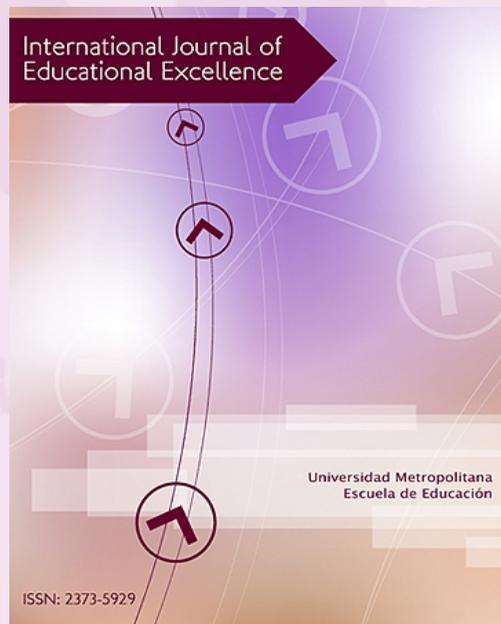


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Universidad Metropolitana (SUAGM)

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International Journal of Educational Excellence

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The *International Journal of Educational Excellence* (IJEE) is open to all scientific articles which provide answers to the main educational and scientific problems currently impacting higher education with the purpose of achieving quality excellence in all areas. Papers will be welcome, regardless of the subject area to which they belong, as long as they entail a contribution, innovation or breakthrough in the development of models for teaching or scientific research within the university environment leading towards social improvement. Research work performed in other educational levels may be also taken into account, as well as they provide an adequate justification and a valid relationship with higher education issues. All papers submitted for publication must be unpublished and original, and should not be under evaluation for publication in other journals. Theoretical work as well as those based on field studies and empirical laboratory experiments contributions, are accepted. All kinds of strategies and methodological approaches may be employed; however the selected method for each research has to be in compliance within the parameters of current scientific and technological research. The review criteria and selection process will mainly assessed the quality of the work under consideration in terms of the following criteria: significant contribution to the object of interest of the journal, a breakthrough to the current scientific knowledge and, ultimately, the contribution to the progress of our society.

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At present, the rules of APA citation are widespread in the field of social research, and its style is the most currently used to cite sources in this area. Therefore in case of any doubt regarding citations, we recommend consulting the *Publication Manual of the American Psychological Association* (6th edition), where it multiple examples of formats of research papers, text citations, footnotes, references, etc. can be found; here we have offered only general guidelines.

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The manuscript should follow the general format not only meeting the scientific requirements requested by this journal but also identifying the best possible characteristics of the article. Submission the manuscript in digital format, or RTF .odf, double-spaced in a standard size paper (8.5 "x 11") or A4 (21 x 29.7 cm) 1 "(or 2 cm) margins, is recommended. Although any easily readable source may be used, the use of Times New Roman 12 point is recommended. The manuscript should include a header at the beginning of the page, providing the main scientific information of the author and the work. These data are:

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Competencies of Virtual Professors in Puerto Rico: Mix Methods Approach

Alice J. Casanova Ocasio^a and Zaida Vega Lugo^a

Received: 11 March 2014 • Accepted: 03 June 2014

Abstract: This article presents the profile of a sample of 145 Puerto Rican professors engaged in virtual education. A mixed study was conducted following Creswell (2013a, 2008b), Creswell and Plano (2011), Hernández, Fernández and Baptista (2006), Tashakkori and Teddlie (2009) mixed integration method. A concurrent triangulation strategy was used to cross-validate findings of quantitative and qualitative data collected concurrently. The profile was produced from the adaptation and validation of the Virtual Teacher Competence Scale (COMDOVIR, *for its Spanish acronym*) developed by Ruiz (2010), a measurement scale used to assess four dimensions of virtual teaching: *pedagogical, technological, interpersonal* and *managerial*; and the validation of the Virtual Teaching Competencies Questionnaire (VTCQ:AC *for its Spanish acronym*) created by Casanova (2014) and her mentor to assess the said four (4) dimensions from the voice of the participants. The validity and reliability of the first instrument showed a coefficient $\alpha = .956$, administered to a sample of virtual professors belonging to the main guild grouping these professionals in the Puerto Rican Distance Education Association (APAD, *for its acronym in Spanish*). Content validity conducted using expert panel judgment following Lawshe (1975) approach resulted in 47 items retained of Ruiz' (2010) original instrument with minimal lexical semantic changes and four (4) validated open ended questions sets of the Virtual Teaching Competencies Questionnaire developed by Casanova (2014). Meta-inferences on the virtual faculty profile are presented based on the triangulation of quantitative and qualitative data in this mixed method study. Results provided evidence of the reliability and validity of both instruments to assess the competencies of Puerto Rican professors engaged in virtual teaching and its usefulness to institutions of higher education as valid and reliable screening tools for hiring virtual education professors and as assessment tools to assess faculty development needs regarding virtual education teaching competencies.

Key-Words: Competencies, Virtual Teaching, Faculty Profile, Virtual Education, Faculty Development, Validity, Reliability.

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1. Introduction

This article is a direct result of a dissertation research conducted by Alice J. Casanova entitled *Adaptation and Validation of an Instrument to Evaluate the Competencies of Virtual Faculty in Puerto Rico: A Mixed Methods Study* at the Universidad Metropolitana of the Ana G. Méndez University System located in San Juan, Puerto Rico. The study was conducted under the mentorship of Dr. Zaida Vega Lugo, Full Professor of the doctoral program in Education in Teaching and Vice-Chancellor at Universidad Metropolitana. The study presents the results of the validity and reliability for Puerto Rico of the Virtual Teacher Competence Scale (COMDOVIR) developed by Ruiz (2010), an instrument used to assess the competencies required of faculty engaged in virtual teaching in four (4) dimensions: *pedagogical, technological, interpersonal and managerial*; and the validity of the Virtual Teaching Competencies Questionnaire created by Casanova (2014) to assess Ruiz' (2010) four (4) quantitative dimensions using a qualitative measurement approach from the voice of the participants. A mixed study was conducted following Creswell (2013a, 2008b), Creswell and Plano (2011), Hernández, Fernández and Baptista (2006), Tashakkori and Teddlie (2009) mixed integration method.

The four (4) objectives pursued in this study respond to the lack of research conducted in Puerto Rico regarding the competencies required of professors practicing virtual teaching in Puerto Rico' institutions of higher education, as well as the rapid growth of distance education within the higher education industry, which has shifted the teaching/learning paradigm. The objectives include: 1) adaptation and validation in Puerto Rico of the Virtual Teacher Competence Scale (Ruiz, 2010); 2) creation and validation of the Virtual Teaching Questionnaire developed by Casanova (2014); 3) assessment of the virtual teaching competency profile of professors in Puerto Rico teaching virtual courses; and 4) identification of the main areas of training and continuing education required for virtual teaching as expressed by participants on both QUAN and QUAL instruments.

Following the mixed method approach, five (5) research questions were studied: *two quantitative, one qualitative and two mixed questions*. *Quantitative questions* included one geared at establishing the validity and reliability of the Ruiz (2010) scale in Puerto Rico, and the second aimed at identifying the virtual teaching competency profile of Puerto Rico virtual education faculty in practice through the administration of the Ruiz (2010) scale to 145 professors teaching virtual courses once validity and reliability was established. The *qualitative* dimension of the study was targeted at researching the object under study [*virtual teaching competencies*] from the voice of the participants through four (4) sets of open ended questions

comprising Casanova's (2014) questionnaire. The *mixed approach* questions were developed to capture, first, the complementary results of both [*Quantitative and Qualitative*] instruments administered to get deeper into the competency profile of faculty engaged in virtual teaching in Puerto Rico; and second, to establish the dimensions in which faculty expressed needing training and support from HEI's administrators extracted from both sets of qualitative and quantitative data collected.

A concurrent triangulation strategy was used to cross-validate findings within the study of data collected concurrently. The process of adaptation and validation of Ruiz (2010) instrument ended with a reliability coefficient of $\alpha = .956$, administered to a sample of 145 professors engaged in virtual education who are members of the main guild grouping these professionals in the Puerto Rican Distance Education Association (*APAD, for its acronym in Spanish*). Content validity conducted using expert panel judgments following Lawshe (1975) approach retained the 47 items of the original instrument with minimal lexical semantic changes and four sets of open ended questions of the Virtual Teaching Competencies Questionnaire created by the researchers. Meta-inferences are presented based on the triangulation of data collected from the quantitative and qualitative approaches of this mixed method study.

Results provided evidence of the reliability and validity of both instruments to assess the competencies of Puerto Rican professors engaged in virtual teaching. The competency profile of faculty engaged in virtual teaching in Puerto Rico is presented and discussed, as well as implications for institutions of higher education engaged or planning to engage in virtual education. This study can be replicated in other countries and comparative research projects conducted.

2. Method

2.1 Instruments and Participants

2.1.1 Instruments

Instruments used in our research are presented below followed by a brief description of the structure and approach. The Virtual Teacher Competence Scale developed by Ruiz (2010), is used to assess the competencies required of faculty engage in virtual teaching on four dimensions: *pedagogical, technological, interpersonal and managerial*. Ruiz (2010) scale provides to be individual or group administered and can be applied in two forms: (a) as a self-administered instrument or; (b) directly administered by an evaluator or researcher. In this study we used option *a*, to be self-administered by participants. Participants received the instrument electronically and responded to it utilizing Google-sites. Ruiz (2010) established that results can range between 44 and 220. The interpretation

criteria established by Ruiz (2010) appears in Table 1. These criteria were used to run the interpretation of our results in Puerto Rico.

<i>Self-administered Scale</i>	<i>Competency Level</i>
208-220	Highly Competent
176-207	Competent
139-175	Average
103-138	Least Competent
44-102	Incompetent

Table 1. Interpretation scale of Ruiz (2010) Instrument

The Virtual Teaching Competencies Questionnaire: Qualitative Approach (VTCQ: AC) was developed to assess the four (4) dimensions from the voice of the participants. It includes four (4) sets of open ended questions to get deeper into the experience of participants.

1. How do you describe your training in instructional design and the motivation strategies required for students registered in virtual courses? (*Pedagogic Dimension*)
2. How do you describe your experience with the Learning Management System (LMS) that you use to facilitate virtual courses? How do you qualify your mastery of its tools, including communication, content, navigation, and others? For which tools do you need more training? (*Technological Dimension*)
3. How do you utilize the communication tools to facilitate virtual courses? How do you promote collaborative work in your virtual courses? Please, provide examples. (*Interpersonal Dimension*)
4. How do you use the calendar and the organization tools of your LMS to administer the virtual courses that you facilitate and the implementation of course activities? (*Management Dimension*)

2.1.2 Participants

The selection of the sample was based on a non-random/non-probability approach. Individuals meeting the inclusion criteria were invited to join the study and had the opportunity to decide whether or not to voluntarily participate (Kinnear and Taylor, 1998). Inclusion criteria were having experience teaching at least one or two virtual courses within the last five (5) years prior to this study. The intentional or purposive sampling technique used was based on the judgment of the researchers as to who could provide the best information to achieve the objectives of the study and were willing to participate (Teddlie and Yu, 2007). As stated by Teddlie and Yu, "Purposive sampling techniques [...] may be defined as selecting units (e.g. individuals, groups of individuals institutions) based on specific purposes associated with answering a research study's questions" (2007, p. 77). This sampling was

extremely appropriate as one of our main objectives was to assess and describe the profile of professors teaching virtual courses in four (4) dimensions: Pedagogic, Technological, Interpersonal, and Management by way of the adaptation and validation of Ruiz (2010) scale in Puerto Rico.

All professors meeting the selection criteria had the opportunity to join the study. This purposive non probability approach was selected due to the similar characteristics of the sample with the population targeted to be studied, thus the sample was determined by the researchers. The participants of this study are virtual professors who belong to the main guild grouping these professionals in the Puerto Rican Distance Education Association (*APAD for its acronym in Spanish*). APAD is a not-for-profit professional association created in 1997 that is focused on the promotion of specialized professional activities to facilitate the development and growth of virtual education in the Puerto Rico higher education industry. At the time of this study, APAD had 357 members from a diverse array of institutions of higher education of whom 40% have had experience teaching virtual courses. Participants have experience teaching at least one or two virtual courses within the last five years prior to the study; and its demographic profile was obtained directly from the instruments administered.

Ten professors engaged in teaching virtual courses at a private institution of higher education integrated the sample of the pilot run to validate Ruiz (2010) scale (Crombach Alpha = .97). Once its validity and reliability was established for Puerto Rico, an electronic invitation was sent to 154 APAD members who met the inclusion criteria of which 145 agreed to participate in the study. This sample responded to both instruments: the Virtual Teacher Competence Scale developed by Ruiz (2010) validated for Puerto Rico by Casanova (2014) and her mentor and the Virtual Teaching Competence Questionnaire created by Casanova (2014) to assess the four (4) virtual teaching competence dimensions from the voice of the participants. Validity and reliability tests were conducted again from the sample of 145 respondents resulting on Crombach Alpha = .95.

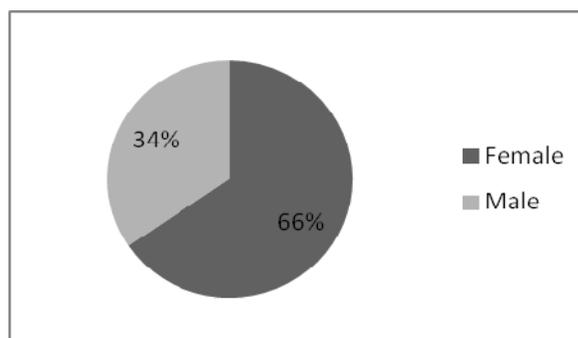


Figure 1. Participants by gender

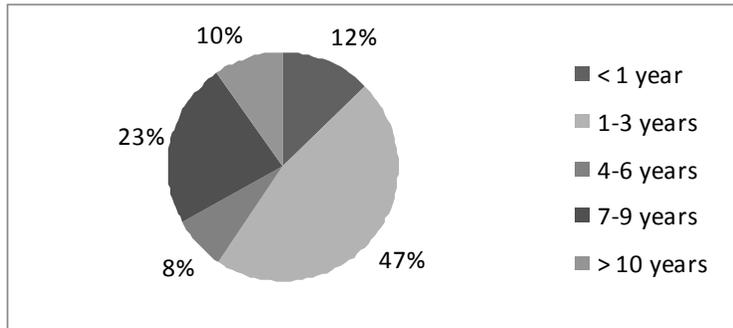


Figure 2. Participants by teaching experience in virtual education

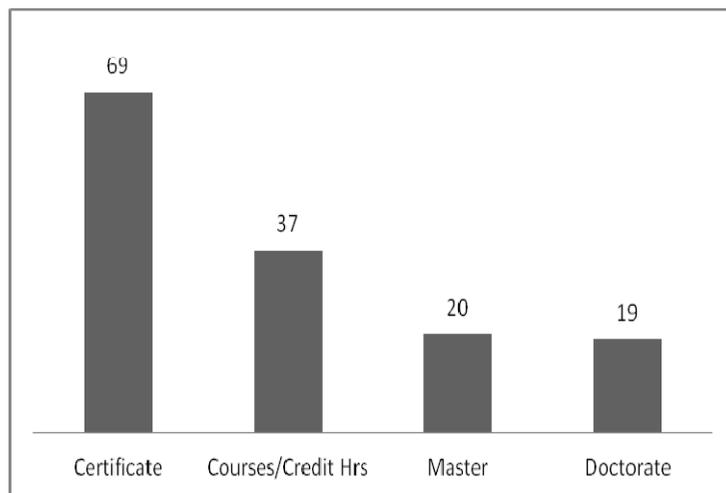


Figure 3. Participants by type of credentials and/or training earned

2.2 Design

This is a mixed method study in which quantitative and qualitative data converged concurrently to provide a comprehensive analysis of the research problem. On this study we collected QUAN and QUAL data at the same time (Creswell, 2013a, 2008b, Creswell & Plano, 2011) to later triangulate data sources and integrate the interpretation of the results in the form of inferences following Tashakkori & Teddlie definition as “a researcher’s construction of the relationships among people, events, and variables as well as his or her construction of respondents’ perceptions, behaviors, and feelings and how these relate to each other in a coherent and systematic manner” (Handbook of Mixed Methods in Social & Behavioral Research, Chapter 1, p. 27, 2010). The integration of both sets of data (QUAN & QUAL) of this mixed method

design provided the grounds to thoroughly investigate the competency profile of professors engaged in teaching virtual courses in institutions of higher education in Puerto Rico through the rich objective data provided by the adaptation and validation of Ruiz (2010) instrument and the responses to Casanova's (2014) open-ended-questionnaire. The Statistical Package for the Social Sciences version 20 was used for data analyses.

2.3 Procedure

2.3.1 Quantitative Approach

Figure 4 presents the procedure followed on the QUAN dimension of the study.

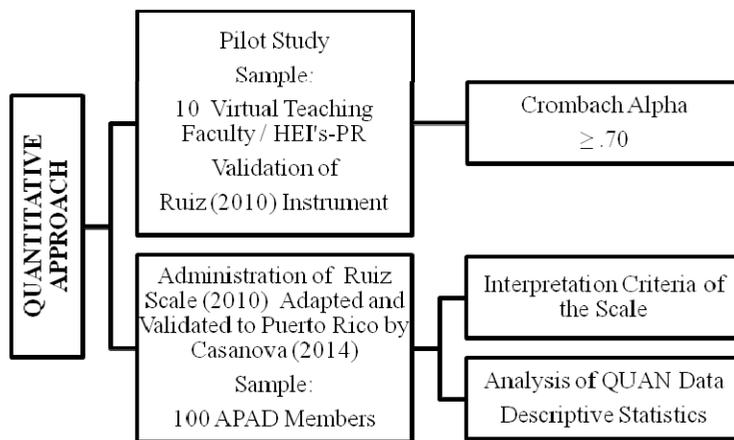


Figure 4. Quantitative Approach Procedure

Phase 1: Pilot Study

To establish the validity and reliability of Ruiz (2010) Scale (COMDOVIR) in Puerto Rico, the Cronbach Alpha Coefficient was calculated on the sample data collected. The procedure included:

- a. A letter requesting the email addresses of professors teaching virtual courses was sent by the investigator to the contact person at the Institution of Higher Education that agreed to participate in the pilot study.
- b. An invitation letter describing the purpose of the pilot study with a hyperlink to the instruments (The Virtual Teacher Competence Scale (COMDOVIR for its Spanish Acronym) & the Virtual Teaching Competency Questionnaire (VTCQ: AC) was sent to 15 professors identified by the contact person of the participant Institution of Higher Education who met the inclusion criteria.

- c. Fifteen (15) days were allowed to respond to both instruments; a follow-up e-mail was sent on day 8, and thereafter, until completing ten (10) responses.
- d. Once sample responses were achieved (10), the investigator ran Cronbach Alpha Coefficient using the *Statistical Package for the Social Sciences* (SPSS) version 20 for the COMDOVIR.

Phase 2: Administration of COMDOVIR Adapted and Validated to Puerto Rico concurrently with VTCQ: AC (Casanova, 2014)

- a. An invitation letter describing the purpose of the study with a hyperlink to the instruments (COMDOVIR and VTCQ: AC) was sent to the APAD professors who met the inclusion criteria registered in its database provided by an authorized member. Participants of the pilot study were excluded.
- b. Fifteen (15) days were allowed to respond to both instruments, a follow-up e-mail was sent on day 8, and thereafter, until completing 100 responses. 145 responded.
- c. Descriptive statistics were performed using the Statistical Package for the Social Sciences (SPSS) version 20 for the COMDOVIR as specified.
- d. The Virtual Teaching Competency Profile for Puerto Rico was identified from the 145 instruments received. The profile was created based on Ruiz (2010) interpretation scale.
- e. The investigators ran another Cronbach Alpha Coefficient of the COMDOVIR due to the robustness of the data (145 of 100 expected).

2.3.2 Qualitative Approach

Figure 5 presents the procedure followed on the QUAL dimension of the study.

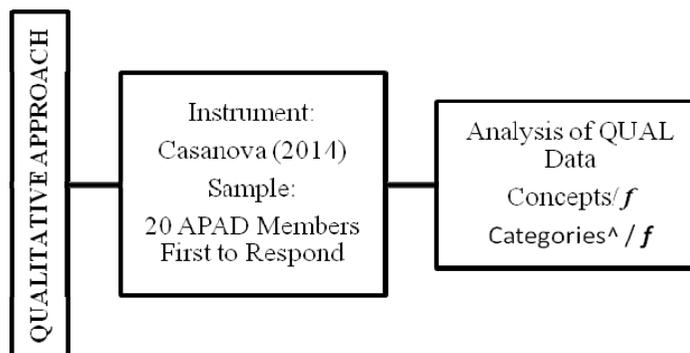


Figure 5. Qualitative Approach

Phase 1: Administration of VTCQ: AC concurrently

- a. An invitation letter describing the purpose of the study with a hyperlink to the instruments (*COMDOVIR* and *VTCQ: AC*) was sent to the APAD professors who met the inclusion criteria registered in its database provided by an authorized member. Participants of the pilot study were excluded.
- b. Fifteen (15) days were allowed to respond to both instruments, a follow-up e-mail was sent on day 8, and thereafter, until completing 100 responses. 145 responded.
- c. The first 20 respondents constituted the QUAL sample of the study to determine the competency profile of virtual professors from the voice of the participants.
- d. Content analysis was conducted of the responses provided by participants to the open-ended-questions of *the VTCQ: AC*; categories and sub-categories were identified related to the four dimensions assessed using AQUAD 7.2 (Huber, 2013).
- e. The Virtual Teaching Competency Profile from the voice of the participants was identified based on the responses provided on the first 20 QUAL instruments received.

