generation of self-study groups.

Among the issues reported in the weekly learning logs by the TA, as well as from observing the contributions made in the discussion forums, the active participation of learners in interaction spaces is notable, as 75 % of them said that the construction of their knowledge was based on the level of involvement of their colleagues.

On the other hand, after interviewing students and conducting a TA survey, situations which could undermine the application of knowledge acquired in the MOOC were found. These were contextual (lack of support from the institution or wide generation gap between peers), technological (limited services) and availability (lack of time, mainly due to personal reasons). Thus Table 4 presents the incidence of these problems, derived from the survey answered by the participants.

Table 4. *Student problems when applying MOOC acquired knowledge.*

37%	Status of their workplace regarding OEM: Interested novice.
30%	Trouble adapting resources created in a language other than their own.
22%	Takes a long time to adapt a resource from another educational practice to their own.
16%	The educational resources from other universities don't cover the topics as needed
10%	Resources created in other universities can't be applied.

Finally, the observation grid, student survey and interviews with students and TA showed motivation in students at the end of the course by: a) contextualizing or generating new ideas with the knowledge acquired in the course; b) providing security by meeting their learning expectations and getting up to date regarding e-learning, MOOC, LMS; c) promoting the free creation of information exchange networks; d) feeling satisfied for having completed the course. The evidences found in student responses are presented in Table 5.

Table 5. *Frequent evidences of MOOC's knowledge contextualization.*

77%	Give high importance to the use of OER to reach open educational models.
73%	High regard to the use of OER to produce institutional innovations.
68%	Recommend use of OER to institutions, professionals and the general community.
62%	Use of OER to enrich the design and preparation of courses.
37%	Close visualization in the creation, use and dissemination of OER.

5 CONCLUSIONS

This study was based on the question: What are the potentialities and challenges that can arise from the connection of learnings from the participants and facilitators of team teaching in MOOCs? The results provide data on potential: previous experience, academic connection networks, institutional support and motivation for teaching also challenges the findings show instructional design, communication, technological support, impact on training and knowledge transfer.

With the rapid technological growth, ways of training also evolve and the MOOC can be an opportunity to support the construction of learning in the teaching - learning processes. The data collected on the number of participants interested in accessing unconventional training processes, provide figures for the high interest these massive courses draw nowadays. Several authors [1, 2, 3, 4] have written about the manner in which connection in MOOC learning could be possible. The study findings denoted the construction development of participants through the development of their competences.

The construction of MOOC learning is favored by the involvement of facilitators, who in turn also build knowledge in the training experience. The findings of the study emphasize the active participation of learners in interaction spaces, building their knowledge being based on the level of involvement of

their other colleagues; the appropriation of knowledge is corroborated by the results of the scores obtained in peer assessment, whose measures of central tendency are shown in Table 2. According to Siemens [1] the connectionist theory of the digital era applies the principles of network to construct knowledge through connections that arise when interacting and collaborating in networks of experts and students. This explains why students, in order to manage their own training, require joining a knowledge network. This immersion in learning communities will undoubtedly promote the development of critical and reflective thinking, and drive forward the process of appropriation of knowledge.

May this paper be an invitation to continue investigating the potential of the connection of participants and facilitators' learning, and to keep searching for strategies to improve the challenges posed by MOOCs.

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REFERENCES

[1] Siemens, G. (2010). Conectivismo: Una teoría de aprendizaje para la era digital. In Aparici, R. (Coord.). *Conectados en el ciberespacio* (pp. 77-92). Madrid: Uned.

[2] Downes, S. (2007). An introduction to connective knowledge. Paper presented at the *International Conference on Media, knowledge & education*—exploring new spaces, relations and dynamics in digital media ecologies. Retrieved from http://www.downes.ca/post/33034

[3] Tschofen, C., y Mackness, J. (2012). Connectivism and dimensions of individual experience. *International Review of Research in Open and Distance Learning, 13*(1), 124-143. Retrieved from: www.scopus.com

[4] deWaard, I., Abajian, S., Gallagher, M. S., Hogue, R., Keskin, N., Koutropoulos, A., y Rodriguez, O. C. (2011). Using mLearning and MOOCs to understand chaos, emergence, and complexity in education. *International Review of Research in Open and Distance Learning, 12*(7), 94-115. Retrieved from: www.scopus.com

[5] Clara, M., & Barbera, E. (2013). Three problems with the connectivist conception of learning. *Journal of Computer Assisted Learning,* Retrieved from www.scopus.com

[6] Cormier, D., & Siemens, G. (2010). The Open Course: Through the Open Door--Open Courses as Research, Learning, and Engagement. *Educause Review, 45*(4), 30-32.

[7] Glance, D. G., Forsey, M., y Riley, M. (2013). The pedagogical foundations of massive open online courses. *First Monday, 18*(5). Retrieved from: http://journals.uic.edu/ojs/index.php/fm/rt/printerFriendly/4350/3673

[8] Maringe, F., & Sing, N. (2014). Teaching large classes in an increasingly internationalising higher education environment: Pedagogical, quality and equity issues. *Higher Education,* 1-22. Retrieved from www.scopus.com

[9] Mackness, J., Waite, M., Roberts, G., & Lovegrove, E. (2013). Learning in a small, task–oriented, connectivist MOOC: Pedagogical issues and implications for higher education. *The International Review Of Research In Open And Distance Learning, 14*(4). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1548/2636

[10] Nyoni, J. (2013). The viral nature of massive open online courses (MOOCs) in open and distance learning: Discourses of quality, mediation and control. *Mediterranean Journal of Social Sciences, 4*(3), 665-672. Retrieved from www.scopus.com

[11] Onwuegbuzie, J., Burke, R., & Collins, K. (2011). Assessing legitimation in mixed research: a new Framework. *Quality & Quantity, 45*(6) 1253-1271. doi: 10.1007/s11135-009-9289-9. Retrieved from Proquest (doc ID: 898216084).

[12] Creswell, J. & Plano, V. (2011). *Designing and conducting Mixed Method Research.* Thousand Oaks, CA: Sage.

[13] Collins, K. (2003). Advanced sampling designs in mixed research: current practices an emerging trends in the social and behavioral sciences. In Tashakkori, A. & Teddlie, C. (Eds.). *Handbook of Mixed Methods in Social & Behavioral Research* (pp. 353-377). Thousand Oaks, CA.: Sage.

[14] Creswell, J. W., Klassen, A. C., Plano, V. L., & Smith, K. C. (2011). *Best practices for mixed methods research in the health sciences*. Office of Behavioral and Social Sciences Research (OBSSR). Retrieved from http://obssr.od.nih.gov/mixed_methods_research/pdf/Best_Practices_for_Mixed_Methods_Research.pdf

[15] Alea, V., Maqueda, I., Muñoz, C. y Viladomiu, N. (2001). *Estadística para las Ciencias Sociales: Cuestiones tipo test.* Madrid, España: Alfa Centauro.