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CONNECTIVITY OF LEARNING IN MOOCs: FACILITATORS' EXPERIENCES IN TEAM TEACHING

Martin Alonso MERCADO-VARELA
Institute for Educational Research and Development
Autonomous University of Baja California
Ensenada, Mexico

Jesus BELTRAN
La Salle Northwest University
Obregon, Mexico

Marisol Villegas PEREZ
Education Department
Sonora Institute of Technology
Obregon, Mexico

Nohemi Rivera VAZQUEZ
School of Humanities and Education
Tecnologico de Monterrey
Monterrey, Mexico

Maria-Soledad RAMIREZ-MONTOYA
School of Humanities and Education
Tecnologico de Monterrey
Monterrey, Mexico

ABSTRACT

The role of facilitators in distance learning environments is of substantial importance in supporting the learning process. This article specifically discusses the role of the facilitator in Massive Open Online Courses (MOOC), which are characterized by their stimulation of learning connections. The study analyzes the experiences of 135 facilitators in hybrid courses (cMOOC + xMOOC) where the following are explored: (1) the strategies used by the facilitators to encourage learning connections, (2) the challenges they faced in their activities, and (3) the basic skills required. A mixed method was used with a convergent design, through the application of a questionnaire qualitative and quantitative data were collected simultaneously. It was found that the collaborative construction of knowledge is the most widely used strategy to promote learning connections in MOOCs and that its design is the biggest challenge that facilitators faced while carrying out theiractivities.

Key words: MOOC, connectivism, distance facilitators, open educational resources, open education movement.

INTRODUCTION

The use of social networks and new educational formats and mobile technologies are having an increasing impact on teaching and learning processes. Consequently, education has entered a process of transformation, resulting in, above all, an imbalance (deWaard et al., 2011). It is believed that an educational format that incorporates and even adopts the complexity of today's world, combined with emerging technologies, may be the path to achieving a new educational order. deWaard et al. (2011) argue that the format of Massive Open Online Courses (MOOC) allows for the type of participation that will lead precisely to a new educational balance that incorporates this complexity.

The argument that curricula should be open and unpredictable has been emerging for several decades (Iannone, 1995). The format of a MOOC is by definition open and online, as its resources are accessible on the Web so as to allow for the participation of all potential learners (deWaard et al., 2011). Laroche et al. (2009) state that this type of fluid environment blurs the distinctions between school and society, blending formal and informal educational settings.

The theory of connectivism, from which MOOCs emerged, speaks of this fluidity in learning environments. This theory argues that learning occurs when participants connect information in a learning community. Additionally, they also add that within connectivism, the most important skills for learning are searching for information and the ability to filter out secondary information (Kop & Hill, 2008).

In this context, environments that foster relationships between individuals and experiences that connect on an emotional level must be created (Shedroff, 2009). Creating an effective work environment is not enough to introduce some tools; however, it should encourage the creation of connections and collaborations between resources and people (Kop, Fournier & Mak, 2011). Kop (2011) states that a "place" where learners are comfortable and in which there is a certain level of trust among participants must be created, while the teacher's participation involves the design, organization, and course facilitation, as well as direct instruction. As a result, educators have now taken on new roles: facilitator, guide, coach, moderator, provider of technical support, etc. (Siemens, 2008).

In this sense the new roles adopted by educators in a massive online education environment must promote learning through dialogue and reflection between the student and the facilitator. MOOCs have the potential to engage participants and facilitators in a continuous stream of dialogue and exchange and promote reflexive action by the learner (Kop et al., 2011). For this reason, understanding the skills required of facilitators in order to promote connectivity of learning in these environments is very relevant (Ramírez, 2014). It is for this reason that this research study seeks to answer the following question: What is the experience of MOOC facilitators in supporting learning connections? Based on this, the following specific questions arise: (1) What are the strategies used by facilitators to encourage learning connections? (2) What are the challenges they face in their activities? and (3) What basic skills are considered necessary?