2.3.3 Mixed Approach

Figure 6 presents the combined analysis of QUAN and QUAL data sets followed on this mixed method approach to reach metainferences, the main feature that characterizes mixed studies. The combined analyses of data collected responds to the pragmatic philosophy that underlines the mixed method approach (Johnson & Christensen, 2012).

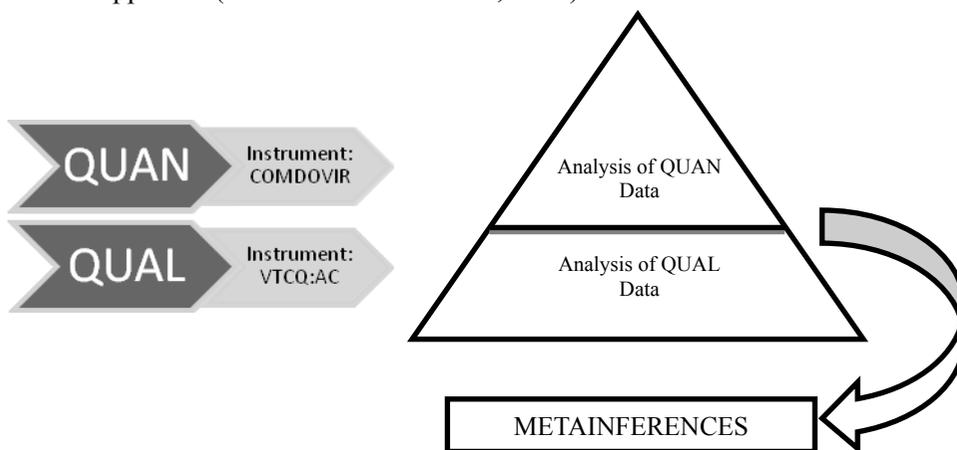


Figure 6. Combined Analysis of QUAN & QUAL Data Sets

Phase 1: Combined Analyses of QUAN and QUAL Data Collected

- a. Analysis of QUAN data using SPSS version 20, interpretation of results, and generation of the virtual teaching competence profile of participants based on the empirical data collected from the administration of the COMDOVIR instrument adapted and validated throughout the study.
- b. Analysis of QUAL data using AQUAD 7.2., interpretation and generation of the virtual teaching competence profile of participants based on the experience revealed by the data collected from the voice of the participants collected on the VTCQ: AC open-end questionnaire.
- c. Combined analyses of QUAN and QUAL data, triangulation of results (Rodríguez, 2005, Rodríguez, Pozo and Gutiérrez, 2006).
- d. Identification of the virtual teaching competence profile of participants engaged in virtual education in Puerto Rico based on the combined analyses of QUAN and QUAL results and the literature reviewed.
- e. Identification of strengths and areas of training needed based on the four (4) dimensions assessed: Pedagogic, Technological, Interpersonal and Management of virtual courses.

3. Results

3.1 QUAN Results by Research Questions

3.1.1 Research Question 1 (QUAN): What is the validity and reliability of Ruiz (2010) Scale for Puerto Rico?

Cronbach Alpha of Ruiz (2010) scale validated to Puerto Rico was .992 on the pilot and .95 on the second administration. Table 2 summarizes Casanova (2014) results as compared to Ruiz (2010).

Analysis	Ruiz (2010)		Casanova (2014)		
Reliability					
Cronbach Alpha	n=110	$\alpha = 0.975$	Pilot study	n=10	$\alpha = .992$
			Second administration	n=145	$\alpha = .959$

Table 2. Reliability of COMDOVIR Ruiz (2010) and Casanova (2014)

3.1.2 Research Question 2 (QUAN): What is the competence profile of professors engaged in virtual teaching in Puerto Rico?

The virtual teaching profile of the 145 professors who participated in the study appears below (see Table 3) and in the graphs that follow by each dimension of the COMDOVIR Scale. 84% of participants considered themselves to be average and competent regarding the four dimensions

assessed. It calls the attention of the researchers that none considered themselves to be highly competent and 4% assessed themselves as incompetent.

<i>Competency Level</i>	<i>Self-administered Scale</i>	<i>f</i>	<i>%</i>
Highly Competent	208-220	0	0%
Competent	176-207	24	17%
Average	139-175	97	67%
Least Competent	103-138	17	12%
Incompetent	44-102	7	4%
TOTAL		145	100%

Table 3. *Quantitative competency profile of virtual professors in Puerto Rico*

The figures below (see figures 7-13) present the results of the responses of the 145 participants by each cluster of items by dimension on the following options given on the COMDOVIR Scale: Always (A), Often (O), Sometimes (S), Rarely (R), and Never (N). Graphs present Always and Often responses combined and Rarely and Never.

Figures 7-13. Profile of competency of virtual professors by clusters of items by dimension:

In the category of instructional design of the pedagogical dimension, 93% affirmed to have facilitated learning through diverse formats (item 3), 90% applied summative evaluation strategies (item 6) and 88% took into account the opinion of students enrolled (item 7).

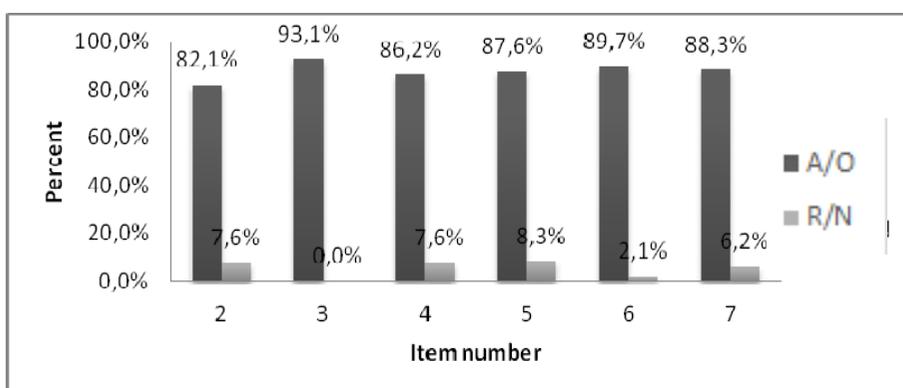


Figure 7. *Pedagogical dimension: Percentage of responses on the items associated to instructional design*

In the category of academic management of the pedagogical dimension, 97% promoted motivation of the group (item 10), 96% discussed the bases for the presentation and delivery of assignments (item 12), and 94% reinforced previous knowledge of students (item 13).

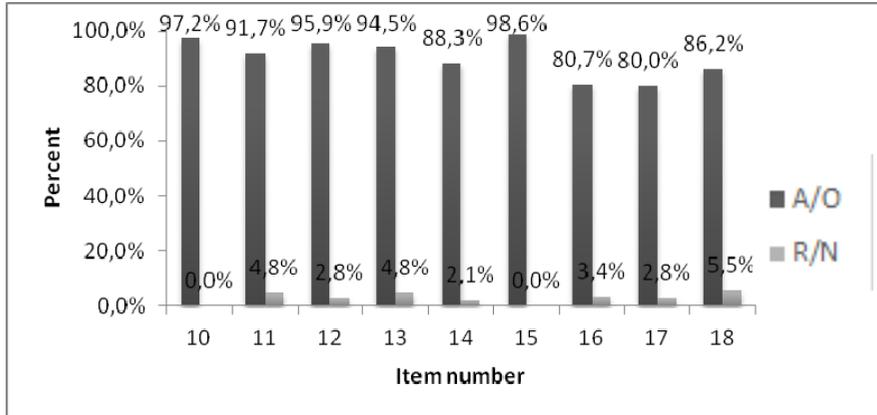


Figure 8. Pedagogical dimension: Percentage of responses on the items associated to academic management

In the category of the design of the learning environment of the technological dimension, 95% organized the structure of each module or unit of the course (item 19), 94% published and discussed the instructional program of the course which included the course syllabus (item 20), 60% created news and novelty forums (item 22); whereas, only 44% created forums to facilitate social interaction (item 24) and 46% reported to do so Rarely or Never.

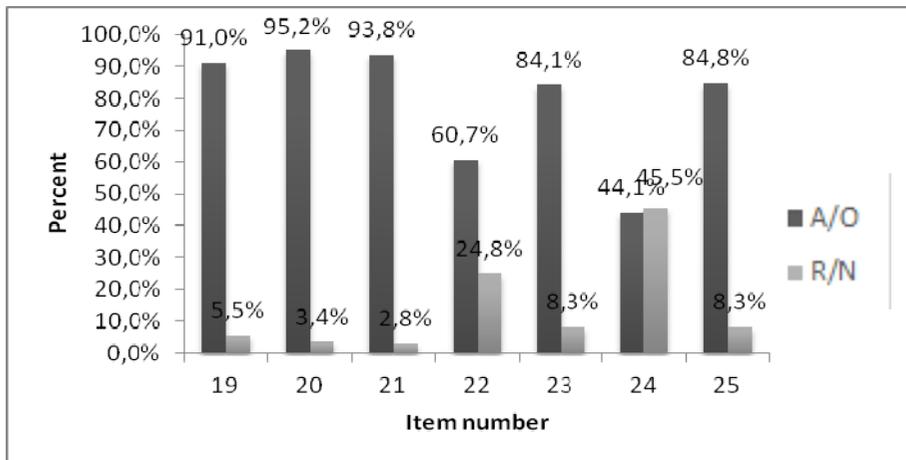


Figure 9. Technological dimension: Percentage of responses on the items associated to the design of learning ambiance

In the category of managing technology tools of this dimension, 84% utilized multimedia materials (item 28) and only 52% integrated communication tools in the course (item 27).

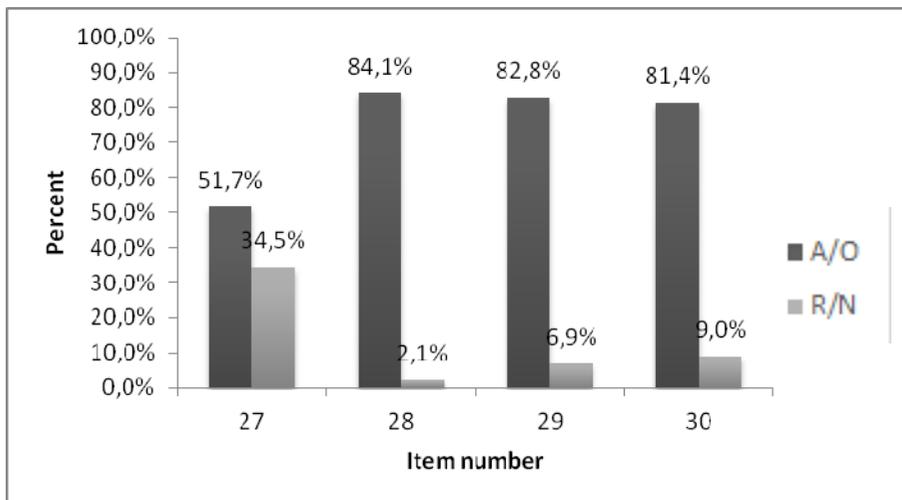


Figure 10. Technological dimension: Percentage of responses on the items associated to management of technology tools

In the category of communication aspects of the interpersonal dimension, 80% promoted asynchrony communication (item 33) and 86% gave their opinion regarding the quality of messages received from students enrolled (item 36).

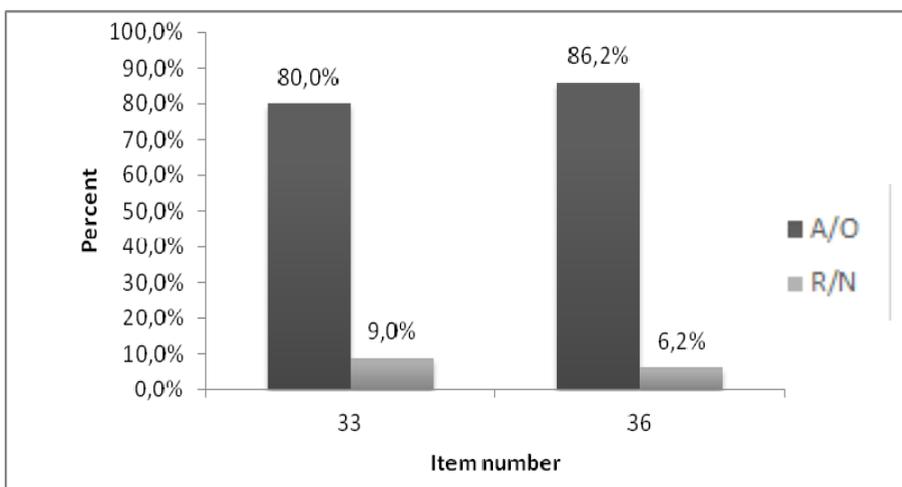


Figure 11. Interpersonal dimension: Percentage of responses on the items associated to communication aspects

In the category of social aspects of the interpersonal dimension, 94% promoted students' active participation (item 37) and 80% intentionally promoted social interaction (item 40).

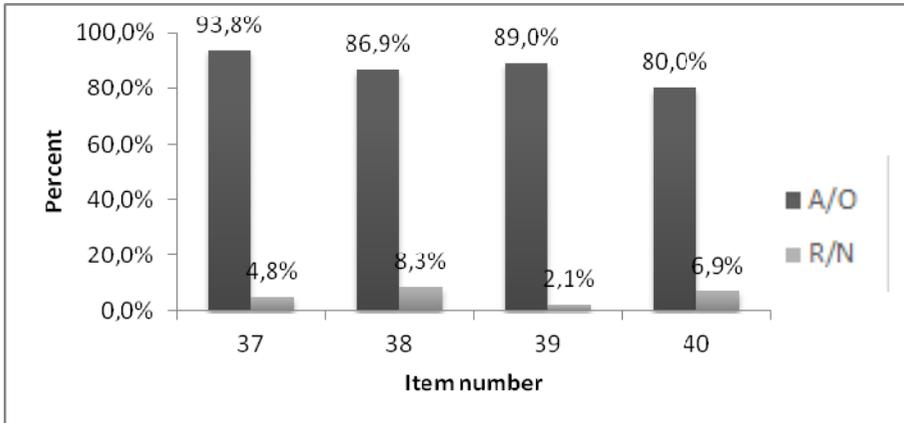


Figure 12. Interpersonal dimension: Percentage of responses on the items associated to social aspects

In the management dimension, 92% followed-up on students' participation (item 43), 95% utilized democratic leadership in managing the course (item 45), and 95% made decisions based on evaluation results (item 47).

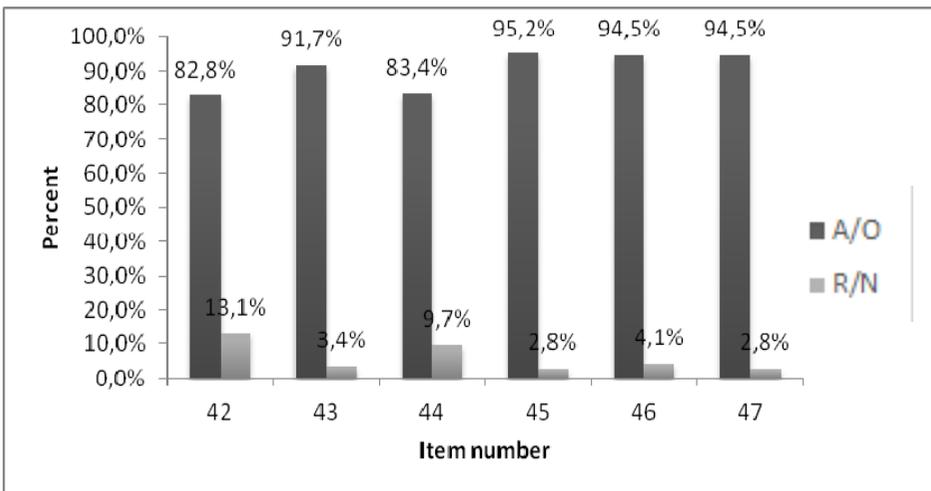


Figure 13. Management dimension: Percentage of responses on the items associated to managing the course

3.2 QUAL Results by Research Questions

3.2.1 Research Question 1 (QUAL): How do the participants describe their experience in the teaching of virtual courses in the four dimensions (pedagogical, technological, interpersonal and management) assessed through VTCQ: AC Open-Ended Questionnaire?

The qualitative dimension of the study was targeted at researching the object under study [virtual teaching competencies] from the voice of the participants through a set of four (4) open ended questions comprising Casanova (2014) questionnaire. Results of the data collected from the first 20 responses received are presented (see tables 4-7).

Tables 4 -7. Categories and sub-categories of competency profile of virtual professors by dimension:

Ruiz (2010) defines the Pedagogical Dimension as the capacity of virtual professors to academically design and manage virtual courses aligned with a particular learning theory and the didactic principles required to facilitate learning and the use of contents. This dimension includes instructional design and academic management of the course. Participants provided general information on their training experiences but more focused in technology than in pedagogy.

VTCQ: AC (Casanova, 2014): How do you describe your training in instructional design and the motivation strategies required of students registered in virtual courses?

Pedagogical Dimension: n=20			Results
Categories	Sub-category	f	
Instructional design	Need of more training	4	20% expressed needing training in instructional design
	Satisfaction with training received	4	20% expressed satisfaction with training received in instructional design and in facilitating students participation and support
Academic management of the course	Satisfaction with training received	2	10% expressed satisfaction with training received to manage virtual courses
Σ		10	50% provided information related to their experience with training on instructional design. No responses given as to motivation strategies to be used with virtual students.

Table 4. Pedagogic dimension: categories and sub-categories

Ruiz (2010) defines the Technological Dimension as the capacity of virtual professors to design and manage appropriate virtual learning environments with easy access to the LMS, easy navigation, participation, interaction and cooperation required to achieve proposed learning objectives with high levels of satisfaction of students and professors. This dimension includes management of the LMS and management of communication, navigation, content design and social interaction tools. Overall, in the Technological Dimension participants expressed satisfaction with the mastery of technological skills and with the use of technological tools.

VTCQ: AC (Casanova, 2014): How do you describe your experience with the Learning Management System (LMS) that you use to facilitate virtual courses? How do you qualify your mastery of its tools, including communication, content, navigation, and others? In which tools do you need more training?

Technological Dimension: n=20			Results
Categories	Sub-categories	<i>f</i>	
Management of LMS	Technological proficiency	2	Proficiency and mastery of most tools and functionalities of the LMS.
Communication, navigation, content design and social interaction tools	E-mailing and messenger	1	Proficient to facilitate communication
	Content design	2	Planning of courses and up-load of content and evaluation rubrics
	Practice	1	Need practice with tools
	Training	3	Need training with tools, content design and Web 2.0 tools
Σ		9	45% provided information related to their experience with the elements related to this dimension

Table 5. Technological dimension: categories and sub-categories of LMS and training

Ruiz (2010) defines the Interpersonal Dimension as the capacity of virtual professors to create appropriate psychological-affective & emotional supportive environments that promote social interaction and communication among the virtual community of learners; which avoid isolation of participants and foster group interaction based on a constructivist model. This dimension includes the management of synchronic and asynchronous communication and fostering social interaction based on ethical principles, participation and cooperation. The Interpersonal Dimension is aim at minimizing the time and space between professors and students in virtual education.

VTCQ: AC (Casanova, 2014): How do you utilize the communication tools to facilitate virtual courses? How do you promote collaborative work in your virtual courses? Please, provide examples.

Interpersonal Dimension: n=20			Results
Categories	Sub-categories	f	
Communication	Tools	5	Forums, wikis, virtual rooms such as Elluminate, Collaborate sessions, emailing, messenger, discussion forums, journals, blogs, Q&A forums
	Social interaction	3	<i>Consistent follow-up and support, clarification of assignments, rapport with students</i>
		Σ 8	40% provided information related to their experience with the elements related to this dimension

Table 6. Interpersonal dimension: categories and sub-categories of communication

Ruiz (2010) defines the Management Dimension as the capacity of virtual professors to manage the administrative and organization aspects of virtual teaching activity. This includes planning, organization, leadership, control and follow-up, evaluation of the quality of virtual teaching, and decision making relevant to virtual courses. In the Management Dimension participants did not provide information on elements related to evaluation, decision making and norms.

VTCQ: AC (Casanova, 2014): How do you use the calendar and the organization tools of your LMS to administer the virtual courses that you facilitate and the implementation of course activities?

Management Dimension: n=20			Results
Category	Sub-categories	f	
Organization of the course	Calendar	4	Tool used to organize the virtual course, administer assignments, establish and follow-up on due dates, help students manage time, move the group through the virtual environment of distance education.
		Σ 4	20% provided information related to their experience with the elements related to this dimension

Table 7. Management dimension: categories and sub-categories of organization of the course

3.3 MIXED Approach Results by Research Questions

3.3.1 Research Question 1 (MIXED APPROACH): What is the competency profile of professors engaged in virtual teaching in Puerto Rico in the four (4) dimensions assessed: pedagogical, technological, interpersonal, and management as shown by the triangulation and the complementary analysis of quantitative and qualitative results?

Tables 8-11. Complementary results of the competency profile of virtual professors in Puerto Rico by dimension where percentage of responses by item pertain to the sum of A = Always and O = Often given by the participants.

Puerto Rico virtual professors competency profile: *Pedagogical Dimension*

QUAN n=145			QUAL n=20	MIXED n=145
Item	<i>Instructional Design Excerpts</i>	% A/O	How do you describe your training in instructional design and the motivation strategies required for students registered in virtual courses?	
1	Use Pre & Post test	68%	20% expressed needing training in instructional design 20% expressed satisfaction with training received in instructional design	The complementary analysis of the QUAN & QUAL data points to a competency profile in the <i>instructional design</i> in which, from the quantitative approach: 93% used appropriate materials and formats; 90% incorporated summative evaluation; 88% took into account students' self-evaluation; 88% applied practical activities to consolidate learning; whereas from the qualitative approach, 20% was satisfied with training received; 20% expressed
2	Design instructional objectives based on learning types and cognitive level	82%		
3	Use appropriate course materials and formats	93%		
4	Acknowledgement of intellectual property of course materials	86%		
5	Apply practical activities to consolidate learning	88%		
6	Use summative evaluation with quantitative, qualitative, and mixed procedures	90%		
7	Take into account the self-evaluation of students in the evaluation process	88%		
8	Consider peer and self-evaluation of students in the evaluation process (co-evaluation)	78%		

Item	<i>Academic Management Excerpts</i>	%		needing training on this element.
9	Encourage interactive and collaborative learning strategies (projects, case studies, problem solving, simulations)	76%	20% expressed satisfaction in facilitating students participation and support	Data points to a competency profile in the <i>academic management element of the pedagogical dimension in which</i> , from the quantitative approach: 99% helped students overcome learning difficulties; 97% supported group motivation; 96% established the basis for the delivery of presentations and coursework; 95% reinforced previous content needed by students to succeed; and 92% used discussion forums; whereas from the qualitative approach, 20% expressed satisfaction in facilitating students participation and support. No specific responses were given by participants as to motivation strategies used with students on the QUAL responses accounted for; however, 97% said to support group motivation as shown in item 10 of
10	Support group motivation	97%	No specific responses were given as to motivation strategies used with students	
11	Use discussion forums	92%		
12	State the basis for presentations and delivery of course work (identification, type of document, size)	96%		
13	Reinforce previous content required by students	95%		
14	Introduce complementary information to deepen into subject matter	88%		
15	Help students overcome learning difficulties	99%		
16	Offer methodological recommendations on how to be organized for success	81%		
17	Stimulate students to reflect upon their practice to auto regulate learning	80%		
18	Use formative evaluation and provide feedback to students on their progress	86%		

				the QUAN dimension of the study.
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Table 8: Complementary results of the competency profile of virtual professors: Pedagogical dimension

Puerto Rico virtual professors competency profile: **Technological Dimension**

QUAN n=145			QUAL n=20	MIXED n=145
Item	<i>Design of the Learning Environment Excerpts</i>	% A/O	How do you describe your experience with the Learning Management System (LMS) that you use to facilitate virtual courses? How do you qualify your mastery of its tools, including communication, content, navigation, and others? In which tools you need more training?	
19	Structure the course in modules and or units based on topics and time schedule	91%	10% expressed proficiency and mastery of most tools and functionalities of the LMS; 10% in planning of the courses, upload of content and evaluation rubrics; and 5% in facilitating communication	The complementary analysis of the QUAN & QUAL data points to a competency profile in the <i>design of the learning environment</i> in which, from the quantitative approach: 91% structured the course in modules and/or units; 95% structured each module and/or unit of the course in the LMS interface; 94% published and discussed the instructional program on the LMS; 85% created general forums to address questions and difficulties of participants; and 84% generated spaces to facilitate participants' personal
20	Structure each module in the LMS interface based on labels (objectives, resources, activities, evaluation)	95%		
21	Publish and discuss the instructional program on the course LMS (calendar, course syllabus, other)	94%		
22	Create a forum to discuss news and periodically publish novelties about the dynamics of the course	61%		
23	Generate spaces to facilitate participants' personal introduction	84%		
24	Create a general forum to facilitate informal social interaction	44%		
25	Create a forum to address questions and difficulties of participants with course modules or offer assistance using email	85%		
26	Provide individual adaptations of programmed activities for students confronting difficulties	66%		

				introduction; whereas, from the qualitative approach, 10% said they were proficient in most tools and functionalities of the LMS; and 10% in planning courses and up-loading content and evaluation rubrics.
Item	Management of Tools Excerpts			
27	Integrate on-line communication tools (Skype, Messenger, other)	52%	15% expressed needing training with tools, content design and Web 2.0 and 5% need more practice	Data points to a competency profile in the <i>management of technological tools in which</i> , from the quantitative approach: 84% used multimedia materials permitted by law; 83% used Web 2.0 tools; and 81% used complementary applications to support the didactic design of the course; whereas, from the qualitative approach, 15% said they needed training and more practice with tools, content design and Web 2.0
28	Use of multimedia materials as permitted by law	84%		
29	Use of Web 2.0 tools to facilitate participation, interaction and cooperation (Blog, Wikis, YouTube, Podcast, Web quest, Facebook)	83%		
30	Use applications as complementary resources to support the didactic design of the course (Word processing, spreadsheets, other)	81%		
31	Use author ware tools to design digital content	70%		

Table 9: Complementary results of the competency profile of virtual professors: Technological dimension

Puerto Rico virtual professors competency profile: **Interpersonal Dimension**

QUAN n=145		QUAL n=20	MIXED n=145
Item	Communication Aspects Excerpts	% A/O	How do you utilize communication tools to facilitate virtual courses? How do you promote collaborative work in your virtual courses? Please, provide

			examples.	
32	Planning of intervention actions at different moments of the development of each module	78%	25% expressed using forums, virtual rooms (Elluminate, Collaborate sessions), emailing, messenger, discussion forums, journals, blogs, Q&A forums	The complementary analysis of the QUAN & QUAL data points to a competency profile in the <i>communication aspects of the interpersonal dimension</i> in which, from the quantitative approach: 86% conveyed their opinion on the quality of messages sent by participants; whereas, from the qualitative approach, 25% said they used forums, virtual rooms, emailing, messenger, discussion forums, journals, blogs and Q&A forums.
33	Facilitate asynchrony and multidirectional communication among participants through discussion forums, blog, wikis, social media, and others	72%		
34	Stimulate synchronic communication among participants using chats, videoconferencing, and others	72%		
35	Chair debates in forums and/or chats with responses targeted at provoking deep reflection of the theme under study	77%		
36	Convey opinion over the quality of messages sent by participants	86%		
Item	<i>Social Aspects Excerpts</i>			
37	Promote students' active participation on the learning activities planned	94%	15% expressed providing consistent follow-up and support, clarification of assignments, and rapport with students	Data points to a competency profile in the <i>social aspects in which</i> , from the quantitative approach: 94% promoted students' active participation on the learning activities planned; 89% promoted a culture of collaboration to incentivize the construction of social learning; 87% planned activities
38	Plan activities aimed at creating an affective climate conducive to productive human interaction	87%		
39	Promote a culture of collaboration and co-responsibility to incentivize the construction of social learning	89%		
40	Intentionally promote social interaction among participants to strengthen interpersonal relations and a sense of community	80%		

41	Stimulate students to participate in informal forums designed as such	78%		aimed at creating an affective climate conducive to productive human interaction, and 80% promoted social interaction to strengthen interpersonal relations and a sense of community; whereas, from the qualitative approach, 15% said they provided consistent follow-up and support, clarification of assignments, and rapport with students.
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Table 10: Complementary results of the competency profile of virtual professors: Interpersonal dimension

Puerto Rico virtual professors competency profile: **Management Dimension**

QUAN n=145			QUAL n=20	MIXED n=145
Item	Communication Aspects Excerpts	% A/O	How do you use the calendar and the organization tools of your LMS to administer the virtual courses that you facilitate and the implementation of course activities?	
42	Check the course registration and inscription process of participants	82%	20% expressed using tools to organize the virtual course, administer assignments, establish and follow-up on due dates, help students manage time, and move the group through the virtual	The complementary analysis of the QUAN & QUAL data points to a competency profile in the <i>management dimension</i> in which, from the quantitative approach: 95% conducted course evaluation and its components; 95% exercised democratic
43	Follow-up on students' participation in the activities planned for each learning module or unit and analyze learning of participants based on the sustained interaction.	92%		
44	Controlled debate discussions to focus students into the topic	83%		
45	Exercise democratic leadership as the facilitator	95%		

	of the course (promote participation, suggest ideas, provide support and self-discipline, constructive critique)		environment of education	leadership; 95% made decisions based on evaluation results to maintain continuous quality; 92% followed-up on students' participation in the activities planned for each learning module; whereas, from the qualitative approach, 20% said they used tools to organize the virtual course, established and followed-up on due dates, helped students manage time, and moved the group through the virtual environment of education.
46	Conduct course evaluation and its components	95%		
47	Make decisions based on evaluation results to maintain continuous quality.	95%		

Table 11: Complementary results of the competency profile of virtual professors: Management dimension

3.3.2 Research Question 2 (MIXED APPROACH): What are the dimensions in which virtual professors in Puerto Rico are in need of training as shown by the triangulation of quantitative and qualitative results and the complementary analysis of data?

Tables 12-14. Complementary results of the training needs of virtual professors in Puerto Rico by dimension where percentage of responses by item pertain to the sum of A = Always and O = Often given by the participants. All percentages 79 and below were considered as areas to reinforce through training and the continuous support of the faculty by Institutions of Higher Education. QUAL results are also presented.

Puerto Rico virtual professors competency profile: *Pedagogical Dimension*

QUAN n=145			QUAL n=20	MIXED n=145
Item	<i>Instructional Design Excerpts</i>	% A/O	How do you describe your training in instructional design and the motivation strategies required for students registered in virtual courses?	
1	Use Pre & Post test	68%	20% expressed	The complementary

8	Consider peer and self-evaluation of students in the evaluation process (co-evaluation)	78%	needing training in instructional design	analysis of the QUAN & QUAL data points to a competency profile in <i>instructional design</i> in which, from the quantitative approach of the study, training is suggested in: the integration of pre and post testing in virtual teaching (item 1); and in co-evaluation (item 8); whereas, from the qualitative approach, training in instructional design was voiced by participants (20%).
Item	<i>Academic Management Excerpts</i>	%		
9	Encourage interactive and collaborative learning strategies (projects, case studies, problem solving, simulations)	76%	20% expressed satisfaction in facilitating students participation and support No specific responses were given as to motivation strategies used with students	Data points to a competency profile in the <i>academic management element of the pedagogical dimension</i> in which, from the quantitative approach of the study, training is suggested in: The use of interactive and collaborative learning strategies such as projects, case studies, problem solving, and simulations; whereas, from the qualitative

				<p>approach, no motivation strategies are suggested as no specific responses were given by participants as to this topic; notwithstanding that, 97% said to support group motivation as shown in item 10 of the QUAN dimension of the study.</p>
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Table 12: Elements identified in need of training as shown by the complementary analysis of data: Pedagogical dimension

Puerto Rico virtual professors competency profile: **Technological Dimension**

QUAN n=145		QUAL n=20	MIXED n=145
Item	<i>Design of the Learning Environment Excerpts</i>	% A/O	How do you describe your experience with the Learning Management System (LMS) that you use to facilitate virtual courses? How do you qualify your mastery of its tools, including communication, content, navigation, and others? In which tools you need more training?
22	Create a forum to discuss news and periodically publish novelties about the dynamics of the course	61%	<p>The complementary analysis of the QUAN & QUAL data points to a competency profile in <i>design of the learning environment</i> in which, from the quantitative approach of the study, training is suggested in: the use of forums (items 22 and 24) and in the individual adaptation of activities to support students confronting difficulties (item</p>
24	Create a general forum to facilitate informal social interaction	44%	
26	Provide individual adaptations of programmed activities for students confronting difficulties	66%	

				26); whereas, from the qualitative approach, training in the design of the learning environment was not voiced by the participants.
Item	Management of Tools Excerpts	%		
27	Integrate on-line communication tools (Skype, Messenger, other)	51%	15% expressed needing training with tools, content design and Web 2.0 and 5% need more practice	Data points to a competency profile in the <i>management of tools</i> in which, from the quantitative approach of the study, training is suggested in: The integration of on-line communication tools such as Skype and Messenger (item 27) and in the use of author ware tools to design digital content (item 31); whereas, from the qualitative approach, training in content design and Web 2.0 tools was voiced by participants (15%).
31	Use author ware tools to design digital content	70%		

Table 13: Elements identified in need of training as shown by the complementary analysis of data: Technological dimension

Puerto Rico virtual professors competency profile: **Interpersonal Dimension**

QUAN n=145		QUAL n=20	MIXED n=145
Item	Communication Aspects Excerpts	% A/O	How do you utilize the communication tools to facilitate virtual courses? How do you promote collaborative work in your virtual courses? Please, provide examples.

32	Planning of intervention actions at different moments of the development of each module	78%		The complementary analysis of the QUAN & QUAL data points to a competency profile in communication aspects in which, from the quantitative approach of the study, training is suggested in: planning of intervention actions at different moments of the development of each module (item 32); facilitating asynchrony and multidirectional communication (item 33); the use of chats and videoconferencing (item 34); and provoking deep reflection of the topic under study through debates (item 35); notwithstanding that training needs were not voiced by the participants.
33	Facilitate asynchrony and multidirectional communication among participants through discussion forums, blog, wikis, social media, and others	72%		
34	Stimulate synchronic communication among participants using chats, videoconferencing, and others	72%		
35	Chair debates in forums and/or chats with responses targeted at provoking deep reflection of the theme under study	77%		
Item	<i>Social Aspects Excerpts</i>			
41	Stimulate students to participate in informal forums	78%	15% expressed providing consistent follow-up and support, clarification of assignments, and rapport with students	Data points to a competency profile in the <i>social aspects of the dimension</i> in which, from the quantitative approach of the study, training is suggested in: Stimulating students to participate in

				informal forums; whereas, from the qualitative approach, training in social aspects was not voiced by participants (15%).
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Table 14: Elements identified in need of training as shown by the complementary analysis of data: Interpersonal dimension

As shown in table 15 no elements of the communication aspects of the management dimension were identified by the participants in need of training.

Puerto Rico virtual professors competency profile: **Management Dimension**

QUAN n=145			QUAL n=20	MIXED n=145
Item	<i>Communication Aspects Excerpts</i>	% A/O	How do you use the calendar and the organization tools of your LMS to administer the virtual courses that you facilitate and the implementation of course activities?	
42	Check the course registration and inscription process of participants	82%	20% expressed using tools to organize the virtual course, administrate assignments, establish and follow-up on due dates, help students manage time, and move the group through the environment of virtual education.	The complementary analysis of the QUAN & QUAL data points to a competency profile in <i>communication aspects of the management dimension</i> showing no training needs identified neither from the quantitative nor from the qualitative results of the study.
43	Follow-up on students' participation in the activities planned for each learning module or unit and analyze learning of participants based on the sustained interaction.	92%		
44	Controlled debate discussions to focus students into the topic	83%		
45	Exercise democratic leadership as the facilitator of the course (promote participation, suggest ideas, provide support and self-discipline, constructive critique)	95%		
46	Conduct course evaluation and its components	95%		
47	Make decisions based on evaluation results to maintain continuous quality.	95%		

Table 15: No elements identified in need of training as shown by the complementary analysis of data: Management dimension

4. Discussion and Conclusions

The literature reviewed on distance education is robust; however, most research conducted in Puerto Rico and abroad focuses on satisfaction, perception, knowledge, and the development of the modality (Abel, 2005a, 2005b, Bonilla, 2009, Conceicao, 2006, Galvis, 2007, García, 2006, García, Ruiz & Domínguez, 2008, Gaytán, 2006, 2007a, 2007b, 2008, 2009, Henderson & Chapman, 2007, Holstead, Spradlin & Plucker, 2008, Lan, 2007, Martínez, 2003, Meléndez, 1998, 2010, Rama, 2010, Rama & Pardo, 2010, Smith & Mitry, 2008, Tebes, 2003, Zawacki-Richter, 2009).

Our study was framed upon a constructivist humanistic model in which learners achieve an identity and a sense of belonging, not only the development of information skills (Wenger, 1998). It calls for active participation in the learning process by fostering the creation of social communities of learners, consistent with Senge's (2006) learning community's principle. According to Mayers (2001), the instructor is a facilitator of the learning process, who is respectful of the autonomy of learners in an environment which is independent in nature. The most critical issue of this education revolution is the role of the facilitator who loses autonomy and must become a member of the team (O'Neil, 2006). In the constructivist model, the facilitator is called to be conscious of the autonomy of learners, be an expert in the subject matter he/she teaches, recognize learners' ideas, respect individual differences among learners, be knowledgeable of the prior content learners must master to be able to construct new learning, master the technological and communication skills required to successfully facilitate distance education, develop the course upon premises that are student-centered, foster students self-learning and responsibility, promote a collaborative and interactive learning environment, and offer needed feedback (O'Neil, 2006). O'Neil (2006) also states that this framework calls for learners who maintain continuous interaction with the facilitator and peers, develop the skills required for independent study, are problem solver centered, engage in research and reflection, are informed about technology and are continuous learners. There are six types of interactions called by the constructivist model in virtual education: learner-facilitator, learner-content, learner-learner, learner-services, learner-interface (LMS), and learner-administration. The American Association of Colleges for Teacher Education (AACTE) affirmed in 2008 that the Technological, Pedagogical, Content Knowledge (TPCK) Model (Shulman, 1987, 1986) is the basis for teaching with technology. TPCK has three (3) key knowledge components: Content, Pedagogy and Technology. The comprehension of the didactic content of technology emerges from the dynamic interaction of content, pedagogy and technology. In the 2007 proceedings of the Society for Information Technology & Teacher Education International Conference

published by the Association for the Advancement of Computing in Education (AACE) Mishra and Koehler (2007) emphasized teachers as curriculum designers within the TPACK Model.

The Virtual Teacher Competence Scale developed by Ruiz (2010), adapted in Puerto Rico by the researchers, is used to assess the competencies required of faculty engaged in virtual teaching on four dimensions: *pedagogical*, *technological*, *interpersonal* and *managerial*. This valid and reliable instrument is consistent with the constructivist framework of our research with one of its main targets aimed at studying the competence profile of faculty facilitating virtual education courses in Puerto Rico.

There is a variety of research performed on the functions and perceptions of professors engage in virtual education (Henderson & Chapman, 2010, Herrera, Mendoza & Buenabad, 2009, Huertas, 2003, Jamison, 2007, Lewis, 2007, Mayes, 2001, Omen-Early & Murphy, 2009, O'Neil, 2006, Ruiz, 2010, Ulmer, Watson & Derby, 2007, UNESCO, 2008) pointing at the characteristics, skills and competencies that the authors proposed regarding virtual teaching.

What follow is the discussion and the conclusions of our research from the empirical stand point of our mixed methodology. The results obtained bring into the picture an empirical profile of professors teaching virtual courses in Puerto Rico (n =145) organized under the four dimensions established by empirical work by Ruiz (2010) about the object of study, and aligned with his definition of each dimension and its corresponding elements and consistent with the constructivist-humanistic model that framed our research. Complementary results of the competency profile of virtual professors in Puerto Rico by dimension is presented in percentage of responses to each item composed of the sum of A = Always and O = Often given by the participants in the COMDOVIR scale adapted to Puerto Rico and the responses provided on the qualitative instrument developed as part of the study (*VTCQ: AC*).

In the Pedagogical Dimension, the instructional design category results reflect a constructivist-humanistic approach to teaching consistent with Wenger's (1998) identity and sense of belonging, Senge's (2006) learning communities principle, Mayers' (2001) instructor as facilitator, and O'Neil's (2006) view of the professor as a member of the team. Casanova and Vega (2014) study showed that of the sample surveyed 93% use appropriate materials and formats; 90% incorporate summative evaluation; 88% take into account students' self-evaluation; 88% apply practical activities to consolidate learning; 20% expressed satisfaction with training received; whereas, another 20% expressed they needed training on instructional design. The qualitative results call higher education institutions to revise and reinforce their training programs and institutional capacity building to support distance education quality. *The Pedagogical Dimension, academic management* category, also

reflects pedagogy that is consistent with Shulman's (1987, 1986) Technological, Pedagogical, and Content Knowledge (TPCK) Model. This is shown by the following results of the study in which 99% help students overcome learning difficulties; 97% support group motivation; 96% establish the basis for the delivery of presentations and coursework; 95% reinforce previous content needed by students to succeed; and 92% use discussion forums. From the qualitative approach, 20% expressed satisfaction in facilitating student's participation and support.

In the Technological Dimension, design of the learning environment category, results evidence consistency with the parameters set forth by the Technology Knowledge and the Content Knowledge of Technology established by the TPCK Model. Of the sample surveyed; 91% structure the course in modules and/or units; 95% structure each module and/or unit of the course in the LMS interface; 94% publish and discuss the instructional program on the LMS; 85% create general forums to address question and difficulties of participants; and 84% generate spaces to facilitate participants' personal introduction. From the qualitative approach of the study, 10% said they are proficient in most tools and functionalities of the LMS; and 10% are planning courses and up-loading content and evaluation rubrics. In the Technological Dimension, management of tools category, 84% use multimedia materials permitted by law; 83% use Web 2.0 tools; and 81% use complementary applications to support the didactic design of the course; whereas from the qualitative approach, 15% said they needed training and more practice with tools, content design and Web 2.0. The voice of the participants must be heard by HEI's to provide training and development, not only on the knowledge of technology, but moreover on the use of the didactic content of technology in distance education.

In the Interpersonal Dimension, the communication and social aspects category results are consistent with O'Neil's (2006) framework that calls facilitators to recognize learners' ideas, respect individual differences, have the communication skills required to successfully facilitate distance education, develop the course upon premises that are student-centered, foster students self-learning and responsibility, promote a collaborative and interactive learning environment, and offer needed feedback. The results of the communication aspects showed that 86% convey their opinion on the quality of messages sent by participants. From the qualitative approach, 25% said using forums, virtual rooms, emailing, messenger, discussion forums, journals, blogs and Q&A forums. In the social aspects category, 94% promote students' active participation on the learning activities planned; 89% promote a culture of collaboration to incentivize the construction of social learning; 87% plan activities aimed at creating an affective climate conducive to productive human interaction, and 80% promote social interaction to strengthen interpersonal relations and a sense of community; whereas from

the qualitative approach, 15% said to provide consistent follow-up and support, clarification of assignments, and rapport with students.