LITERATURE REVIEW

Connectivism

Connectivism is a learning theory developed by George Siemens in the digital age, in which the use of Information and Communications Technology (ICT) is the norm; however, it is based on principles explored by chaos, network, and complexity and self-organization theories (Siemens, 2005). The theory views knowledge as a network state and learning as

the process of generation of networks and adding and maintaining connections (Siemens, 2013). According to Siemens (2005), the principles behind it are:

- **Learning and knowledge rely upon a diversity of opinions.**
- **Learning is a process of connecting nodes or information sources.**
- **The ability to learn is more important than what is known.**
- **It is necessary to nourish and maintain connections to facilitate continuous learning.**
- **The ability to see connections between ideas and concepts is essential.**
- **Decision making is a learning process.**

In conclusion, connectivism can be understood as an approach to learning that places the importance of networks and connections at the forefront (Weller, 2011).

Massive Open Online Courses

From the perspective of the MOOCs as a new educational model, new ways of teaching and learning arise. The model appears as a complement to the changes in learning as a result of the rise of social media and new technologies (deWaard et al., 2011). In this regard, Kop et al. (2011) mention that this involves a network learning method that employs a structure that is different from traditional courses.

MOOCs are described taking into account the characteristics of (1) open access: there are no requirements to participate in these courses nor associated costs, although the term "open" also implies the reuse and adaptation of resources integrated in the course; and (2) scalability: the courses are designed to support any number of participants, where the interconnections are chosen by the participants themselves, and the architecture that promotes this is designed by course facilitators. Beyond these general characteristics, according to Siemens (2012), the adoption of a pedagogical model defines two types of courses: cMOOC and xMOOC.

cMOOC: **This type uses connectivism's pedagogical principles of autonomy, diversity, openness, connectivity, and interactivity.**

xMOOC: **This type emphasizes a traditional learning approach through video presentations and tests.**

Today there are a greater number of xMOOC courses. In this context of hegemony, the legacy of the first cMOOCs is that xMOOCs are increasingly integrating connectivist features, adding to the complexity of the design processes and delivery of this online model (Méndez, 2013). Given the characteristics of massive courses, connectivity of learning must be encouraged.

Connectivity of learning

The term connectivity must be understood based on its relation to learning. In basic connectivist theory, learning is the process of connecting information from different sources. Siemens (2005) notes that...

> *... the basic premise of connectivism is the individual. Personal knowledge is composed of a network, which feeds into organizations and institutions, which in turn feed back into the network, and then continues to provide individual learning. This cycle of knowledge development (personal-network-organization) allows students to remain up-to-date in their fields through the connections that have been made (para.7).*

In the case of massive courses, connectivity is measured through social networks, and a great deal of online and free-access resources provide the study material (McAuley, Stewart, Siemens & Cormier, 2010). This makes it possible to assess the Internet resources made available in an interactive way in the educational space. In this sense, the learner follows his or her own path within the course, creating networks, evaluating the information universe and making important decisions, such as with whom to collaborate and, more importantly, what to learn.

Distance Facilitators

The facilitator figure is a key element in contributing to the learning connection processes in a MOOC. Open access (the participation of thousands of participants) and connectivist pedagogy (knowledge sharing), characteristics that define these educational spaces, have secured their integration in instructional approaches as they activate learning connection processes among participants. According to McAuley et al. (2010) these types of courses are based on the active participation of massive amounts of learners who self-organize their participation based on personal and shared learning, as well as their previous skills. In this regard, a facilitator's participation may have different levels.

In a cMOOC model, what participants can do for themselves leads to a complete learning experience. In this model, the participant becomes a certain type of person (ontological development), who as a learner is characterized by self-organization, motivation, and autonomy (Siemens, 2013). Therefore, over-instruction by educators can end up inhibiting the independence of learners (McAuley et al., 2010). Changing the paradigm in which the instructor is considered as the focal point and whose role is as an expert, can cause the learner to become aware of his/her own ability (expertise) and lead to networked learning approaches (Stewart, 2013), which represents the premise of connectivism. In this context, the facilitator may be responsible for designing the architecture that will foment the self-organization and learning connections of the learner, which represents his/her main activity.

However, since learning in MOOCs is based on active participation and communication among people, continued mediation efforts by a facilitator with advanced skills (expertise) can benefit a greater number of participants. Siemens and Cormier (2010) mention that in open learning, the facilitator figure continues to be of vital importance, as it facilitates interaction, sharing of information and resources, and contributes to the growth of learners' knowledge. In this context, the presence of the facilitator throughout the process of an online situation is essential to increasing learners' learning connections.

Whichever level of participation a facilitator adopts, both before and during a MOOC situation, the characteristics of these spaces pose challenges to carrying out their functions. The large-scale scope of learners complicates the forms of mediation. Adaptability to the characteristics and learning needs becomes essential to promoting interaction among participants and with the different areas of the course and the Web in which knowledge is distributed.

METHOD

Type of Study

The study followed a mixed method combining the collection and analysis of qualitative and quantitative data (Creswell & Plano Clark, 2011; Johnson, Onwuegbuzie, & Turner, 2007) in order to achieve a deep understanding of the learning connections of massive and open environments; the convergent desing (Creswell, 2012) involves simultaneous data acquisition of a different nature: qualitative and quantitative. The study was conducted in three stages: (1) exploratory stage: participation as a facilitator in order to explore the dynamic developed among participants in these educational spaces; (2) field work phase: focus on the application of a questionnaire in

the last week of the course, the first stage allowed participants access to and application of the tool; (3) analysis stage: after completion of the course, participants' responses to the applied tool were analyzed.

Context and Participants

The course "Educational Innovation with Open Resources" was the setting in which the facilitators' experiences were defined. The course was delivered in September 2014. Table 1 summarizes its main characteristics:

Table 1. Characteristics of the course "Educational Innovation with Open Resources

Element	Description
Objective	To promote awareness of open educational resources and their integration into the open educational movement for innovation in educational processes.
Length	4 weeks in which the participant was asked an average activity 4-6 hours per week.
Openness	Access was open to any participant character; however, the course also functioned as a training space for a group of teachers from the Tecnologico de Monterrey university.
Course outline	I. Open educational movement. II. Searching for open educational resources. III. Use of open educational resources in learning processes. IV. Mobilization of open educational resources in learning environments.
Prior preparation	Basic knowledge of use of IT tools. Collaborative work. Self-management skills.
Course format	Each week will begin with opinion questions and a review of resources on the subject (videos and/or readings). Subsequently the participant will complete exercises on the subject, followed by self-evaluation, practice with digital portfolios, and peer review.
Pedagogical approach	The setting was designed following connectivist principles. The vision of the role of the participants involved the active participation of massive numbers of apprentices who self-organized their participation in accordance with the objectives of learning, knowledge, previous skills and common interests. Learning took place in a network, where the establishment of connections allowed its maintenance and growth.
Facilitator	The facilitator figure has the main function of supporting learning connection processes among learners. His/her function is to bring the learners closer to the course instructors, with the understanding that his/her task is to support the instructional approach designed by the instructors, guiding the students' actions in the space of course.
Work team	Plays the role of facilitating learning connections between learners; the team is composed of two facilitators teachers, two support facilitators and facilitators volunteers. Volunteers were selected via an initial survey and the selection was made according to the criteria: (1) previous experience in remote facilitation processes and (2) having some knowledge of the courses topic; this kind of facilitator has two functions, to act both as a learner doing all the course activities and as part of the work team supporting learning connection processes among learners.

It was decided to work with facilitators volunteers because they have a dual perspective: as a learner and as a part of the work team. A group of 203 facilitators responded to the tool. For research purposes we worked with a simple random sample of 135 with average age of 40.81 (SD=11.24) and a confidence level of 95% and a maximum error of 5% to achieve represent the population and manage the amount of qualitative data. Table 2 summarizes some of its most outstanding characteristics.

Table 2. Identifying data of MOOC participants

Characteristics		n (%)
Sex	Male	62 (46.9)
	Female	73 (54.1)
Education level	Technical career	8 (1.5)
	High school's degree	2 (5.9)
	Bachelor's degree	49 (36.3)
	Master's degree	61 (45.2)
	Ph.D.	14 (10.3)
Teaching experience	Hybrid education (virtual and traditional classroom)	70 (51.9)
	Traditional classroom	46 (34.1)
	Without pedagogic experience	5 (3.7)
	Virtual	14 (10.4)
Types organization of origin	Public	63 (46.7)
	Private	47 (34.8)
	Mixed	12 (8.9)
	Others	13 (9.6)

Tool

The tool was designed by a group of experts on massive courses with the aim of compiling the experiences of facilitators of MOOC courses with regard to connectivity of learning. The content validity of the tool was conducted by an expert judgement, various meetings to reach agreements were made. It consists of questions that obtain identifying data and 12 open questions to identify areas of opportunity in his/her role as facilitator and to understand, which are the main strategies to encourage learning connections.