In the Management Dimension-communication aspects 95% conduct course evaluation and its components; 95% exercise democratic leadership; 95% make decisions based on evaluation results to maintain continuous quality; 92% follow-up on students' participation in the activities planned for each learning module; whereas from the qualitative approach, 20% said using tools to organize the virtual course, establish and follow-up on due dates, help students manage time, and move the group through the virtual environment of education. These results are aligned with the six types of interactions called by constructivist models in distance education: learner-facilitator, learner-content, learner-learner, learner-services, learner-interface (LMS), and learner-administration.

To conclude, we can state that Puerto Rico Higher Education Institutions (HEI's) have: a) a quantitative instrument that is valid and reliable ($n=10$ in the pilot with $\alpha=.992$; and $n=145$ in the second administration $\alpha=.959$) to assess the profile of faculty teaching virtual courses (Ruiz, 2010, adapted by Casanova (2014) and her mentor; b) a qualitative instrument that is valid and reliable created by Casanova (2014) and her mentor to assess the profile of faculty teaching virtual courses in Puerto Rico from the voice of the participants using open-ended questions that are based on the four dimensions established by Ruiz (2010); c) an empirical profile of 145 professors who belong to the Puerto Rican Distance Education Association (APAD for its Spanish acronym) based on the four dimensions of the quantitative instrument adapted to Puerto Rico: pedagogical, technological, interpersonal and management and the qualitative instrument developed by the researchers; d) a set of areas in which participants stated needing training: instructional design, collaborative work in the virtual room, motivation strategies, communication tools, assessment strategies as pre/post testing, and Web 2.0 tools; e) the bases for the revision and/or creation of Faculty Training and Development Models for faculty engage in virtual education; f) the foundations for more research on the topic, especially of cross-cultural studies; g) empirical evidence that support the premise that virtual education is not a replica of traditional education.

The researchers will continue to investigate the object of study. Most salient research topics are: assessment of learning in virtual education; the profile of virtual professors as it relates to regional accreditation criteria; relation between the profile of virtual professors and state licensing requirements; and, the cross-cultural replication of the study. The constructivist approach to teaching and learning in virtual education calls Institutions of Higher Education (IHE's) to review their Mission, Vision and Strategic Plans to assert distance education as a multifaceted priority.

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Tutoring in Distance Education: New Proposals, Challenges and Reflections

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Abstract: Distance Education has expanded in the world, due to the democratization of knowledge mediated by technologies for accessing different levels of education. Online and classroom tutoring systems have been a source of research and discussion on redefining roles in distance education. It's understood that the role of the tutor must be intrinsically linked to the political-pedagogical project of the course, regardless of their nature: graduation, specialization, etc. The mentoring held in the fifth Specialization Course in Distance and Continuing Education (University of Brasilia, Brazil) had its assumptions and guidelines, grounded in the CTAR-Community Work and Learning Network, which advocates a proactive tutoring, with engaging and emancipatory character, valuing collaborative knowledge construction. It was essential to ensure the basic and continuing training of selected tutors to favor the formation of networks in the realization of the activities and actions that promote learning. With this perspective, mentoring can take an active, collaborative and intervening role as the knowledge mediation, employing strategies and facilitating technological resources. It was important to consider in the formation of selected tutors and the tutoring supervision of the course, the articulated monitoring of the team, encouraging a coordinated and concerted action of the various actors of the course, specifically, the general coordination, tutoring coordinator, the classroom tutor and pedagogical assistant, seeking to prevent evasion. Knowing the profile of the participants and their difficulties, it is possible to act in a preventive manner, anticipating assistance, encouraging the participation in discussions and diversifying strategies and technological resources to respond to the various identified needs and motivate their permanence on course. We emphasize that this tutoring proposal is a pioneer to the extent that the tutor is part of a team responsible for the course, where he is a specialized teacher and well aware of his role in developing a quality in Distance Education.

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1. Introduction

The expansion of Distance Education (*Educação a Distância*, EaD) in educational context has been discussed constantly, both on the global and national scenario, it is used as an important alternative in terms of the democratization of education and access to higher education. Its trajectory was structured as a process of human education and its perspective assumes different sides on the development and diffusion of technologies, subsidized by today's educational trends and paradigms.

In that way, it is observed that the training of teachers and other professionals (health, environment, law, etc.) are qualified with the development of curriculum proposal with planned activities considering the personal dimension, as parameter for assessing for its offer, which are interconnected to the structuring of the contents, as well as its dynamics which establishes the principle, fostering interactivity and use of technologies.

Technology is an essential tool for mediating the process of teaching and distance learning, which has the teacher as one of the most important factor to push this process forward. It is recognized, also, the importance of the organization of educational activities, that is why the appreciation of planning, in order to greatly enhance the quality of the teaching-learning process, and the proper use of the *Ambiente Virtual de Aprendizagem* (AVA) - Virtual Learning Environment tools to promote the steady integration of the contents, the selected materials, technological resources, the pedagogical mediation and student learning. Aspects emphasized by Silva, Andrade e Silva (2011) reveal the importance of teacher-student triad and objects of knowledge, and the tutor as an essential protagonist in this mediation.

For this reason, the coaching systems at distance and face-to-face have been a source of constant discussions, research and reflections on redefinitions of roles and functions in EaD - distance education. In fact, the role of tutor must be intrinsically linked to the political-pedagogical project of the course, regardless of their nature: graduation, specialization, masters or doctorate.

From this perspective, the tutoring of the fifth *Curso de Educação Continuada e a Distância*, presented here, has a history of regular offerings on the *Faculdade de Educação of the Universidade de Brasília* (FE/UnB) in post-graduation level *lato sensu* - Specialization, the fifth edition offered in partnership with the *Universidade Aberta do Brasil* -UAB/CAPES/MEC (Open University of Brasil, Coordenação de Aperfeiçoamento de Pessoal de Ensino

Superior/Staff Development Coordination of Higher Education, Ministério da Educação/Ministry of Education), it is up to the UnB, as a Federal Institution, to make the certification of approved destined to the education of tutors of the UAB/UnB and the CEFET/PA (*Centro de Ensino Tecnológico Federal do Pará* – Pará’s Federal Technological Education Center) to work at EaD.

To understand the concept of mentoring adopted in the fifth *Curso de Educação Continuada e a Distância* it is important to resume the path of previous offerings of the course that contributed to the solidification of the concept of EaD assumed by the actors of that course, acknowledged by the *Comunidade de Trabalho e Aprendizagem em Rede* – CTAR, which will be commented further on. The requirement of a formal statement and commitment to support the participation of course participants over the course by the home institutions, was a requirement of the course, as well as presenting a distance education pre-project that focused on the institutional development in the area and conclusion work.

The first edition took place in 1994 with the *Consórcio Interuniversitário de Educação Continuada e a Distância* (BRASILEAD) - Inter-University Consortium for Distance and Continuing Education. Its constitution included partnerships with leading International and National Educational Institutions, among them the Université de Poitiers, Universidad Nacional de Educación a Distancia (UNED), Simon Fraser University, University Virtual Latinoamericana (UVLA), *Secretaria de Educação a Distância* (SEED/MEC) - Department of Distance Education and UAB which were maintained in the new offerings. Directed to the State Coordinators of the program of *Formação Continuada de Professores do Ensino Fundamental* called “*Um Salto para o Futuro*”-SEED/MEC (Department of Distance Education, Ministry of Education).

The second *Curso de Especialização em Educação Continuada e a Distância* - Specialization Course in Distance and Continuing Education offered from 1997 to 1999, it was destined to the education of professionals of the IES (*Instituições de Ensino Superior*) - Higher Education Institutions, consortium members of BRASILEAD, it had the support of SEED/MEC and embassies for involvement of teachers from the Universidad Nacional de Educación a Distancia -UNED, Spain, Universidade Aberta de Portugal, Portugal, and the University Simon Fraser University, Canada and UVLA.

The third course was offered from 1999 to 2000, with funding from SEED/ MEC and support 33 public universities, and private Brazilian Community on formal statement and support to course participants. With the support of the mentioned universities and especially of Simon Fraser University, from Canada which allowed the translation and the use of virtual learning environment Virtual University (V.U) It was directed to the professionals of the distance education of IES, consortium members of BRASILEAD, of the SEED/MEC, of the Departments of State and Municipal

Education, government entities, companies, social movements and non-governmental organizations (CTAR, 2009).

The fourth *Curso de Especialização em Educação Continuada e a Distância*, offered between 2008 and 2010, was supported and responded to teachers from the UAB/CAPES/MEC in the development of disciplines of the distance education courses and MEC organs (SEED and CAPES), which indicated and supported the participation of participants and their institutional projects at the conclusion of the course.

It is important to mention that in the first four editions of the course, the professor (author and supervisor of the discipline) catalyzed participation as tutor both at a distance and classroom, conducting the mediation directly next to the participants. Thus, the insertion of the tutor on the course was gradually being shaped and configured, from the accumulated experience, both pedagogical as technological and were consolidated in fifth *Curso de Educação Continuada e a Distância* with new prospects of distance education.

The purpose of this reflection is facing three moments: (a) the design of CTAR group on *Educação a Distância* (EaD) - Distance Education, extended to the education of the staff of tutors, ensuring the theoretical and practical articulation. Thus, briefly presents the trajectory of the course, the pedagogical action and the description of the activities: (b) the design tutor and underlying tutoring, describing how has happened the formation of this group for the fifth *Curso de Especialização em Educação Continuada e a Distância*, in 2010-2011, in accordance with the proposal of the *Universidade Aberta do Brasil* (UAB); (c) the expansion of the discussion in the virtual environment and activity coordination of the course, interfaced with the classroom tutoring, the work of the pedagogical assistant, integrating the didactic and pedagogical interfaces and content, involving tutors and teachers authors in order to foster the quality of teaching and learning process.

2. Description of Experimental Course: *The Fifth Curso e a Perspectiva da Comunidade de Trabalho e Aprendizagem em Rede* (CTAR)

Understand The fifth *Curso de Educação Continuada e a Distância*, began in 2010 with the purpose of certifying as EaD experts the teachers and tutors of the UAB, servants of CEFET/PA, entities of MEC to work in the disciplines offered in graduation courses of UAB at UnB. The course was organized in 420 hours, focused on continuing education, developed online in the *Ambiente Virtual de Aprendizagem Moodle*, distributed in ten (10) teaching modules added the presentation of *Trabalho de Conclusão de Curso* (TCC) - Work of Course Conclusion. The modules have taken a theoretical and practical character, covering the entire body of study directed to the formation of a specialist in Distance and Continuing Education, using diverse

strategies (forums, virtual workshops, classroom meetings, web conferencing, etc.) and other AVA tools. The objective was to provide for the participants a variety of enablers resources of educational practices, in hybrid teaching systems, using the Moodle platform as integrative media.

The pedagogical project of the fifth *Curso de Especialização em Educação Continuada e a Distância* made possible to rescue the theoretical principles that support the *Comunidade de Trabalho e Aprendizagem em Rede* (CTAR, 2010) that were reflected in the practice of mentoring, involving the following factors: coordination, mentoring coordinator, classroom tutor and pedagogical assistant, who were constituted as a working group to develop activities together and articulated with the tutors and author teachers, under the supervision of the general coordination of the course. The unified actions were aimed at identifying the different strategies that enabled the pedagogical development, their essential routines and interfaces to the learning process in AVA, a dynamic and articulated interaction as shown in Figure 1 below (CTAR, 2006).

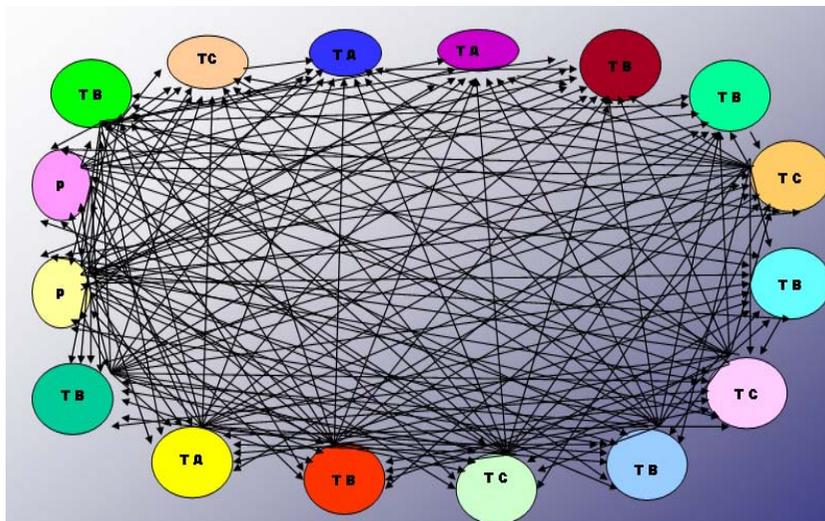


Figure 1. Interaction between People-P=Teacher; TA, TB, TC=Tutor of Groups A, B, C.

It is indisputable the contribution of technology and media, without which it would not be possible to perform a distance education, in other words, the educational process beyond the limits of the school's physical space. However, this relationship has not been established historically as dependent or subordinated to the means. At the origins of the modern EaD (if not considering the old forms of written correspondence between teachers and students), technological condition was always associated with two main objectives: an alternative education, by overcoming geographic, spatial and temporal limitations and the democratization of education, as a public asset,

allowing the inclusion of socially marginalized portions of the education system in its conventional form. These principles remain fully valid in the present scenario of the new technologies of information and communication. Similarly, the technical characteristics, the combination and convergence of languages and the means mean the ability to expand and deepen many of the essential aspects of teaching and learning process, but it can not be seen as paradigms imposed by the inherent nature of technologies (*Grupo CTAR*, 2006).

To place this proposal in view of this diverse experience, it is primarily characterized the performance of each subject of this experience (tutor, tutoring coordination, the pedagogical assistant and classroom tutor) and in order to spread the teaching practices, the concept of CTAR as highlighted by Souza, Fiorentini and Rodrigues (2010), developed for about fifteen years ago by a pioneering group of professors from the *Faculdade de Educação da Universidade de Brasília* (FE/UnB) - Faculty of Education at the University of Brasilia. This group claims that it is possible, with the support of the new *Tecnologias da Informação e da Comunicação* (TIC) - Information Technology and Communication to build an education that breaks with the stigmatized view of distance education, promoted by traditional models, which favored the transmission of information and individual learning at the expense of collective and cooperative construction of knowledge.

Since this is a consolidated experience it is recognized the importance to think about the educational activities, experiences throughout the development of the course modules to retake the guidelines and fundamental pedagogical principles of CTAR and especially the practice of tutors and staff which composed the coordination. An experience that, like other initiatives, has contributed to a conception of distance education and open university, which aims to consolidate the principles and practices of quality education, a commitment that should be considered inalienable to a public university.

3. Tutoring in *Fifth Course* and the Pedagogical Proposal into Action: Theoretical and Practical Foundations

The appropriation of new technological languages in the educational process comes to destabilize (or disrupt) the essentially classroom school model, requalifying it on the new possibilities of access to education Politics, aesthetics and culture are regrouping in the face of social change, triggered by new communication technologies, the social networks and informational systems. Therefore, it is essential, to review the impact regarding the many forms of learning and teaching, and in parallel, identify how educational institutions, at all levels, are dealing with the new scenario of a globalized society and quick technological changes.

A working community and network learning (Pontes & CTAR, 2010), in the conception of CTAR group of the *Faculdade de Educação* (FE/UnB) is based on essential assumptions, revealing a different proposal on the EaD: (1) the belief that a technological education can be based on dialogue, as opposed to mere vertical and asymmetrical transmission of content and knowledge; (2) the cooperative and collaborative action between the subjects should prevail over the individual competition; (3) learning should value the reflective work, rather than the simple accumulation of information; (4) network communication should turn to the coexistence, rather than lead to isolation and individualism; (5) and finally the affirmation of a distance education directed to a transforming action, rather than merely reproductive activity of knowledge without commitment to change the reality of students. Image 2, below, expresses the guiding principles and the dynamics undertaken at CTAR (2006).

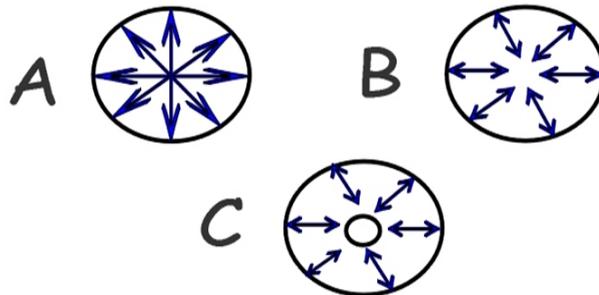


Figure 2. Community Work and Learning Network

Note. Explication Figure 2: Self-organization of group / (A) Role teacher/tutor=directive intervention / (B) Open education supported by the Pedagogy of Autonomy / (C) Exerted the Community Work and Learning Network - People'knowleged

The CTAR at the *Faculdade de Educação* (FE/UnB), would only be possible in a context marked by TIC, such as the current one. This circumstance, however, represented only the necessary background for teaching values and varied teaching experiences that led to the search of the possibilities of a technological education based on different practices of those who began to impose the market logic that looks at education, especially as an attractive and profitable commercial product. So CTAR adopted as a principle and guideline to claim that another distance education, it is possible.

It is essential to emphasize that the purpose of this study is not to indicate models, but to present experiences in order to promote reflections that can transform the mentoring process into effective action that leverages the EaD, opposing the prospect of mere transfer of information and static

knowledge for collaborative construction action of networked knowledge. Ensuring this principle, the fifth *Curso* was built and developed aiming at continued education of professionals working at EaD/UAB all over the country. Embracing managers, tutors (classroom and at distance), polo coordinators, teachers, supervisors, in short, everyone involved in the UAB network.

It is essential to recognize that at growing demand for distance learning courses, the training of professionals becomes a quality element, as emphasized by Pereira and Moraes (2010). Becoming a challenge, since most teachers, tutors and the students themselves come from a classroom experience, tending to repeat the model in the online method.

Faced with this prospect, the team of professionals of the fifth *Curso* (general coordination, mentoring coordination, the pedagogical assistant and classroom tutor, and the teachers authors) took the proposal to overcome the simple tutor education and embrace a paradigm of developing skills, abilities in theoretical and practical perspective as a foundation for learning, TIC-mediated, with the axis of the pedagogical action quality. In this light, the interactivity, interlocution and dialogicity were the basis for the construction of knowledge in an integrated and challenging way.

4. Selection, Initial and Continuing Training of Tutors: Principles and Strategies

Tutoring and their dynamics in the fifth *Curso* were sources of fruitful discussions, constructive evaluations by the team of professionals of the course, involving the initial training of tutors, the continuity in the development of the course and at the conclusion of each teaching module. It was discussions that were based on axial issues that posed: what's the conception of CTAR proposes for tutoring? how to ensure the effectiveness of the tutoring action to promote learning? what sets a mentoring proposal proactive and collaborative?

For the selection of tutors was defined by the team of teachers and coordinators of the course that the selected participants would accompany all of the course modules and that, to do so, they would have to do the training before the starting of the course and during the course as well. Therefore a survey was carried out of the characteristics and skills needed to perform the job considering that, according to the teachers authors who compose the CTAR, were essential to the activity of mentoring and developing their teaching modules.

These elements were formed, when organized, in an initial questionnaire that was made available at the UAB page, for those professionals who were interested in joining the tutor group. The questionnaire aimed to gather preliminary information on: (a) academic

training: graduation, graduate degree, specialization, master's and doctoral degrees; (b) professional experience: teaching, experience in distance education (EaD) and UAB, beyond the conception of distance education, and other relevant educational experiences; (c) employment and management of media materials and production of teaching-learning material: *Moodle* or other e-learning platform, experience with web conferencing, preparation of web pages, production of written or digital materials, and materials for EaD; and (d) availability and expectations, as 20 hours a week for meetings, planning, monitoring and supervising activities on the platform, besides the expectations in the action of tutoring. Also, it was required to present a resume with work experience, such as information that would allow a selection of experienced tutors.

This set of information was essential to the first screening of candidates for tutoring, with eliminatory requirement the demand that everyone should live in the *Distrito Federal*, in the proximity of the *Universidade de Brasília – UnB*, where you found the physical structure and personnel of the course. Although the tutors were distant (online), the dynamics of the course provided systematic classroom meetings of the tutor with the coordinating team, with the teachers authors of the modules associated with the preparation of materials, the pedagogical discussions with the staff of technological support and also the participation of the tutor in other course activities such web conferencing and physical meetings of teachers and support staff with the participants.

According to the modulation adopted by the course of 35 students per class, six tutors were selected, as were 200 places available for the course. However, predicting and anticipating adverse conditions such as problems to take over the tutoring, tutor dropout during the course among others, we chose to select six other tutors. This implied to hold a training involving 12 pre-selected tutors, this period was also an important time to collect data and analyze the action of each one, in the training process. New criteria were adopted for the final selection in which six tutors were selected that would act immediately in the course and 6 for the backup register with the commitment of all participate in the training, with effective involvement in their scheduled activities.

In the CTAR proposal, the formation of the distance tutor lasted 40 hours of theoretical and practical activities, planned in a way that corresponds to the concept adopted by the course, requiring a differentiated mentoring to ensure the educational objectives of the course. Leal (2005) lists aspects that permeate the tutor's action, as the concern and investment in technical knowledge, pedagogical, didactic and contextual to the formation of the student, marked in collaborative action, critical-reflexive, that allow students to develop and employ scientific knowledge and expertise in various educational settings. Finally, provide a didactic conversation that can

stimulate thought, freedom of thought, the flow of ideas and the confrontation of epistemological positions. Having as reference these conceptions in the formation, the following strategies of mentoring were implemented in the course:

1. Monitoring of the teaching-learning process, from the first module to the second last (IX module) with the same group of students, to allow better student-tutor integration, avoiding pedagogical relationship breaks and virtual interaction, then seeking the mainstreaming of contents and integration of the axes of the course;
2. Facilitation of the transition of a module to another and, if necessary, the complementation of the contents and expansion of knowledge about the tools selected for the module. Feeding back the importance of self-training and knowledge developed in practice, in addition to continuing discussion surrounding the action-reflection-action, heralded by Shön (2000) and Alarcão (2008).
3. Promotion of initial and continuing training of tutors establishing routine with specific time, before contact with the participants and during all nine modules, to discuss the specific contents, suggesting further reading to expand the resources for educational guidance and strategies to address it. In this process was emphasized: knowledge of the course structure, management and educational domain of tools and technology resources, as well as the content and the articulation between the modules.
4. Dynamic of continuing education tutors module by module, beyond the period, prior to the start of the course. To this end regular meetings with the teachers authors of each module to discuss the contents addressed were scheduled, clarifying doubts and raising suggestions of possible greater needs understanding of the topic being discussed in the module, including presentation (objectives, content, activities, evaluation, etc.), development and closing it.

From this perspective the mentoring process developed in the fifth *Curso* consisted in a collective activity, proactive and committed, in the proper sense of the course and its objectives. The tutor at distance/online is not intended as a subject of passing on information or the idea of simple tutelage. On the contrary, he is thought to develop his 'to do' directed and linked to the pedagogical space, dimensioned and integrating the contents, activities, the demands of students and teachers, he was finally integrated into the course as a great articulator, even more so, a genuine pedagogical mediator. So it was fundamental and strategic to the formation of this professional.

Such paradigms overcame the traditional view of mentoring, since the responsibility for the development of contents and activities, as well as the evaluation processes with 'voice' and power to express their perceptions and opinions against the development of the module education. At first, he would not produce the materials and neither he would select it, however, he would be a pedagogical actor who makes the dialogue with the students, who motivates, especially, who encourages interactivity and joint action. In this way, he would also contribute to the reorganization of activities, texts and even, along with his students, he could discuss the evaluation process and criteria. Clearly the model alluded was one of the proposals of the *V Curso* to increase the autonomy, independence and, above all, the ability to intervene and manage virtual learning spaces of UAB.

In the conception of the CTAR, the tutor is tasked to monitor, supervise, guide students aiming to the acquisition of knowledge, from the perspective adopted by Shön (2000) and Alarcão (2008) action-reflection-action. It would be incongruous to demand of tutors tasks in which they don't have fully knowledge or to promote activities distant from its significance as highlighted by Leontiev (1991). How could they develop certain content, skills and collaborative prospects if they were treated as simple reproductive of the proposals of teachers? How could they reflect on their pedagogical actions, the meaning and significance of the contents if they are unaware of the mission and objectives of the course? How they would engage in a project in which they felt stripped and pushed out of the process, being only a gear in this machine?

Cortelazzo (2008) emphasizes that it is incongruous as dissonant the construction of collective projects without the interaction processes being active, and that collaboration enables effective construction. The author also shows that distance education is established in three areas: the didactic framework that ensures the sharing of knowledge and experience, then linked: to the pedagogical action based on dialogic process that are directly associated with autonomous learning, creative, articulate and reflected in educational materials chosen; the evaluation process, involving all stakeholders, stimulating self-assessment, joint assessment and the evaluation of others.

Depending on the dynamics and peculiarities of teaching moments they enrich the comprehension and the systematic training. Therefore, it is essential to note that, in our experience, there was the main concern with the formation of the tutors, since its performance has become the action model adopted by the course. From an initial training that allowed the contextualization of its activity as well as integration with the proposal of the course and its actors continuously and buoyed by praxis. Thus, regarding the formation of tutors, it was based on three movements that complement each other: the self-formation, the hetero-formation and inter-formation, according to Garcia (1999 as cited in Isaia & Bolsan, 2014):

a) Self-formation: process in which professionals are responsible for their training, consciously, taking responsibility for the process and the purposes of his training (Bandeira, 2006). Complementing this concept, Isaia & Bolsan (2014) show that professionals seek sources and materials to expand their knowledge, considering its interests, needs and demands of the educational environment, activities and training projects that, in a direct way, influence their knowledge, skills and competences for the development of teaching. For example, a text shown on authorship to later perform guidance to the course participants of how to construct a paraphrase, or even a further reading on mentoring to know the different processes involved.

(b) Hetero-formation: established by the contribution of other professionals who are experts in areas related to that kind of knowledge. In short, includes the dynamics in that the professional of education is eligible and different into his activity as a subject who learns and teaches being an essential binomial for his professional development. Constituting a privileged space for reflection, comprehension and change as a result of the situations – *as a teacher* - experienced and being problematized in order to lead, motivate, and generate new elaborations. Despite the fact of the teacher not being directly involved in the training proposal, this should be closely linked to self affirmative actions (Santos & Figueira, n.d.). During the course of training of the tutors, there were those moments with the presence of the authors teachers, in the construction of the modules and through the web conferencing with guests and even overall lectures for all professionals of the course.

(c) Inter-formation: through interpersonal activities the professionals in education construct their teaching activities, given the changes and ahead of the interests, common needs and demands that foster the search for improvement, skills development and expertise affecting their professional development (Bandeira, 2006; Isaia & Bolzan, 2014). In this way, the joint moments of educational activities should be prioritized to ensure the group process. Especially, where there are exchanges, support and psycho-pedagogical guidelines, problems and solutions can emerge from this joint activity. In the meetings directed only to tutors or even with the group in partnership with teachers, the exchange of knowledge and experiences happened in the group.

In this sense, our experience points to the realization that the training of tutors to work in a course EaD must be a project planned and something to be incremented as an essential part, regardless of the intention of promoting the initial or continuing education. After all, their pedagogical action is linked to the concept of the own course design, which should establish the extent and

scope of their duties, which are not restricted to a mere reproduction of the content. As noted, the formation of the tutor involves several dynamics, surpassing that closely linked to the content. For this he must have autonomy in thinking to contribute and re-evaluate educational processes under his monitoring.

5. The Fifth Curso Team: Coordination and Unity in the Pedagogical Action

To support the pedagogical and administrative proceedings, several professionals have integrated the course team and were essential to the success of the activities of fifth *Curso de Especialização em Educação Continuada e a Distância* - Specialization Course in Distance and Continuing Education. The fifth *Curso* work team was formed by 17 teachers (authors and supervisors), six tutors at a distance, a classroom tutor, a pedagogical assistant, a tutoring coordinator, a general coordinator of the course and support of the platform of the course, *Moodle* (an administrator and multimedia specialist) and a Web designer to work on the accessibility of the virtual environment of the course.

As for actions related to tutoring and activities on the course platform it was established a weekly 20-hour monitoring of the entire educational process: calls, chats, reading, reviewing and correction of forums and meeting with teachers authors and tutoring coordination and general coordination of the course. Strategies have been worked out and discussed to guide follow-up actions to address the demands, doubts and questions of the course participants and, in particular, suggestions on reading activity and research concerning each module, under the responsibility of a distance tutor and classroom one, a pedagogical assistant, a coordinator of the course and mentoring. Everyone systematically accompanied the offering of the modules and the dynamics adopted for its development. Horizontalizing the action, the focus was on boosting the central module proposal and the plan developed by the authors teachers. This encompassed from the selection of texts, videos, images to the evaluative task. Having the presence of the classroom tutor, the web designer at first and then the coordinator and mentoring of the course. This first move was then scheduled for the general coordination and mentoring, to establish space and the inclusion of assistive technologies within the discipline. Also encourage and support the authors teachers in the construction of the space and ensure the pedagogical and didactic dimension, still counting with the collaboration of the platform administrator, to add, expand and verify the demands of the authors teachers. One example was the construction of the 'sandbox' on the IV module which provided students the contact with the *Moodle* platform, they had the power to edit and to build, in an experimental mode, their course. Also, in the module IX, the adoption of

an environmental cause of each locality, through Facebook, aiming at social and educational role.

Regarding the access, retention and adherence of the participants to the course and concurrently the scheduled activities, several conditions were considered, such as: the identification of the missing students and those infrequent in the virtual environment and the physical meetings, having then, as the first gesture, to put them in contact the distance tutors. If this were not a success, it was passed on the participant's name to the teaching assistant who retook contact by email and then by telephone.

Therefore, the intention was to recognize the situations that got in the way or prevented the monitoring of the course and also motivate the participants for the resumption of the scheduled activities. So it was constantly raised and addressed in the pedagogical meetings situations and problems, both in interpersonal, teaching and educational level, and other difficulties that arose throughout of the modules, such as those relating to access and platform operation. Above all, integrating and reviewing the pedagogical conditions; the concern was to provide constant feedback to the doubts, tasks and readings, as well as those that estimated punctuality, attendance, interactivity and in particular the autonomy and collective construction, always permeated by theoretical and practical articulation .

Routine activities were planned for the development of modules, they involve, in general, the schedule of meetings between the tutors coordinating, the group of tutors as well as the teachers authors. At the end of each module, it also sought to ensure and assimilate conditions linked to the systematization of activities, development of mentoring report, to be made available on the platform, with the experiences, suggestions and evaluation process. The reporting of notes, missing and grades, and module closing and the transition from one module to another, the learning revaluation activities. Sometimes there was the transition from one module to another at which point the module authors teachers being finalized and contacted the future teachers, aiming to contextualize the pedagogical conditions and trigger a process of vertical integration between them.

Whenever the teaching module was closed, it was elaborated a synthesis of each class involving pedagogical plans, educational, operational and those facing the offering of the next module. In this sense, the feedback to the authors teachers was essential for the redesign of activities and including the learning support, for students who did not obtain a satisfactory development in the module. Therefore, opportunities for discussion and reflection about the difficulties presented in the mentoring process, together with the teacher, with periodic evaluations of the groups about module proposals, including the self-assessment of teachers/tutors.

In the planning of the modules were planned at least three meetings (beginning, middle and module completion), lasting 40-45 days. Among the

scheduled activities, all material were available and delivered in advance of at least 15 days for distance tutors in order to allow reading and a preview of the proposals so that in the day of the first meeting of the module, one could argue critical points, the congruence, positive aspects to be considered, recognizing the different levels of experience and knowledge of the student group. Especially, prepared for the presentation and clarification of objectives, assessment methods, and resources and strategies employed to improve with students, in order to foster the axis of discussions and educational strategies adopted.

Another important strategy adopted in the course was the creation and enhancement of the space of the platform *Moodle* for tutors. The online space established the status of an enlarged and shared discussion with all the tutors, where the weekly or biweekly meetings were recorded, discussions and referrals originating from meetings with authors teachers. Also, desires, organization, questions and concerns are shared by the group or sent to tutoring coordination and then those directly engaged in the situation.

One of the team's concerns was to ensure the coordination of actions and the integration of the activities of online tutors with teachers authors and other participants of the course team, seeking to ensure the efficient and integrated communication, concerning educational activities and teaching-learning strategies, in emergency conditions, when it came to identifying problems that interfere with the proper development of the tutoring: pedagogical, administrative, technical and others. Thus, the actions reinforced the unit in the speech regarding the decisions and strategies for the dynamics of development of teaching modules.

So it was encouraged and fostered a critical and proactive approach on the part of tutors emphasizing collaborative nuances instead of the difficulties that emerged in the process, concerning the content of the modules, as well as in the progress of activities, thus having periodic evaluation of the mentoring process. Valuing and forwarding the new demands of tutoring at a distance to enhance the process, whether demanding the support of authors teachers, the platform administrator, the web designer, the tutoring coordination and of course coordination, for those intrinsic to the monitoring of students. While focusing on topics relevant to improving tutoring, parallel to the development of the modules.

6. Online Tutoring: Systematization, Organization and Evaluation Processes

The prospect of tutoring in the fifth *Curso* was based on a new proactive dialogue and autonomous action in the online learning process. The CTAR (Souza, Fiorentini & Rodrigues, 2010) calls for collaborative learning, so the tutor the distance should be imbued with this action, that is, it must

foster in the spaces of learning activities, proposals and issues to ensure dialogicity between tutor-student and among members of their own class. In this sense, learning should establish the autonomy of thinking, produce, of transforming, anchored in the theoretical and practical knowledge.

Nörnberg (2011) emphasizes that the tutor plays an important role in the pedagogical intervention, ensuring the teaching-learning process, mediated by technology, considering that the activities and the tools used, interfere and promote the cognitive, interactional processes among others. In parallel, the pedagogical actions promote the collective intelligence, with shared characteristics and it can mobilize affective aspects and aspects of the group consciousness. As stated by Oliveira (2011) recognizing the importance of material and symbolic artifacts that interfere with cognitive functioning, but which are directly linked to social practices and the meanings that emerge from these contexts. At the same time, it seeks to motivate students to organize their space of study, valuing punctuality, attendance and collaboration in selected tasks.

In the fifth *Curso*, the distance tutors were also responsible for assessing the learning that has been widely discussed with the authors teachers, responsible for developing and monitor their module. Thus, another function was to maintain constant dialogue with the teachers in order to enable the understanding of the dynamics of the module, content and of their own collaborative action among course participants. It is interesting to emphasize that tutors have taken the assessment of his students, however, bringing the difficulties and the problems in the periodic meetings with the teachers responsible for the module, as positive points and facilitators of learning.

Based on a proactive tutoring, the tutors, at the meetings of the modules, discussed the different forms of assessment and having knowledge about the learning process of class, pointing out the difficulties or the improved conditions proposed on tasks, sharing their experiences and perspective with teachers. Thus, in a collectively and contextualized way, it was discussed processes and selected evaluative forms, also deadlines for implementation and delivery, methods, approaches, among other activities related to the teaching-learning process.

In this sense, the course professionals retook the postulate that the evaluation reflects aspects of the teaching-learning process, one element that promotes the expansion, not having a merely classificatory character. How Leite and Fernandes (2014) point out that the evaluation should be an element that helps the teacher, a pedagogical support for learning, improving and promoting the development of skills and competencies. They point out that the evaluation can be an aspect of social equity, involving the co-responsibility as well as a promoter of self and the regulation of other

students, that is, in its sense of training, empowerment and pedagogical mediation.

Also the tutors broadened the contents offering supplementary materials indicating links and information about the EaD, for example, the issue of authorship and how it should be credited in the forums, in the production of written materials and to the further reflection on themes of their interests that could be harnessed to the final paper/ thesis. Similar to the position assumed by Onrubia, Colomina and Engel (2010) pedagogical intervention, in that case, adopted by tutors aimed at helping students find, organize and manage the knowledge, whether formal or informal, in order to maintain motivation and commitment with the course. Even helping to keep the focus on the objectives, activities and collaborative processes.

In agreement with the aforementioned authors, we understand that the primary conditions of the mentoring action emerged from various roles. As regards organization role the tasks related to the distribution of time, the resumption of the educational objectives of each module and of the course embracing the rules and conditions that ensure the participation and relevant evidence to the evaluation. At the same time, the social role, with a view to encouraging a social space that implement group interaction, dedicated to learning processes, the formation of a collaborative environment, and support the development and collective consciousness.

The intellectual role where the knowledge of the tutors (theoretical, practical, of past experiences) to pedagogical action, in the whole process, form optimizing the knowledge, acting in critical moments, reorganizing the activity, maintaining consistency and rescuing the goals of the discussions, and yet, summarizing the key points of the contents or tasks, also giving the necessary feedbacks.

The technical paper that refers to the domain and use of technological tools in the AVA to help students manage it and to solve emergency problems that arise. And the evaluative role, not only in a summative process condition, however, of adopting a condition of progress and development of the student, in the intellectual field, affective, social and as their cooperation with colleagues and division of labor. In this sense, the appreciation of the student's action in order to generate autonomy and leadership, as the dynamic behind the training process and self-management of knowledge.

So, it is rescued reflection of Quinquer (2003 as cited in Bassini & Behar, 2009) indicating that the way to approach the learning evaluation is inextricably linked with conceptions around the teaching-learning process. In particular, called by the researcher, communicative or psychosocial model where learning is a process derived from social interactions. Therefore, the assessment is characterized as an instrument that aims to improve the communication process and promotes learning, though, allows the appropriation of knowledge tools and suggested criteria for evaluation. In the

case, the assessment and learning activities are faces of the same coin, being integrated and congruent. Thus, students will gradually appropriating and taking over the responsibility and autonomy of the process, including through self-assessment and assessment of others.

As a result, emerged the constant worry about the teaching-learning, online, periodically fostering collaborative and collective construction of knowledge, without ignoring individual differences in the process, respecting the learning rhythms and different experiences as unique condition of development of the person. Therefore, the assessment constituted feedback condition for the process of knowledge and dialogicity. Being fundamental the qualification of tutors, to the extent that their pedagogical action was a differential in subsidized by reflection on the tools of learning, considering that knowledge transcends the modules, it becomes a self-training for course participants.

Rescuing the analysis of Belloni (2003 as cited in Marcuzzo & Gubianni, 2014) the author points out that the tutor guides students, settles questions and search strategies for the development of the content, as well as their effective participation in the assessment process, as well as educational support to enlarge the processes involved in learning. Of course, such learning situations are based on the proposed activities, material selection and evaluation strategies proposed by teachers. While the teacher creates activities for reflection.

In this sense, in the process of monitoring the student learning, the stimulus for participation, in the comments on the contributions made by each, in a forum discussion, for example, and the articulation of these different contributions and point of views, the integration of content, the feedback of the tasks and activities, in the assessment of learning, the tutor acquires density and visibility in distance education (EaD). Ensuring this perspective, he becomes partner of the student, in guiding, building a much more meaningful working relationship for the teaching-learning process.

6. Classroom Mentoring and the Role of Pedagogical Assistant: Preventive Processes and Interfaces

The teaching-learning process has multiple dynamics and due its complex nature, it was retaken the dropout problem in distance education (EaD). Aware of the problem efforts and investments were aimed to reduce the evasion in the distance education and that has been widely discussed in the academic world both for conceptual disagreement and for the large number of occurrences. Levy (2007 as cited in Santos & Oliveira, 2009) reinforces that even before the advent of the internet, distance learning courses had already a high dropout rate, around 25% to 60%, and this is the average in Brazil and also it remains in other countries. Santos and Neto (2009) rescued the concept

of evasion indicating that it is the withdrawal of the student at any time of course, without the student's return.

It is important to recognize the different factors that can influence the amount of the evasion, among them: the traditional conception of teaching face to face, referring only the condition of interaction, affective states, also group formation. Added to the handling and poor knowledge of computer, internet and AVA tools by students, how to use chat, email and access a text, combined with the absence of habits, skills and competencies related to written communication process which then prevents the essential interactivity to the process. In this case, like responding to a forum, performing a task as directed and to perform a search on the web, including the absence of a physical space that agglutinates students, as in the classroom model.

Complementing the picture, they identify other factors related to socio-demographic status of the student (age, gender, marital status, number of children and working conditions), motivation and interests between the different aspects that compete to the course curriculum (design and teaching strategies) and pedagogical action of the tutors (Santos & Neto, 2009).

Added to this set, the need for independence and autonomy on the study times, in a particular systematic, considering the demands of adulthood, for example, how to coordinate the time for work, family and studies, with personal interests. Having as reference that 70% of students enrolled in distance education (EaD) work full time and it is essential to systematize and organize time (Santos & Neto, 2009). Mistakenly, some students believe they can study anytime without a schedule, that they can manage the pace and hours of studies, with the illusion that when they are insomniacs it is the time to engage on their activities. Forgetting that in fact, there is a the scheduled time for the activities and the accumulation of content and that the absence on the platform causes no integration with the group and the lack of engagement in the collaborative process for building knowledge and exchanges, resulting in damage to the acquisition knowledge and as well as the motivation to continue the course.

Such conditions should be analyzed when assessing the success or failure of the course considering not only quantitative aspects, but drop-out rates. Reiterating the situation, Almeida (2008) states that it is necessary to recognize the factors that contributed to the evasion, focusing not just in the final number of students who completed or not the course. Therefore, the fifth *Curso de Especialização em Educação Continuada e a Distância*, endorsed that evasion would be considered the output of students that were effectively participating in at least one teaching module. Thus, it was not considered those who enrolled in the course, more specifically, in the first module, under the guidance of local coordination without having knowledge of the proposal, time and curriculum to be incremented. After all, they never participated in any activity or kept in touch with his group.

To confront the problem of evasion was proposed a systematic monitoring involving three actors in the network: the online tutor, the classroom tutor and the pedagogical assistant. Thus, the online tutor for the constant and close contact, has always been the first professional to make the dialogue with these students by their primary function, the pedagogical articulation, emotional, social development and in their approach with their students, could prevent or reduce the number of avoidance. That way all students who started the course received support from the online tutor through messages of encouragement, monitoring of the development of the student in the AVA and even a 'rescue of that who was already hanging by a thread'. As evasion prevention strategy actions were used that would promote the interaction, stimulation and motivation through motivational messages in the forums or via individual email.

Complementing the rescue of the students with problems, the pedagogical assistant and the classroom tutor associated with the mentoring coordinator and in special cases, the course coordinator, reinforced this action. After several contacts and conversations of the online tutor with the student and if not achieving success, the second step was to submit the names of students on the list of abandonment for the tutoring coordinator to replay and analyze strategies along with the classroom tutor and the pedagogical assistant so that they can establish new contacts through email, and in the absence of answers, via telephone to listen to the student, identify their problems and propose alternative so he can continue to perform well in the course.