Data Collection and Analysis

The tool was applied online during the last week of the course on the Coursera platform. Subsequently through the system management platform database was obtained for analysis. Qualitative techniques were used, such as content analysis to list the answers with the highest occurrence, as well as comparative analysis with contingency tables in order to compare data of interest. Responses were categorized, captured and recorded in the SPSS

statistical program version no. 23, with which descriptive statistical tests were applied in order to identify trends, differences or similarities. Chi-square test (χ^2) was used to determine whether there were significant differences between participants regarding the variables: reasons for involvement, strategies, challenges and skills; the analysis corresponds to nominal variables reason that determines the test selection.

RESULTS

The characterization of facilitators in MOOC courses is presented below; a distinction was made between the facilitators based on their experience in this area. To perform the following descriptive analyses, it was necessary to distinguish between the facilitators, in which said criterion was their type of experience in MOOC environments. In this sense the distinction was as follows: (a) teacher: facilitator who has previously been involved as an instructor in a MOOC; (b) student: only experience with MOOCs is as a student and (c) first participation: facilitators who are new to this type of training environment. In Table 3 the facilitators' aims at the start of the course are shown, which mainly demonstrates their interest in learning about Open Educational Resources (OER). Meanwhile, through Chi-square test (χ^2), it was found that the reasons for participation does not depend on the type of experience in a MOOC, as no statistically significant differences were found (p=.340).

Table 3. Reasons for involvement in MOOC course

Reasons for participation	Type of experience in MOOCs			
	Teacher (%)	Student (%)	First Participation (%)	Total
To learn about OERs	8 (25.8)	23 (37.1)	12 (28.6)	43 (31.9)
To update knowledge (participants with prior knowledge)	3 (9.7)	16 (25.8)	7 (16.7)	26 (19.3)
To improve teaching practices	5 (16.1)	8 (12.9)	9 (21.4)	22 (16.3)
To learn new things	8 (25.8)	3 (4.8)	7 (16.7)	18 (13.3)
Professional reasons	5 (16.1)	4 (6.5)	6 (14.3)	15 (11.1)
Other	2 (6.4)	8 (12.8)	1 (2.4)	11 (8.2)
Total	31 (100)	62 (100)	42 (100)	135 (100)

With regard to the necessary learning connection strategies of the facilitators, all of them agreed on the significance of all actions aimed at constructing knowledge through collaboration among peers (see Table 4). Through Chi-square test, it was found that certain strategy to encourage learning connections is not confined to one type of facilitator, as they did not show significant differences (p=.619).

Table 4. Most significant strategies for learning connections according to MOOC facilitators

Strategies to encourage learning connections	Type of experience in MOOCs			
	Teacher (%)	Student (%)	First Participation (%)	Total
CKC	14 (45.2)	34 (54.8)	20 (47.6)	68 (50.4)
ROL	5 (16.1)	9 (14.5)	3 (7.1)	17 (12.6)
MOT	3 (9.7)	5 (8.1)	6 (14.3)	14 (10.4)
IF	1 (3.2)	3 (4.8)	5 (11.9)	9 (6.7)
RPP	3 (9.7)	2 (3.2)	1 (2.4)	6 (4.4)
Unspecified	5 (16.1)	9 (14.5)	7 (16.7)	21 (15.6)
Total	31 (100)	62 (100)	42 (100)	135 (100)

CKC: Collaborative knowledge construction, ROL: Relationship with own learning, MOT: Motivation, IF: Information finding, RPP: Relationship with professional practice.

Moreover, the facilitators perceived challenges other than those they faced in promoting connectivity of learning. The two main challenges perceived were: (1) the design of the MOOC, which consisted of qualifying criteria, the development of activities, flexibility of the course, and instructional design and (2) the massiveness and diversity of participants, referring to the large number of participants that must be supported and the diversity of nationalities, among which the use of language is highlighted (see Table 5). The Chi-square test showed that the challenges that the different type of facilitator face are the same, as no statistically significant differences were found (p=.638).