The coordinated actions are supported in Almeida's research (2008) in which distance tutors, the classroom tutor, pedagogical assistant and the tutoring coordination, incessantly sought to minimize these problems, the adoption of unification of interventions, from extending deadlines in relation to the preparation of tasks, answer questions through chat or skype, or even know what was going on with students and how they could help to promote his return.

Identifying the problem as an educational phenomenon, he saw the role of the classroom tutor, along with the online tutor, as one of the actors that could interfere with this cycle. In reports of online tutors in an informal survey conducted by tutoring coordination, it was found that in 100% of the students of one class worked full time and complained of lack of time for dedication to ongoing activities, in this perspective, it was registered the withdrawal of a student, justified by the physical, emotional and social overload, to reconcile the volume of work and activities of the course. In another situation, the abandonment of a student who dropped out at the last module, in the *Trabalho de Conclusão de Curso* (TCC) - Work Course Conclusion because she had failed to coordinate the work tasks, the demands of the course and family conditions. Situations like these are recurrent in the distance courses/online that need to be studied to find alternatives that may

potentialize the online courses and encourage the training of many professionals who can not afford to make classroom courses of continuing education.

In our course, the role of classroom tutor was crucial, she accompanied each of the six classes, the posts of the students and also the demands of the online tutors as to the remoteness or infrequency of students in activities in the course platform. She accompanied the messages of the online tutors for students and reinforced to them the invitation to follow activities on the course and remembering the importance of the presence and monitoring for the success in it and was always alert to the return of student to the platform and activities.

The classroom tutor in meetings scheduled with online tutors, mentoring coordination and course coordination and module teachers performed on an ongoing basis, the survey of absences in the activities. She also was tracking using the *Moodle* platform, identifying the access of the participants and the engagement in activities. At the beginning, middle and at the end of the module it was performed a survey of dropouts, reporting its history, the contacts made to encourage the return to activities and the justifications given by the students. After all, it is investigated what are the reasons that led them to give up the education in order to obtain information and data on aspects that caused the abandonment.

In possession of the information above, it was prepared a preliminary report by module, by registering the amount of dropouts, as well as the most frequent reasons reported by course participants. Constituting a steady job and rapid response to the online tutors, teachers authors of the module and the tutoring/mentoring coordination and general coordination of the course. The information was then presented to the team, involving all professionals of the course so that collectively they could seek alternatives to support the student and therefore minimize the triggering conditions of evasion in the course.

Another actor who was differentiated during the development process was the pedagogical assistant that according to Escalante (2013) is an expert working as articulator between the pedagogical coordination, coordination of tutoring, the classroom tutor and online tutor, and extending his contribution to authors teachers, students and the ongoing support of staff in the context of information and guidance on the administrative part of the course. To catalyze the actions and integrate the actors of the course, the pedagogical assistant employed dissemination strategies for information and general guidelines, using TICs, whether posting general reports on the platform, communicating by e-mail, and even making contact by phone.

The pedagogical assistant was directly involved and was of continued support to the demands of the course coordinator and mentoring coordinator, having access to information from actors and also the *Moodle* platform. The activity also extended to the authors teachers in order to meet emergency

demands or to answer questions about the organization of the course. Also sought messages and students posts in the spaces involving general questions on the course, requests by the secretariat, contact with teachers, course coordination and also forwarding the solution for platform access issues through the specific interface available in the virtual environment of the course to contact the pedagogical assistant, which were standing the aforementioned information and the students could contact or answer questions regarding the dynamics of the course and organization of it.

On the tenth module, at the *Trabalho de Conclusão de Curso*, the pedagogical assistant worked as a great articulator, following the posts of the 10 groups formed, each having their respective mentor and forwarding it to their mentors for student support in preparing its TCC. She even accompanied the physical meetings of the course team that occurred with the group of teachers of the course, coordination of tutoring, the course coordinator and the presence of the classroom tutor, participating in discussions and recording it and subsequently disclosing to its participants.

7. Pedagogical Interface between Online Tutoring and the Authors Professors: The Construction of Knowledge and the AVA

In the proposal of the fifth *Curso de Educação Continuada e a Distância* was predicted the importance of dialogue among the actors, in particular, between authors teachers responsible for structuring the proposal and the pedagogical planning of the module and the online tutors who would develop the content, activities and evaluation processes with the participants of the course. There were 17 teachers authors and supervisors, among them there are 14 doctors (in the fields of Education, Psychology and Sociology) and 03 masters in Education, they formed pairs or there were three together to the development of activities in the AVA, by area of interest and action in education and the research for the development of teaching modules that composed the course. All of the teachers had proven experience in higher education and distance education.

The authors teachers participated in the initial training of online tutors giving an overview of their education modules, presented the overall objectives and the content to be addressed. In the construction period of the the AVA, the authors teachers were accompanied by the coordination of mentoring and coordination of course also counting on web designer support for organizing the teaching module and its activities, text, images and exercises in the course platform. In that moment it was constituted as a systematic on the course for the pedagogical design of the modules, going from the inclusion of the module plan, structure, sequence and distribution of content, to the activities of evaluation, not necessarily ready, but proposals in development. In that way, many authors teachers have chosen to continue to

discuss the evaluative dynamics with online tutors, as they were accompanying classes.

Thus, the evaluation process was not only a moment, but would be characterized as an element of the teaching-learning process. This way, the evaluation assumes an emancipatory aspect, adopting a forward-looking action, so it is possible to identify that the student can acquire new skills, abilities and knowledge. However, not perceiving as a final point, but giving continuity to the learning that happens after it. That is, after the modules, how the participants would expand the teaching-learning process, using their workspace and also on a personal level.

The meetings of the authors teachers with the online tutors occurred fortnightly or weekly, depending on the needs of teachers and the dynamic of the module. In it, beyond the programmed contents it was discussed the conduct of activities, positive points, difficulties and suggestions for overcoming the problems regarding the teaching-learning process, the level of interactivity between the class and the collaborative construction of knowledge. To the closing of each teaching module, there were one or two meetings to analyze the moment of closing of the activities, especially with propositions regarding those course participants who had not finished the activities or, in particular, those with difficulties in final evaluation. This way, together, author teacher and online tutor decided to program new additional assessment activities or extend the deadlines for the delivery of activities. Period in which the online tutors planned to accompany the participants who were struggling to guide, correct and do the feedback of evaluation results. Subsequently, sending the results to the authors teachers and classroom tutor and posting the results on the platform.

The authors teachers had access to the evaluation and the results, following the response on the platform, in short, they had full access to the AVA, and maintaining communication with the group of tutors in a special space created in the module. If necessary they made contact with the tutor, depending on the need for module evaluation review.

In summary, the authors teachers not only elaborated the thematic modules, but guided, discussed, received and gave feedback of the contents, of the learning activities with tutors. They were not in constant contact with the students on the platform, but they followed through the 'eyes' and 'words' of the tutors. In the module shutdown, the online tutors gave feedback to the teachers involved, from the organization of virtual space, content, materials and selected tools of the *Moodle* to the module evaluation. Simultaneously, they performed the self-assessment of their work and also the team work, pointing crucial points to be observed for the next modules and offers. The authors teachers, did the same regarding the evaluation of the module and the teaching-learning process, as well as the contributions and improvements to the module.

5. Conclusion: Reflections, Challenges and New Perspectives on the Mentoring Process

As previously emphasized, for tutoring developed in fifth *Curso de Especialização em Educação Continuada e a Distância* the option was that it was proactive, engaged, articulate and with character of continuous formation and remains connected to the political-pedagogical project of the course. In particular, because the tutoring becomes an essential quality element to the learning process and its relationship with the different actors of the learning network becomes critical. The unity in the action, not only reflected in the teaching-learning process, but in monitoring and frequent exchanges of knowledge, experience and education prospects.

It is worth mentioning that the construction of tutoring, sedimented in the design of the *Comunidade de Trabalho e Aprendizagem em Rede* - CTAR coined by course teachers, mostly researchers of EaD, approaches the four pillars for education of the future, propagated by Delors and collaborators (1977) in the interplay of learning to be, learning to do, learning to learn and learn to live. And that, in a peculiar way, are consistent with the understanding and the development of new TICs, to systematically ensure the aspect of interactivity, the async/sync in contrast to the linearity and the ability to simulate and design events of everyday and events in the imagination space (Carli & Polato, 2002; Nunes, 2013).

It is essential to recall that effective communication in virtual space, does not depend solely on technological means, first of all, it comes the development of skills and communicative competence that evidence affective processes, respecting the pace of students, with patience, sensitivity, attention, reading beyond the writing. Above all, in a new culture and peculiar learning space, fluid and steadily interaction between students and teachers-tutors create an atmosphere of trust that favors the formation of bonds that influences the process of acquiring knowledge. Also, in the permanence and in the investment of the students in this educational space, as defended by Reis (2000).

Thus, the political pedagogical project of the fifth *Curso*, not only made explicit the roles and functions of each actor: teacher-author, online tutor, classroom tutor, pedagogical assistant, as well as the articulators and the general coordination of the course and coordination of mentoring, in addition to the technical and administrative support, the platform administrator and the web designer. Meetings with all those involved were foreseen in order to facilitate joint action and at the same time interconnected to promote the success of the course. In this way, there were several times when the whole team was present, other times the meetings were held in small groups in accordance with the objectives outlined, as the constant contact between the

mentoring group and authors teachers in all the nine modules. Better yet, the tutors, the mentoring coordination and coordination of course with the web designer.

With this perspective, it is important that the mentoring process is set being the online tutor a professional and protagonist of the teaching-learning process, mediated by technology. It is possible and viable to understand its function, through its practical activity and, in particular, on building a critical position, integrating it into the construction process, transforming not only the knowledge, but relations between subjects, culture and the educational process. From their experiences, their action and a quality in the educational space, it is believed to be possible to undertake efforts to change politics, administrative, and in their own culture and practice of distance education (EaD) and classroom and virtual spaces that bring together these professionals. Finally, understand that the mentoring held at fifth *Curso de Especialização em Educação Continuada e a Distância* was very productive in the course, but above all, was productive in the training of professionals who participated, and today, in most cases, they are developers of training actions with the EaD, and have the understanding that is needed to ensure a quality distance education, and that is possible and necessary to accomplish (CTAR Group, 2006).

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Knowledge and Influence of MOOC Courses on Initial Teacher Training

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Abstract: The impact of MOOC courses in the processes of distance learning has been extremely important from the very beginning. They offer an innovative model of massive teaching, which exploits in a paradigmatic manner the potential and relevance that ICT's currently have in modern society. The present article has as its primary objective the analysis of the presence of these courses and the role that they represent in teacher training, and their knowledge and influence on the future teachers that are currently being formed at university level. A case study has been carried out with descriptive not experimental methodology, from a quantitative base. The sample study has been undertaken in Spain (n=200). Its main result being the determination of the minimal impact that the MOOC phenomenon has had on the students polled. Equally, a significant lack of knowledge has been revealed in all its dimensions (professional, pedagogical, structural, etc.), with only a minority of those in the sample group having indicated that they have studied any of the courses, or know to some extent the main platforms of the world in which they are offered. A large number of those surveyed therefore are unaware of the existence of these courses. As a result, it has been established that, regardless of the quality of the learning and the didactic and methodological characteristics that the MOOC courses offer, their study and analysis is considered necessary for future educational professionals. It is imperative that at the level of Higher Education, and especially in the faculties of teacher training, that the most recent advances in the field of ICT's are introduced in the study plan and in the academic programs, for they constitute the base of modern society. This will permit not only the granting of technical abilities to university students, future professionals, but will also permit the undertaking of a critical analysis of the characteristics of our world which will contribute to the boosting of everything that is really beneficial for social development.

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1. Introduction

Undoubtedly, Information and Communications Technologies (ICT) today imply profound social transformation, one which needs to be engaged by education. One of the main concerns of the education system is the integration of technologies and media resources into the teaching-learning process as well as the need for a critical analysis to be undertaken into the importance of these resources in our world (Buckingham, 2000 and 2013; McFarlane & Sakellariou, 2002; Gómez-Galán, 2003, 2007 and 2015; Hepp, Hinojosa, Laval & Rehbein, 2004; Schibeci, MacCallum, Cumming-Potvin, Durrant, Kissane & Miller, 2008; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012). In this framework, ICT teacher training is fundamental for excellence ICT pedagogical integration (Williams, Coles, Wilson, Richardson & Tuson, 2000; Alonso & Gallego, 2000; Llorente, 2008; Tondeur, Van Braak, Sang, Voogt, Fisser & Ottenbreit-Leftwich, 2012).

Alongside these two important issues there is the continuing emergence of new technological proposals which are emerging in the context of the digital paradigm, and are presenting themselves as not only being innovative but also promise to essentially change the meaning of education in the fields in which they are applied. They are having a significant impact and a great amount of experimental practical and scientific studies are being realized especially in relation to the advantages and disadvantages of their potential, which is essential for the definition and assessment of their true significance (Murphy & Greenwood, 1998; Wood, Underwood & Avis, 1999; Gómez-Galán, 2001 and 2011; Stensaker, Maassen, Borgan, Oftebro & Karseth, 2007; Bingimlas, 2009; Livingstone, 2012; Kreijns, Van Acker, Vermeulen & Van Buuren, 2013; Vrasidas, 2015).

A clear example of this educational-technological impact can be found in MOOC (Massive Open Online Courses) courses. These courses are based on the principles of massive, free access to all materials and resources offered online. This phenomenon has had a major worldwide expansion, opening opportunities at the same time for education and training. In addition to being the entry point for the popularization of science (Anderson y Dron, 2011; Regalado, 2012; Vázquez-Cano, 2013), the future possibilities are enormous and are being studied in all their various dimensions (Adamopoulos, 2013; Aguaded, 2013; Emanuel, 2013; Grover, Franz, Schneider & Pea, 2013; López-Meneses *et al*, 2013; Siemens, 2013; López Meneses, Vázquez-Cano & Gómez-Galán, 2014; Al-Atabi & Deboer, 2014, Gómez-Galán, 2014; King, Robinson & Vickers, 2014; Chen & Chen, 2015; Malchow, Bauer & Meinel,

2015; Reich, 2015; Raffaghelli, Cucchiara & Persico, 2015; Selwyn, Bulfin & Pangrazio, 2015).

The realization of this study is essential because the MOOC paradigm, from its beginnings as an innovative proposal offered by Cormier and Alexander, has provoked a great revolution in different parts of the world, and produced enormous change and progress in society (Vance, 2013). Many initiatives as a result have been developed to implement this new form of education. The success of some of them, such as Coursera, EdX, Udacity, MiriadaX, among others, has seen Spain and other countries express interest in the implementation of these courses, with several universities already participating in this initiative.

The courses are open, participatory and distributed along a pathway for connection and collaboration as well as job sharing. Some experts consider these courses to be positive while others see them as a threat to current educational systems (Liyaganawardena, Adams y Williams, 2013; Haynie, 2014; Morrison, 2014). The phenomenon is nevertheless expanding rapidly worldwide, with such speed that the word tsunami is often quoted by some authors when referring to MOOC (Brooks, 2012; Sancho-Salido, 2013). It is therefore imperative to understand how it works internally as well as studying strengths and advantages and the undoubted potential it has for the enrichment of teaching and learning in the 21st century.

2. Objectives and Hypotheses of the Study

Once the general approach to the issue has been exposed, the fundamental aim of this research, which focuses on the impact on and the knowledge required by future teaching professionals in Spain with regard to the MOOC phenomenon, will be explained.

From this general objective, several specific goals can be set that will allow an in depth analysis of the subject and the acquisition of additional information. They are: (1) assessing the level of participation that potential teachers have in courses different to MOOC; (2) research into the time elapsed since this phenomenon was first recognised if ever; (3) examining how this phenomenon has come to light (3) analysing the problems found by subjects when running MOOC courses; (4) investigating the choice future professionals must make in relation to languages when signing up for MOOC teaching courses; (5) investigating which of the MOOC platforms are the most used; (6) showing the extent of involvement with other students or professionals throughout the courses; (7) assessing the participation of subjects in these courses; and (8) investigating the motivation that leads respondents to participate in MOOC courses.

Based on the objectives that have been mentioned in the previous section, this research poses a main hypothesis from which several additional

hypotheses arise. The main hypothesis is that: future educational professionals in Spain have insufficient knowledge of the MOOC phenomenon and as a consequence the impact upon them has been minimal. On the basis of this main hypothesis other secondary hypotheses have been established : (1) the younger population follows different online courses than MOOC (as they make greater use of technology); (2) the highest percentage of people who are aware of the MOOC phenomenon comprises students who study exclusively (more time employed) the percentage is lower if part or full time work is added to the study pattern (3) MiríadaX is the most widely used platform in Spain (it was created in this country and primarily uses the Spanish language) for the conduction of MOOC courses; and (4) the main reasons leading to the completion of these courses is gratuity (the main feature of these courses).

The research developed into this work will allow us to test the proposed hypotheses, so that information can be obtained pertaining to the necessity for future educational professionals to at least have greater knowledge of MOOC courses or, a thorough knowledge of the phenomenon.

3. Methodology and Scientific Study Procedures

This research has been developed employing a non-experimental descriptive methodology. The procedure consists of a literature review which provides information on previous studies and compares that to the results obtained in our study. This also allows information to be obtained on the status of new technologies in today's society as well as the main features of e-learning processes and the initial and ongoing training of teachers in relation to new technologies, so that the emergence of the MOOC phenomenon and more specifically the situation of the phenomenon in Spain can be analyzed.

To perform the empirical framework the collection of information was implemented through a questionnaire involving students in Education degrees at Spanish universities. The sample total was 200 students, of whom 113 were women and 87 men, aged mostly between 18 and 25 years with a smaller percentage between 25 and 35 years. We believe that the sample has been significant enough to obtain objective outcomes.

The main instrument for conducting this research has been the questionnaire by Christensen, Steinmetz, Alcorn, Bennett, Woods & Emanuel (2013), although it has obviously been adapted to the characteristics of education in Spain. Also it was validated through expert opinion before application. It consists of 13 items divided into two parts. The first part is based on general knowledge of the data of the subject under study, while the second focuses on a deeper understanding of the MOOC phenomenon. Each of these items contains various choices, one of which must be selected.

Once this information had been gathered, the statistical analysis of the different sections was initiated with the most appropriate tests being carried

out for the goals pursued. Later the preparation of the section on findings and conclusions of the study was carried out. This research not only aims at making contributions to the body of knowledge in this field but focuses on publicizing the MOOC phenomenon, which has had a major expansion globally, as well as within Spain and among future education professionals.

4. Data Analysis and Results

To best synthesize this section, each of the questions from the questionnaire used for the study will be detailed as well as the results obtained from each. As we mentioned the questionnaire is divided into two parts, the first of which is based on general data of respondents, whereas the second goes deeper into an understanding of how MOOC works.

4.1. General knowledge of the subject

<i>General knowledge of the subject</i>					
		Frequency	Percentage	Valid percentage	Cumulative percentage
Sex	Men	87	43,5	43,5	43,5
	Women	113	56,5	56,5	100,0
	Total	200	100,0	100,0	
Age	Between 18y24	163	81,5	81,5	81,5
	Between 24y35	37	18,5	18,5	
	Total	200	100,0	100,0	100,0
Occupation	Student	173	86,5	86,5	86,5
	Part-time	27	13,5	13,5	100,0
	Total	200	100,0	100,0	
Online courses	Yes	65	32,5	32,5	32,5
	No	135	67,5	67,5	100,0
	Total	200	100,0	100,0	
Number of online courses	Under 5	163	81,5	81,5	81,5
	Between 5y10	33	16,5	16,5	98,0
	Between 10y20	4	2,0	2,0	100,0
	Total	200	100,0	100,0	

Table 1. *General knowledge of the subject.* Source: *Compiled by authors from SPSS Statistical Programme.*

As we can see in *Table 1*, in the selected sample for the study there is a higher percentage of women (56.5%) than men (43.5%). To check the age of the subjects four sample categories have been established: between 18 and 24, between 24 and 35, between 35 and 50 and over 50. The results obtained show that there is a higher percentage of subjects aged between 18 and 24 years (81.5%), and a lower percentage of subjects between 24 and 35 (18.5%) and a nil percentage among the last age groups.

In relation to the current situation of subjects in this sample it is noticeable that most of the subjects (173) are students corresponding to 86.5% of the total, while 13.5% (27) of the remainder, study and work part time simultaneously. With regard to the question as to whether the subjects participated in an online course different to MOOC, it can be seen that 135 subjects (67.5% of the total) that made up the sample group have undertaken no course while 65 subjects or 32.5% have. In relation to the number of online courses, different to MOOC, in which the students have enrolled it is clear that most of the subjects, 81.5% (163 subjects), have studied less than 5 courses, while 16.5% (33 subjects) have enrolled in between 5 and 10 courses. Only 2% (4 subjects) of the sample group studied between 10 and 20.

To test if there is a correlation between the variables of age and participation in online courses different from MOOC, contingency coefficient tests have been completed with no significant results evident. From the figures mentioned above, it can be specified that of the total of 65 people who had attended several courses different to MOOC, 48 are aged between 18 and 24, while the remaining 17 are between 24 and 35 years old. Through Pearson's *Chi-square* test it has been shown that these differences are not significant.