Table 5. Challenges faced by the facilitators during the MOOC course

Challenges with regard to learning connections	Type of experience in MOOCs			
	Teacher (%)	Student (%)	First Participation (%)	Total
UT	2 (6.5)	8 (12.9)	9 (21.4)	19 (14.1)
DM	11 (35.5)	20 (32.3)	7 (16.7)	38 (28.1)
MDP	10 (32.3)	17 (27.4)	13 (31)	40 (29.6)
ATCP	0 (0)	5 (8.1)	1 (2.4)	6 (4.4)
CC	2 (6.5)	4 (6.5)	6 (14.3)	12 (8.9)
None	6 (19.4)	8 (12.9)	6 (14.3)	20 (14.8)
Total	31 (100)	62 (100)	42 (100)	135 (100)

UT: Use of technology, DM: Design of the MOOC, MDP: Massiveness and diversity of participants, ATCP: Attitude toward the course and participants, CC: Complexity of contents.

Lastly, the facilitators were questioned as to the skills required in order to achieve learning connections. In this regard three skills were identified that, according to the facilitators, are the most necessary in order to carry out their activities, which are the following: Communication (23%), Digital (20.7%) and Empathy (13.3%) (See Table 6). The Chi-square test showed a specific set of skills that are common among different types of facilitators, as no statistically significant differences were found (p=.115).

Table 6. Skills required by facilitators with regard to learning connections in the MOOC

Skills required to promote learning connections	Type of experience in MOOCs			Total
	Teacher (%)	Student (%)	First Participation (%)	
PED	2 (6.5)	2 (3.2)	7 (16.7)	11 (8.1)
EMP	6 (19.4)	7 (11.3)	5 (11.9)	18 (13.3)
DIG	6 (19.4)	12 (19.4)	10 (23.8)	28 (20.7)
SUBM	2 (6.5)	2 (3.2)	3 (7.1)	7 (5.2)
MOT	1 (3.2)	5 (8.1)	4 (9.5)	10 (7.4)
COM	5 (16.1)	22 (35.5)	4 (9.5)	31 (23.0)
No answer	9 (29.0)	12 (19.4)	9 (21.4)	30 (22.2)
Total	31 (100)	62 (100)	42 (100)	135 (100)

PED: Pedagogical EMP: Empathy, DIG: Digital, SUBM: Subject of the MOOC, MOT: Motivation, COM: Communication.

DISCUSSION

Learning connections in a massive course are increased when the facilitator focuses on constructing knowledge collaboratively with the participant and is highly digitally literate. Empirical evidence from the study suggests that skills associated with digital literacy and collaborative construction of knowledge as a strategy of the facilitators are the main factors that enhance learning connections. As a facilitator's participation in a MOOC is "teacher as learner as teacher" (Siemens, 2006), the importance of digital skills is critical; literature on the learner's experience has shown that possession of these skills is one of the main factors that shapes their experience in a MOOC (Kop & Fournier, 2010). Participating in these educational spaces requires self-management by the participant, which has a direct relationship with advanced levels of digital literacy; self-directed learning, presence of other participants and critical literacies pose challenges for learners who venture into spaces with a connectivist approach (Kop, 2011). If this requirement is not met by participants who enroll in MOOCs, its potential to democratize knowledge will be limited by the digital divide.

MOOC philosophy, such as massiveness and openness, pose challenges for facilitators, as they must promote different learning styles according to the characteristics of the participants. These two attributes of mass courses were identified by the facilitators as the main challenges they faced while carrying out their activities within the space of course. The heterogeneity of participants with different levels of knowledge and skills makes it impossible for the facilitator to individualize the experience of each learner (McAuley et al., 2010); to address the diversity of participants Maringe and Sing (2014) propose increase the curricular access and language teaching, increase staff with cultural understanding, increase opportunities for deep learning for all, continuous monitoring of participant satisfaction, diversification of evaluation and merit of the MOOC; a principle of "increase" in the same way that increase the participants. On the other hand, there is a tendency to integrate the

features of cMOOCs into xMOOCs adding complexity to these courses (Méndez, 2013); the facilitator is an ever-present element in these types of courses and in the construction with "others" as connectivism noted (Ramírez, 2014; 2015). This implies an opportunity to generate guidelines with regard to the design of the MOOC that integrate the facilitator into his or her instructional approaches, providing him or her with skills to increase the active participation and learning connections of participants, never limiting them.