4.2. MOOC knowledge

		<i>MOOC (A) knowledge</i>			
		Frequency	Percentage	Valid percentage	Cumulative percentage
Knowledge of MOOC phenomenon	Over one year	10	5,0	5,0	5,0
	Over the past year	21	10,5	10,5	15,5
	Six months ago	13	6,5	6,5	22,0
	One month ago	3	1,5	1,5	23,5
	MOOC phenomenon unknown	153	76,5	76,5	100,0
<i>Total</i>		200	100,0	100,0	

MOOC knowledge procedure	Acquaintances	18	6,5	27,7	27,7
	Internet and social networks	12	5,0	21,3	48,9
	Direct Advertising	8	3,5	14,9	80,9
	Others	9	4,5	19,1	100,0
	<i>Total</i>	47	23,5	100,0	
	Missing values	<i>System Total</i>	153 200	76,5 100,0	
Problems	Interaction with instructors	3	1,5	11,1	11,1
	Video, audio quality	1	,5	3,7	14,8
	Website browsing	1	,5	3,7	18,5
	Ineffective forums	3	1,5	11,1	29,6
	Lack of time	18	9,0	3,7	100,0
	Poor solution and technical assistance	1	,5		
	<i>Total</i>	27	13,5	100,0	
	Missing values	<i>System Total</i>	173 200	86,5 100,0	
Language	English	2	1,0	7,4	96,3
	Spanish	24	12,0	88,9	100,0
	Others	1	,5	3,7	
	<i>Total</i>	27	13,5	100,0	
Missing values	<i>System Total</i>	173 200	86,5 100,0		

Table 2. *MOOC knowledge: problems associated with following these courses and with the selected language.* Source: *Compiled by author from SPSS Statistical Programme.*

In this section an effort was made to establish how many of the subjects surveyed were familiar with the MOOC phenomenon and, if so, for how long. The results suggest that all the subjects in the sample, 76.5% (153 subjects), do not understand the MOOC phenomenon, whereas the remaining 23.5% does. Within this percentage 5% (10 subjects) have had knowledge of MOOC for more than one year, 10.5% (21 subjects) have become familiar with it in the last year, 6.5% (13 subjects) for a period of six months and only 1.5% (3 subjects) have learned about it in the last month.

With regard to the question of how knowledge of the MOOC phenomenon was acquired only 47 were able to respond as the remaining 153 are unfamiliar with it and are considered to be lost cases, as shown below. From the extracted data it can be concluded that 6.4%, i.e., 18 of 47 subjects with knowledge of MOOC, acquired the said knowledge from someone else; 12 (5%) became informed via Internet and social networks; 8 (3.5%) through direct publicity and 9 (4.5%) through other means, specifically teachers.

Of the people who are familiar with MOOC only 27 have made any progress. Three of these 27 people have encountered problems in their interaction with instructors, one with the quality of video or audio, one had problems navigating the website, three considered the Forum was ineffective, 18 felt they had insufficient time to complete their work, and one considers that the solutions are poor and the technical support is inadequate.

In response to the question regarding which language was chosen by subjects when taking these courses, 24 (12%) completed their studies in Spanish, and only two in English (1%). One subject referred to “another language” (0.5%) but failed to specify which one.

		<i>MOOC knowledge (B)</i>			
		Frequency	Percentage	Valid percentage	Cumulative percentage
Platforms	Coursera	7	3,5	25,9	25,9
	EdX	1	,5	3,7	29,6
	Udacity	3	1,5	11,1	40,7
	Uned	2	1,0	7,4	48,1
	COMA				
	Several	13	6,5	48,1	96,3
	University Platforms				
	Moodle				
	MiriadaX	1	,5	3,7	100,0
Missing values	<i>Total</i>	27	13,5	100,0	
	<i>System</i>	173	86,5		
	Total	200	100,0		
Interaction	Yes	7	3,5	29,2	29,2
	No	14	7,5	58,3	87,5
	No	6	3,5	12,5	100,0
	interaction, but conversation-reading				

Missing values	<i>Total System</i>	27 173	13,5 86,5	100,0	
	Total	200	100,0		
Participation	Participated and completed	13	6,5	27,7	27,7
	Participated and not completed	14	7,0	29,8	57,4
	Not completed but I'm interested	13	6,5	27,7	85,1
	Not participated and no interest	7	3,5	14,9	100,0
	<i>Total System</i>	47 153	23,5 76,5	100,0	
Missing values	Total	200	100,0		

Table 3. *Platforms used in MOOC. Interaction and participation of subjects.* Source: Compiled by author from SPSS Statistical Programme.

This section aims to examine what the platforms most widely used by the sample subjects are. In *Table 3* it can be seen that 13 subjects have completed courses through various university platforms Moodle (6.5%), 3.5% in Coursera (7 subjects), 1.5% in Udacity (3 subjects) and 1% Uned COMA (2 subjects), a lower percentage is evident for platforms such as MiriadaX and EDX (0.5% with only one subject having used it).

As for the interaction of subjects in forums during MOOC courses 7.5% (14 subjects) reported no interaction while 3.5% (6 subjects) read forum conversations without participating in the interaction themselves.

Regarding the participation of the subjects in our sample study there is a greater number who answer question 12, because the questionnaire indicates that those unfamiliar with the MOOC phenomenon must go directly to that question number.

As can be seen in this case we have established four categories: in the first 6.5% of those in the study sample state that they have participated in these courses but have not finished any. In the second category, there are 14 subjects who participated and completed one or more courses (7%), while 6.5% of subjects answered in the negative with regard to participation or

interest in the courses, with the remaining 3.5% saying that they did not participate but were interested in enrolling.

		<i>MOOC knowledge (C)</i>			
		Frequency	Percentage	Valid percentage	Cumulative percentage
Motivation	Free	15	7,5	37,5	37,5
	MOOC topic	8	4,0	20,0	57,5
	Curiosity about MOOC	10	5,0	25,0	82,5
	Important university	3	1,5	7,5	90,0
	Easy access to materials	2	1,0	5,0	95,0
	Improve career prospects	1	,5	2,5	97,5
	Personal development	1	,5	2,5	100,0
	<i>Total</i>	40	20,0	100,0	
Missing values	<i>System</i>	160	80,0		
	Total	200	100,0		

Table 4. *Motivation to achieve MOOC courses*. Source: *Compiled by author from SPSS Statistical Programme*.

The last question on the questionnaire is based on research into the motivation for the subject to complete the courses. As can be seen in Table 4, there is a variety of motivations that cause subjects to enrol in MOOC courses. Among the 40 subjects who answered, 7.5% (15 subjects) took these courses because of their gratuity, 4% (8 subjects) responded that they were interested in the topic, 5% (10 people) were curious about MOOC, 1.5% (3 subjects) were influenced by the college where the course was offered, 1% (2 subjects) suggested that easy access to materials was a factor while only 0.5% (2 subjects) answered that taking these courses was done to improve employment prospects and a further 0.5% mentioned personal development.

A survey with the variables sex and MOOC knowledge on the one hand has been conducted, and with the variables current state (employee, part-time or full-time worker) and MOOC knowledge on the other. To this end, a test has been carried out to analyze the contingency coefficient and *Chi square*, so that the significance of the relationship between the two variables can be checked. The results showed no significant difference.

It can be specified that, based on results obtained in the contingency tables, more women than men are aware of the MOOC phenomenon, because women were the majority in the sample study. Despite these results however, and in accordance with Pearson's *Chi-square* test: equality of conditions are accepted and no relevant differences between men and women are noted.

Also, of the 10 who were aware of the phenomenon for over a year, 9 are students, while only one is working part time. Of the 21 who became familiar with it during the last year, 17 are students and 4 are working. 10 students and 3 part-time workers have discovered MOOC in the last six months. Finally, the three people who became familiar with it one month ago are all students. Consulting Pearson's Asymptotic Significance *Chi-square* a value of 0.681 is noted enabling the acceptance of the equality of conditions but not the remaining significant differences between current state and MOOC knowledge variables.

5. Discussion and Conclusions

Once the research was completed, it could be said that all the objectives sought were achieved and the main hypothesis demonstrated, but also all results could be rejected save one. Starting from the main objective, which was to investigate the impact upon and the knowledge possessed by future teaching professionals in Spain with regard to the MOOC phenomenon, it can be asserted that knowledge about MOOC is insufficient and the impact upon sample subjects was minimal.

Regarding the proposed secondary objectives, the level of participation that future teachers have in courses different from MOOC has been assessed as well as the period of time elapsed since the acquisition of knowledge of the phenomenon. Likewise, initial awareness of the phenomenon and how that knowledge was obtained has been examined. Similarly, the problems found by subjects when following MOOC courses have also been analyzed, delving into the language selected by future education professionals in doing these courses. As well, attention has been given to which of the MOOC platforms are mostly used and the degree of interaction with other students or professionals throughout the completion of these courses noted. Similarly, the participation of students in these courses has been evaluated alongside the motivation that leads the subjects to participate in MOOC courses, as has been presented above. The information obtained for these objectives can be determined in the tables presented in this document.

Therefore, the conclusions will be described following the structure of the main hypothesis and those arising from it. As mentioned earlier, the main hypothesis is confirmed, i.e. future professionals of education in Spain do not have knowledge of the MOOC phenomenon. This hypothesis is accepted because of the fact that from a sample of 200 subjects the phenomenon was

only known by 47, of whom 27 have followed some MOOC courses while the remaining 20 have yet to follow any or show any interest in doing so. As for the hypotheses derived from the main one it can be said that:

1. The subjects studying online courses different to MOOC are younger. This hypothesis however has been rejected, as 48 out of the total of 65 who have followed courses different to MOOC, are aged between 18 and 24, while the remaining 17 are between 24 and 35 years old. Despite these figures however, the Chi-square test indicates that these differences are not significant.
2. There is a higher percentage of students who are aware of the MOOC phenomenon and a lower percentage who are working part time or full time. Out of the total of 47 people who are familiar with MOOC, 39 are students and only 8 are working part time. As in the above hypothesis, Pearson's Chi-square test shows that the equality of conditions is accepted, and no significant differences between current state and MOOC knowledge variables exist, so this hypothesis is rejected.
3. MiriadaX is the most widely used Internet portal for undertaking MOOC courses in Spain according to the SCOPEO report (2013). From the results it is notable that in our sample group only 0.5% have used MiriadaX, so this hypothesis will be rejected by ignoring what was collected in the research theoretical framework. According to SCOPEO (2013), MiriadaX is undoubtedly the most widely used portal in Spain, but the same is not valid for specific cases as observed in our study (training teachers).
4. The main motivation for the realization of these courses is gratuity. This hypothesis is accepted because out of the 40 subjects who answered the question, the majority stated that their undertaking of the courses was due to their gratuity rather than other options such as the improvement of job prospects or personal development.

Therefore, on the whole, it can be said that in recent years social changes have caused subjects to carry out a continuous learning curve in adapting continually to professional requirements and transformations (Brown & Adler, 2008; Blewitt & Cullingford, 2013; Schütze & Slowey, 2013; Head, Van Hoeck & Garson, 2015). Although MOOC is not the only teaching option that has emerged in the field of new technologies, it has opened up a new range of possibilities and benefits in the field of non-formal learning, allowing access to information anywhere and any time and in any field of expertise (Gómez-Galán, 2013; Billington, & Fronmueller, 2013; Olcott, 2013; Gómez-Galán & Pérez-Parras, 2014). In this sense, this new mass, has opened up scenarios which facilitate research and innovation, especially at universities, where teachers are required to face new educational challenges and work in collaborative virtual environments which are targeted at cooperation and the exchange of knowledge.

Probably MOOC is not the only teaching option for the future, but its philosophy should certainly be present in educational methodology. This phenomenon is expanding very rapidly around the world, so we believe that knowledge of it and its dissemination is necessary for universities. Its correct understanding and proper functioning will fulfil its potential and empower its strengths which will enrich and contribute to the teaching-learning process. This implies that knowledge of MOOC must be present in teacher-training studies although, as we have seen, this has yet to be realized. We have offered a new perspective on teacher training and MOOC, in relation to other international studies (i.e., Guo, Fang, Liu & Zhou, 2014; Li, Luk & Jong, 2014; or Tan, Goh & Sabastian, 2014).

Once the study was completed and the conclusions noted a number of limitations regarding this research have been highlighted. The first is that this is only a case study focusing on several universities and regions in Spain (Madrid, Extremadura, and Andalusia), so it would be appropriate to extend the subject sample to other Spanish regions and universities. However, according to all sociological statistics (CIS, 2014) the selected regions are representatives of the whole of Spain. It would also be of considerable importance to research not only the training of teachers but also to assess professionals who are already teaching. The same parameters should apply into research done into active teachers with regard to their knowledge of MOOC and the motivation which led them to take these courses. In order to achieve this it would be necessary to conduct a more comprehensive study, one which delves into the nature of MOOC courses in greater detail and analyzes more variables.

In doing this a deeper look into the issue should be aimed for, one that can determine its global importance in the teaching of professionals. Thus, not only will a better understanding of MOOC courses be achieved but also the using of new teaching methodologies that have been created from the ICT revolution will be encouraged and their ideas and knowledge shared.

In summing up it can be said that given the importance that MOOC courses in higher education have alongside the possibilities offered, the courses are poorly understood or not even known by future teaching professionals in Spain, where MOOC has practically no influence. It is therefore urgent that MOOC is studied and analyzed as part of present and future teaching syllabuses. Today, because of their importance in society, integration of ICT's in all educational processes and their constant updating is required. It is necessary for all future education professionals.

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Phenomenology in Educational Qualitative Research: Philosophy as Science or Philosophical Science?

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Abstract: The objective of this monographic contribution is to inform the reader about the essential elements that constitute phenomenology as a educational qualitative research design. It aims to orient the reader concerning the basic concepts and scaffolding that distinguish the phenomenological design. Additionally, the author exposes the background of phenomenology as philosophy in a general manner, and the development and incorporation of phenomenology into a scientific research model. To facilitate the reading process, the text is broken down into the following sections: philosophical origin, types of phenomenology and general usage criteria, sample and data collection strategy in phenomenology and, lastly, data analysis in phenomenology.

Key-Words: Phenomenology, Research Design, Hermeneutic, Purposive Sampling, Textual and Structural Analysis, Meaning Units, Essence.

1. Introduction

Phenomenology is known as a educational qualitative research design (Ponce, 2014; Creswell, 2013, Marshall & Rossman, 2010). The philosophical basis of qualitative investigation stems from phenomenology (as a philosophy), from hermeneutics and from existentialism (Lucca Irizarry and Berríos Rivera, 2013). Therefore, qualitative research is contextualized in different philosophical paradigms which center on diverse conceptions of reality (Guba & Lincoln, 2000; Denzin & Lincoln, 2008). According to these authors, the main philosophical paradigms are: positivist, post-positivist, critical theory, constructivism and post-modernism.

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2. Philosophical Origin

The philosopher Immanuel Kant used the term phenomenology in his classic work, *Critique of pure reason*, in which he differentiated between the mental representations of objects, understood as the thing in itself (*a priori* knowledge independent from experience), and objects understood on the basis of experience: *a posteriori* or empirical knowledge (Parodi, 2008). The word phenomenology derives from the Greek, and one of its meanings is the following: “apparition or manifestation”. It has also been defined as the *philosophy* or school that explains being and consciousness on the basis of the analysis of observable phenomena (Litchman, 2006).

The “father” or greatest figure of phenomenology was the mathematician Edmund Husserl. He was born in 1889 into a Jewish family in what is today known as the Czech Republic (previously Moravia) and died in 1976 (Parodi, 2008). According to this author, “with his phenomenological school, [Husserl] emphasized the study of meanings and ideal objects, of the psychological conscience of the world and of science” (p. 473). Husserl proposed phenomenology as an experimental method based on the conscience of phenomena in which the pure essences of the contents of consciousness stood out.

Starting with empirical observations, Husserl sought to reach conclusions framed within the scope of science. This is one of the most transcendental contributions of phenomenology to science. In fact, through this attempt Husserl aimed to attack psychology as a pure science, highlighting elements related to human perception and the intentionality of consciousness. The intentionality of consciousness refers to the search and identification of subjacent, subjective elements of consciousness which surpass the intention of understanding reality from a single point of view. Philosophical phenomenology stemmed as a counterattack to the reductionism derived from positivism. This philosophical current aimed to reduce information from experience to the empirical sciences. An example was the mainly behavioristic practice of psychology. Husserl reacted to behavioristic psychology proposing phenomenology as a rigorous science of experience and human consciousness (Parodi, 2008).

As a method of research, Husserl proposed *epokhé*; a word of Greek origin which means *doubt*. Giorgi (2009) held that the concept of *epokhé* refers to the suspension or suppression of judgments and the positioning of the researcher with regard to the experiences of the studied phenomenon. This suspension of judgment is a mechanism which ensures objectivity during the process of data analysis in a qualitative research. While it is true that the concept of *epokhé* stems from pure phenomenology, it is also true that the term has been adapted to qualitative investigation in general.

The researcher who places him or herself within the qualitative paradigm must set aside all preconceptions, judgments or prejudices towards a particular topic in order to make an objective analysis of the information participants bring to an investigation. Additionally, one of the precepts of all qualitative investigations lies on the perception held by the participants as protagonists of the studied phenomenon. It can therefore be argued that qualitative research is underlined by an element closely linked to perception (subjectivity to some) of the studied object.

This approach gives way to the following statement:

All qualitative research has a phenomenological aspect to it, but the phenomenological approach cannot be applied to all qualitative researchers.

In the first place, it is completely appropriate to say that all qualitative research has a phenomenological aspect to it, because one of its main characteristics lies on the study of qualities and the interpretations addressed by the object of study. Here, the philosophical basis of phenomenology that originates and permeates all qualitative research is openly manifested. All qualitative investigation describes the richness of content in human complexities (Lichtman, 2006; Denzin & Lincoln, 2008). In the second place, the previous statement suggests that even when qualitative investigation is centered on the systematic study of a problem through the interpretation of its informants, this does not imply that the phenomenological focus must be used as a strategy of data collection in all qualitative researches. Rather, it is used in particular cases depending on the research problem studied. The characteristic scaffolding of phenomenology as research focus is discussed in the following section.

3. Types of Phenomenology and General Usage Criteria

In order to accurately describe the scaffolding or staging of phenomenology, it is appropriate to begin with its different types and classes, hereby briefly described:

- Descriptive or hermeneutical phenomenology – It refers to the study of personal experience and requires a description or interpretation of the meanings of phenomena experienced by participants in an investigation.
- Eidetic (essence) or transcendental phenomenology – It analyzes the essences perceived by consciousness with regard to individual experiences.
- “Egological”, genetic or constitutional phenomenology – It refers to the analysis of the self as a conscious entity. This type of phenomenology appeals to universal consciousness.

Creswell (1998) posits that the best criteria to determine the use of phenomenology is when the research problem requires a profound understanding of *human experiences* common to a group of people. The author suggests that the studied group should consist of 3 to 15 members. The members of the group need to be able to articulate their lived experiences. The more diverse the experiences of participants, the harder it will be for the researcher to find the underlying essences and common meanings attributed to the studied phenomenon. The role of the phenomenological investigator or researcher is to “construct” the studied object according to its own manifestations, structures and components (Ponce, 2014).

4. Sample and Data Collection Strategy in Phenomenology

The samples or participants in phenomenological research are generally chosen according to what is known as “purposive sampling”. Purposive sampling is characterized by the incorporation of specific criteria met by the participants at the moment of selection. For example, in a study concerning the practices, experiences and meanings of equity in couples, Padilla Díaz (2006) selected the sample based on the following criteria: self-denomination as couples that practice equitable ideas (validated by a qualitative instrument), 5 years or more of living together (given that this was the period shown by existing literature as a reasonable span for the configuration of experiences as a couple) and solid belief in some feminine aspects or theories. These criteria aimed to ensure that the selected couples had common experiences regarding the studied phenomenon.

The most appropriate data collection strategy for a phenomenological research is the profound interview. Existing literature (Kyale & Brinkman, 2009; Marshall & Rossman, 2010) coincides in that the phenomenological interview should be open or semi-structured. These two types of interviews allow the researcher to address the phenomenon profoundly, providing a space of aperture for the informants to express their experiences in detail, approaching reality as faithfully as possible. The detailed descriptions or interpretations brought by the participant in the profound-phenomenological interview should be as representative of experienced reality as possible.

The main focus of the phenomenological interview is the description of the meanings of phenomena (Rubin and Rubin, 2012). These authors point out that is recommendable to carry out some additional interviews in order to: verify the information obtained, allow the participant the opportunity to provide further detail or expand on the information offered and, lastly, for the participant’s final approval. As exposed, phenomenological interview is complex and requires a great deal of time to scrutinize the studied phenomenon with the necessary depth. It is therefore vital for the researcher to have excellent skills and/or competency in interviewing.

Some of the skills to be considered during the interview are the following: paraphrasing, clarification, summarizing, reflection of feelings, self-revelation, empathetic listening (Rivero Vergne, 2009). Additionally, the researcher must have dominion or skills in the following areas: paralanguage, kinesics, oculosics, proxemics, vocalizations, identification and recognition of types of silences and sensibility to cultural diversity. A general knowledge of the styles or types of questions is another necessary skill for the researcher using phenomenology. Some types of relevant questions are: those without a specific focus, anecdotal questions, bipolar, intentional, reflexive, of instantiation, etcetera.

5. Data Analysis in Phenomenology

Data analysis in phenomenology is characterized by the following procedures: *epokhé*, identifying common meanings and essences, “horizontalization” of data, textual and structural analysis (Moustakas, 1994). These procedures are discussed in this section, with the exception of *epokhé*, which was previously discussed in this essay.

Textual analysis refers to the description of *what* is expressed by the participants. Structural analysis refers to the interpretation of *how* it is expressed by the participants. These are some questions proposed by Smith and Osborne (2003) to guide the researcher using phenomenological analysis:

- What elements do people unintentionally filter?
- What are some events evidenced through the stories without the person being aware of it?
- How does the person construct meaning within his or her social and personal world?