CONCLUSION AND FUTURE RESEARCH

The research aimed to answer the following question: What is the experience of facilitators of MOOCs in supporting learning connections? The results show that MOOCs facilitate learning connections through peer exchange; this implies new roles for both facilitators and learners, focusing the educational experience on self-management of their own learning, which requires from learners greater responsibility and interaction with peers and with the resources available on the Web. On the other hand, open and flexible design of a MOOC, as well as the large number of participants and their diverse nationalities, languages, and cultures represent the greatest challenges to connecting learning in these environments. These results suggest that to maximize the connection of learning in an open environment and distance must be sought facilitators who are assertive communication with the apprentices, which is related to its ability to accommodate trainees despite the virtuality; and to achieve this they should be able to search, process and disseminate information and communicate and build knowledge through electronic means.

The study was carried out in a MOOC primarily aimed at teachers and administrators, which represented a constraint since the results may not be generalized with regard to MOOCs with other types of participants. In further research, it would be interesting to explore the experiences of facilitators and participants as to learning connections taking into account more heterogeneous samples, and even courses with different topics, as well as distinguish between the facilitators taking into account other characteristics such as level of education, level of digital competence and content mastery. This is beyond the scope of this study, but could help re-define the facilitator profile for these educational spaces.

BIODATA and CONTACT ADDRESSES of AUTHORS

Dr. Martin Alonso MERCADO-VARELA has worked as an instructor of classes on teaching techniques and educational assessment, and has participated in various projects in the field of assessment: factors associated with learning. His lines of research include: assessment of learning and educational technology, with a focus on massive courses (MOOC).

Dr. Martin Alonso MERCADO-VARELA
Instituto de Investigacion y Desarrollo Educativo
Universidad Autonoma de Baja California, Mexico
Phone: +5216441232231
E-mail: martin_mercado44@hotmail.com

Jesus BELTRAN holds a Master's in Educational Research and a Bachelor´s degree in Education Sciences from the Sonora Institute of Technology (ITSON). He has worked as an instructor of classes on research and communication on La Salle Northwest University, also was the designer of the educational platform of the Institute of Development and Learning of Grupo Estrella Blanca.

Jesus BELTRAN
La Salle Northwest University, Mexico
Phone: +526441180607
E-mail: j.beltrans@hotmail.com

Marisol Villegas PEREZ holds a master in Educational Research from the Sonora Institute of Technology. She has participated as a collaborator on the scientific committee of the International Congress on Education "Technology, Innovation and Liaising" in the city of Obregon, Sonora, Mexico. She is assistant teacher in the Master of Educational Research program at the Sonora Institute of Technology.

Marisol Villegas PEREZ
Education Department
Sonora Institute of Technology
Avda. 5 Febrero 818 sur, 85000, Obregon, Mexico
Phone: +52 6441147106,
E-mail: Marisol.villegas7@outlook.com

Nohemi Rivera VAZQUEZ is an instructional designer in McKenzie. Her academic interest areas are educational interfaces, e-learning, educational multimedia and use of Internet in education. She was a member of the Grupo de Investigación e Innovación en Educación at Tecnológico de Monterrey from August 2013 to December 2015. She has participated in several distance-learning projects: SINED-CLARISE para la educación a distancia, ANUIES-CSUCA "Cooperación interuniversitaria para la formación e investigación en el Movimiento Educativo Abierto". She also published several papers related with the open educational movement in congresses like the ICERI (7th International Conference of Education, Research and Innovation), CIIE (Congreso Internacional de Innovación Educativa) and CNIE (Congreso Nacional de Investigación Educativa).

Nohemi Rivera VAZQUEZ
Instructional design, McKenzie
Paseo de la Reforma 505, Cuauhtemoc, Ciudad de México
Phone: 8116282438
E-mail: nohemirv@hotmail.com

Maria-Soledad RAMIREZ-MONTOYA is a Professor of Distance Education at School of Humanities and Education, of the Tecnologico de Monterrey (Mexico), director of the UNESCO Chair "Open Educational Movement for Latin America", director of the International Council for Open of Distance Education (ICDE): OER Latin America office. Dr. in Philosophy and Educational Sciences from the University of Salamanca at July, 1998. Her research interests include teaching strategies, technology resources for education, training of educational researchers and open education movement. She has over than 80 journal articles published in international indexes, 20 international book chapters and other national and international articles, papers submitted to international meetings.

Maria-Soledad RAMIREZ-MONTOYA
School of Humanities and Education
Tecnologico de Monterrey,
Avda. Garza Sada 2501 sur, Monterrey, Mexico.
Phone: +528183582000x4949
E-mail: solramirez@itesm.mx

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