If we analyze the questions posited by Smith and Osborne (2003), we will notice that they highlight the transference of explicit information (what the participants say) to implicit information (how it is told; what is behind the narration, what are the meanings behind what is told and what is omitted). In other words, phenomenological analysis requires: describing and analyzing the “text” to interpret the “context”. The description, analysis and interpretation of the information obtained through interviews make up the three main steps suggested by Wolcott (2010) for the general analysis of qualitative research. As part of the scaffolding characteristic of phenomenology, analysis and interpretation must be headed towards particular search activities: descriptions, contexts, hidden discourses, meanings and essences.

While it is true that both types of analysis (textual and structural) are fundamental in the interpretation of the findings, structural analysis plays a

vital role as a fundamental part of the scaffolding of phenomenology because it is the one that directs us towards common essences and meanings. Structural analysis reflects the intentionality of conscience as a fundamental aspect of phenomenology.

Creswell (2013) describes the following steps to elaborate phenomenological analysis:

1. The researcher describes his or her own experience with the object of study in order to identify personal judgments and prejudices so that they don't affect the process of analysis.
2. The researcher proceeds with the "horizontalization" of data. This refers to the process wherein the researchers lists each of the relevant quotes of the studied topic and gives them equal value with regard to the expressions of the group. This is where the textual description begins: what are the participants saying? What are the relevant topics expressed by the research participants?
3. The researcher groups the relevant topics into units of meaning.
4. The researcher writes the textual description and includes "ad verbatim" quotations.
5. The researcher writes the structural description.
6. Finally, according to the textual and structural analysis, the researcher proceeds to identify the essence of the phenomenon. What are the common elements repeated in each of the researched participants?

To give an example of this last step, the research by Padilla Díaz (2006) explored practices of gender equity in a group of heterosexual, Puerto Rican couples. From the expressions of the couples with regard to the meaning of the practice of equity, an assessment and recognition in equal parts of individuality (the individual self) and mutuality (the self as belonging to a bond) emerged. This meant that in order for equity to be practiced, it was necessary to establish a balance between individual needs and goals, and the needs and goals of the significant other. The couples never expressed these exact words. The analysis done by the author was structural in nature, and allowed her to establish essence and meaning beyond direct textual transcriptions. In fact, the author inferred that achieving a balance between individuality and mutuality required a proper management of interpersonal relationships. To illustrate the procedure of the research, here are some of the textual expressions from which emerged the structural analysis and essences of this particular group.

Equity is:

"It's about having a vision of relationship, and even when you take care of personal needs, it's a relationship to achieve a compromise between both parties"

“Contributing to achieve each other’s goal and having that goal become the partner’s goal”

“Your own, individual wellbeing becomes common wellbeing”

It is important to highlight to the reader that these *ad verbatim* quotes were interpreted according to emerging categories, which themselves emerged after a process of scrutinizing abundant amounts of information. Therefore, the transcriptions or audio that contain the information from the interviews require carrying out the prolonged chore of visiting and revisiting the text. Abstracting the information along with constructing the relevant categories or themes constitute the main basis to obtain an interpretation that is faithful to the essence and meanings of the studied phenomenon. Phenomenology as a research design contains some validation strategies.

Some of the most commonly used strategies during the process of validation under phenomenology include corroboration by participants and agreement between coders (Creswell, 2013). Corroboration with participants consists of presenting and discussing the data analysis between the researcher and the research participants to verify that the essences and meanings are in fact those expressed directly or indirectly by the participants. Agreement between coders is a more complex process. Various people or external researchers participate willingly in the process of encoding data. These people concern themselves mainly with seeking correspondence between the relevant themes (and subthemes) and the categories that emerge from the data analysis. At the end, all coders compare their respective analysis and, if necessary, according to mutual agreement, the categories can be reorganized to validate the information obtained.

Up to this point, some tenets that characterize phenomenology as a qualitative research design have been presented. Phenomenology is inserted into the field of research as a design with a particular scaffolding. Some people frame it as a philosophical current and others as a methodological research design. The origin of phenomenology is of a philosophical character, and its greater contribution has been to provide a new vision of philosophy that allows us to view things in themselves. This new vision or understanding of “reality” is precisely what gives way to phenomenology as a pertinent qualitative research design. The qualitative paradigm is known as a “decolonizer of method” (Lincoln & Guba, 2000), with a clear reference to an investigative endeavor that distances itself from the traditional quantitative method. The qualitative paradigm seeks to study the experiences of human beings in their most natural, purest scenarios. In this context, phenomenology occupies a transcendental area in the new paradigms of science: to systematically inquire into the mind and human experiences to reflect the essences of phenomena as well as the intentionality of conscience. After the statements exposed, the reader is left to answer on his or her own account: is phenomenology philosophy as science, or is it a philosophical science?

6. Discussion and Conclusions

Phenomenology has become an useful and meaningful design among educational and social sciences researches. Most of them, have understood that phenomenology is a genuine manner of representing the realities that participants experience in their lives. Although this premise is true, one of the biggest misconceptions about phenomenology (as a research design) is that it can be applied to all qualitative approaches. Indeed, perception is an element in all qualitative research designs, however, it is very important to consider the intention of the research and the problem to be resolved, before selecting phenomenology as a design. Usually, the type of problem best suited for this design is the study of lived/common experiences. The researcher has to understand the philosophical assumptions that are implied in the use of phenomenology.

Bracketing is another aspect that the researcher might employed while conducting a phenomenological research. The main aspect of phenomenology is to understand the essence of the experience that participants share within a common ground. It is important to understand that participants will bring out subjective and objective experiences. The emphasis while analyzing the data is on the essence (or common experiences) and on the significance of the experience. In other words, it is important to read the “text” and the “context” . This requires to analyze not only what is told by the participants but what it really means: textual and structural analysis). The categorization of the significant statements and meaning units which were verbalized by the participants are key within the data analysis process. Thus, interpretation and analysis skills from the researcher have to be adequately developed. Although deep interviews are the most common data collection method, observations and documents can be used to conduct the research. Phenomenology research can be considered directive as its sampling method is purposive. However, it is important to comprehend that all qualitative research has a phenomenological aspect to it, but the phenomenological approach cannot be applied to all qualitative researchers.

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The MECD Quality Certification Proposal of MOOC Courses

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Abstract: This article discusses the possible application of quality standards MOOC (Massive Open Online Courses) at the Ministry of Education, Culture and Sport (MECD) of Spain through EduTool®, registered trademark in the Spanish Office of Patent and Trademark (3,087,298 in force). This work comes from a line of research of the Pablo de Olavide University of Seville and it was developed in the Computational Intelligence Laboratory (hereinafter CIL) under the auspices of the UNE 66181. In the tool we have analyzed the weights of the subfactors of each of the dimensions (recognition of training, learning methodology and levels of accessibility) of this standard for Quality Management of Virtual Training for MOOC by fuzzy logic. In this sense, It arises the possibility to apply the quality certification of that tool to the Ministry MOOC educational offer in order to alleviate the high dropout rate of users in the MOOC pilot plan for teacher education occurred in 2014, within the lines of action of the project "New Forms of Training" and, thus, be avoided in the offered training activities for this current year 2015.

Key-Words: MOOC, Training, Educational Quality, Educational Assessment, Quality Management, MECD, E-Learning.

1. Introduction

The MOOC courses are a new form of training proposals to the webcast of content and a plan of learning activities open to collaboration and mass participation. These are courses with scalable web support and free for those who wish to access enrollment and continue training proposals.

The training MOOC proposals, term coined by Dave Cormier during the development of an open course on Connectivism in 2008, have spread

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globally with millions of participants in platforms such as Coursera, Udacity, EdX... In this sense, the National Institute of Educational Technologies and Teacher Training of the Ministry of Education, Culture and Sports of Spain (hereinafter NIETTT) began in 2014 a pilot plan of MOOC for teacher training within the lines of action of the project "*New Forms of Training*" in its MOOC platform educaLAB.

The MOOC movement is certainly a milestone in the education of the XXI century and it has brought a revolution to the Ministry of Education, Culture and Sports of Spain in the model of continuous training. In this way, its quality is an emerging field for researchers concerned with measuring such training qualitatively and quantitatively. Thus, most studies focus on calmly evaluating what these courses offer in their educational value in the field of training via the Internet and, more importantly, how they can improve in this regard. (Aguaded, 2013; Guàrdia *et al.*, 2013). Also, it doesn't seem so obvious that MOOC offer quality training (Martín *et al.*, 2013) and it would need to be improved if the goal is for them to be a disruptive milestone (Roig *et al.*, 2014).

Based on the above, this study emphasizes the need to certify the MOOC courses offered by the NIETTT through the EduTool® instrument, based on the AENOR standard (Spanish Association for Standardization and Certification). The main contribution of the tool in the field of e-learning tools is the UNE 66181 norm of Quality Management of Virtual Learning. This standard was updated in July 2012, after an initial version dating from 2008, and establishes a series of quality indicators headings with five levels for each one of them.

2. New Forms of Training at the National Institute of Educational Technologies and Teacher Training

In June 2014 it was announced on the blog of NIETTT that two MOOC courses had been completed. One of them dealt "PLE (acronym for Personal Learning Environment) for the professional development of teachers". After processing the data of participation, the Ministry makes an analysis on the experience of training non-university teachers started with the announcement of that course. This call was an experimental proposal and it is part of the main priorities of the "*New Forms of Training*" project in the framework for Teacher Professional Development, in collaboration with the Training Services of the Autonomous Communities in Spain.

Although they have not been officially certified, these open courses have been an opportunity for all participating teachers to be able to share their ideas and proposals on educational use of PLE and the PBL methodology (acronym for Problem Based Learning), and advance together in their digital competence and professional development as teachers connected to virtuality.

2.1. Results of experimental MOOC plan for teacher training.

A total of 14,237 users (58% female and 42% male) have been registered and logged on the platform that has supported these courses (<https://mooc.educalab.es/>). 61% of users come from Spain, with the regional distribution as shown in Table 1.

<i>Autonomous Community</i>	<i>Participation (%)</i>
Andalusia	27,0
Madrid	11,0
Castile and Leon	9,0
Valencia	9,0
Galicia	6,5
Castilla La Mancha	5,6
Catalonia	5,4
Asturias	3,6
Murcia	3,4
Aragon	3,0
Canary Islands	2,7
Basque Country	2,7
Extremadura	2,4
Navarre	1,8
Cantabria	1,8
Balearics Islands	1,5
The Rioja	0,7
Ceuta and Melilla	0,5

Table 1. *Percentage of user participation of the Autonomous Communities.* Source: <http://educalab.es/mooc>

As for users from other countries, the distribution of countries with the largest share in Table 2 is shown.

<i>Other countries</i>	<i>Participation (%)</i>
Mexico	9,6
Argentina	7,7
Colombia	6,0
Peru	5,8

Table 2. *Percentage of countries with the largest share of users.* Source: <http://educalab.es/mooc>

7,871 users were enrolled in the MOOC about "PLE for teacher development", which began on January 13 and ended in March. Of all those, only 66% initiated activities and 1,052 participants successfully completed them, 20% of them really started actively (13% of all enrolled). Given the

dedication required to complete the plan of activities of the course and that the percentage of completion of a MOOC is usually very low, this data is important and positive. Table 3 shows the generated products as a result of participation (full or partial).

<i>Course of "PLE for the professional development of teachers"</i>	
Created Products	Number
Blogs	1,700
Virtual Communities	120
Discussion Threads	1,500
Digital emblems delivered to complete the first module	900
Digital emblems delivered to complete the course	700
Venues face # MOOCafé	40
Hangouts	49
Tagged tweets #eduPLEmooc during the first 30 days	21,000

Table 3. *Products from user participation.* Source: <http://educalab.es/mooc>

In the “PBL” MOOC course, which began on March 31 and ended in early June, 5,137 users were enrolled, where only 71% initiated activities. The 11% of those who started completed the course successfully (402), and 349 collected the final emblem. Also, this course has generated as a result of learning activities, a series of products shown in Table 4.

<i>“PBL” Course</i>	
Created Products	Number
Collection of publications of the course product in Flipboard	1
Course planet blogs	1
PBL communities in Procomún network	10
Followers in channel of course in Twitter	3,000
Messages with hashtag #ABPmooc_INTEF	10,000
Pins in board in Pinterest	91
Social bookmarking Group of resources about PBL in Diigo	1

Table 4. *Products of the participation of users.* Source: <http://educalab.es/mooc>

The feedback from participants has been very positive, being in the top quartile more than 90% of responses on the evaluation forms, as shown in Figure 1. In the NPS question (Net Promoter Score) in scale 0-10 about if students would recommend the course to a colleague, both courses have had an average above 8.

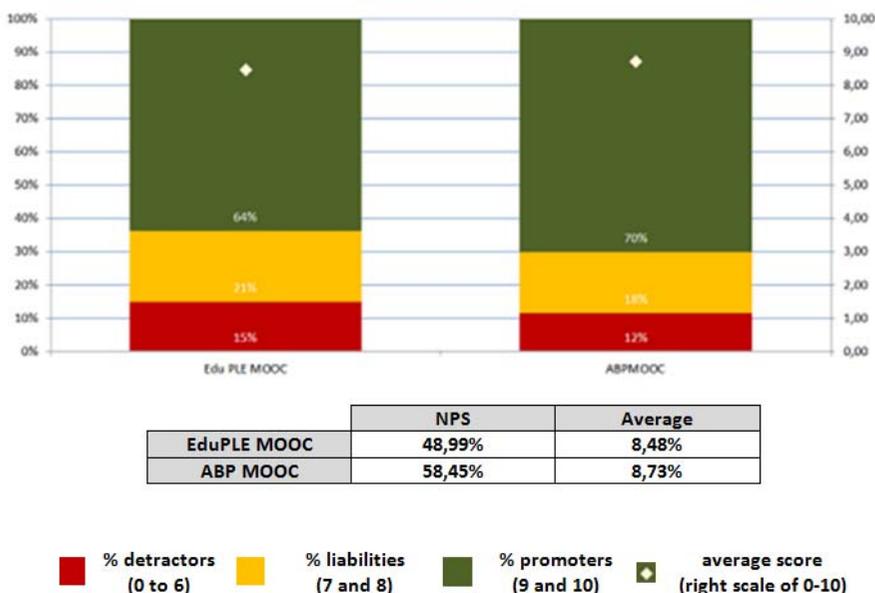


Figure 1. Assessment of the participants. Source: <http://educalab.es/mooc>

2.2. MOOC training assessments made by the Ministry of Education, Culture and Sports.

Participation was really massive, hence the thousands of participants who enrolled as tracking who have had courses in educational platform. It is a modality which can be very useful in promoting non-formal training processes.

It is questionable whether the results would have been better with certification of activity who completed the activities plan with the relevant publication in its digital portfolio of evidence of their learning in the course. Perhaps many more teachers would have participated with a proposal for certification of activity by education authorities.

Much of the success of the courses has resided in the good work of facilitation teams and energizing them, and training actions that have been built on a plan of activities aimed at promoting interaction, generation of communities, creating products in collaboration and web dissemination of all materials generated.

Assessment processes have been raised appropriately: blog as portfolios of learning evidence, peer review by P2P activity headings, automated assessment of the system (which records video opening, completion of questionnaires, P2P activities and participation in the forum) and self-assessment processes.

As an element of motivation and recognition of the work performed, each course proposed to get 3 digital emblems (they were given a total of 2,420 emblems in the MOOC of PLE and 1,322 in the MOOC of PBL) implemented by *Mozilla Open Badges*. Forums assigned "medals" to the most active participants. Thus, it has initiated a new way of recognition of training, more associated with the development of competencies and personal learning graph.

The MOOC format is shown as a new form of training that can be useful for teacher training oriented to career development, but can also be useful for the educational system both in skills training and networking support to students learning with participation of families and generating learning communities and "*learning hubs*". It could also be used to generate workgroups in schools, whose results were certified by the education authorities of the autonomous community.

As indicated in the European initiative "*Opening up Education*" (2013), these new forms of mass training can encourage students to create and produce their own products and contents as a result of learning in inter-centers cooperation projects. Besides offering new innovative opportunities for schools, teachers and students, allowing to extend the use of open educational resources (OER) and facilitating widespread access.

Thus, as has been done in other countries, it would be advisable to centralize the whole range of mass training for non-university teachers on the same platform, and establish basic common criteria for validating of courses and possible forms of accreditation of developed learning. MOOC certification of quality offered by the NIETTT institution becomes necessary based on the latter idea.

3. EduTool® Instrument as Quality Evaluation and Accreditation Proposal of the NIETTT MOOC Training Mode

3.1. The UNE 66181:2012 standard on quality management of virtual training.

The phenomenon of virtual training facilitated by globalization and the development of information and communications technology (hereafter ICT) has been remarkably developed in recent years, which has helped to improve and expand the existing educational offerings. This type of training is used by many organizations to comply with paragraph 6.2 of the UNE-EN ISO 9001 norm on systems of quality management, to "provide the necessary demand to employees and ensuring their competence". In this sense, it is necessary "to ensure that the acquired virtual training meets the specified purchase requirements" according to section 7.4 of that standard.

Therefore, the UNE 66181: 2012 norm is intended to serve as a guide to identify the characteristics of virtual training activities, so that users can select

virtual courses that best suit their needs and expectations, and that educational organizations can improve their offer and student satisfaction too. In this sense, the dimensions of the satisfaction factors of virtual training are: employability, learning methodology and accessibility.

The information of quality levels is expressed according to a system of representation of cumulative stars, where one star represents the minimum level and five stars represent the highest level. Thus, the level reached in each dimension is represented by an equal number (from 1 to 5) of accumulated black stars from the left, followed by the remaining stars until five without a color (white). Therefore, the quality levels of this standard are cumulative, so that each level is also the sum of the contents of the previous levels.

However, these headings have been adapted to an instrument that can easily measure the courses with quality indicators. In summary, a MOOC course could include indicators of different headings of quality levels and it wouldn't be cumulative, so that each quality standard could be valued and would not have to contain the sum of the indicators from previous levels (Baldomero *et al.*, 2015a).

3.2. Stage study and analysis of research of the EduTool® instrument.

The EduTool® instrument is in the line of work started in the ICT teaching innovation research 2.0 in the European Higher Education Area, located in the framework of Action 2 of Innovation Projects and teaching development subsidized by the Department of Teaching and European Convergence of the Pablo de Olavide University of Seville and developed in the CIL.

This tool, with registered trademark at the Spanish Patent and Trademark Office (file number in force: 3,087,298), has the following dimensional structure (Baldomero *et al.*, 2015b):

- The dimension of the recognition of training for employability consists of 6 items.
- The dimension of the learning methodology contains 43 items divided into four sub-factors: the didactic-instructional design (11), training resources and learning activities (10), mentoring (9) and digital technology-learning environment (13).
- The dimension of the accessibility levels contains 21 items divided into three sub-factors: the hardware accessibility (7), accessibility software (7) and web accessibility (7).

Each item is dichotomous (yes/no) and measures the clarity of the claims of each subfactor indicator of the corresponding dimension. The defuzzified values or weights of the obtained sub-factors are distributed evenly among the indicators for each scope of each. This criterion of

distribution in this research has been used because it is a simple continuous pattern. That is, in the case of adaptations of standard indicators, presumably stochastic, these can only take values between two ends: a and b. Thus, all slots of the same length (inside the ends) has the same probability, as shown in the expression (1).

In this sense, scope levels (Beginner, Basic, Good, Very Good or Excellent) of the same sub-factor will have the same weight corresponding to the proportional share of defuzzified value of the sub-factor divided between five levels of reach. Thus, the total set of indicators for each reach level will have the same weight, which also corresponds to the proportion of the number of indicators in the range one.

$$f_x(x) = \begin{cases} \frac{1}{b-a} & \text{if } x \in (a, b) \\ 0 & \text{if } x \notin (a, b) \end{cases} \quad (1)$$

Therefore, the distribution function of the weights is obtained by integrating the density function, as shown in Formula 2.

$$P(X \leq x) = \begin{cases} 0 & \text{if } x \leq a \\ \frac{x-a}{b-a} & \text{if } x \in (a, b) \\ 1 & \text{if } x \geq b \end{cases} \quad (2)$$

For example, and based on this, the weights distribution in the sub-factor 1.1 is clarified as shown in Table 5. The weighting of this sub-factor is 9.51%. Therefore, for each level of scope shall correspond 1.902% (9.51/5) and, according to the number of indicators that contains each level of scope, the weights will be allocated proportionally to each indicator of the level. Thus, for level indicators "Very Good" will correspond a weighing of 0.951% (1,902/2).

Dimension 1: Recognition of the training for employability				
Sub-factors of satisfaction	Levels	Indicators	Assessment	
1.1. Recognition of the training for employability	Beginner	No diploma or certificate is not issued (if it is received something, pointing)	1.902%	
	Basic	Students receive a certificate of attendance	1.902%	
	Good	A certificate for those students who pass an assessment test of knowledge acquired is granted	1.902%	
	Very Good		The certificate of knowledge is recognized by the Administration or by an external prestigious entity	0.951%
			A monitoring process of training recognition is performed	0.951%
	Excellent	The reached title or certificate has international validity	1.902%	
Peso del subfactor 1.1.: 9.51%				

Table 5. Weight values of the indicators of sub-factor 1.1. "Recognition of training for employability" from defuzzified value of weigh. Source: Baldomero and others (2015c).

In Social Sciences, the instruments design must fulfill two basic and fundamental conditions for its implementation and validation: content validity and reliability. Thus, the content validity is the efficiency with which an instrument measures what it purports to measure (Chávez, 2004; Hurtado, 2010). That is, the grade to which an instrument reflects content domain-specific of what is measured and, therefore, that the selected items are truly indicative of what is to be measured (Hernández *et al.*, 2010).

This study checks the validity of the content of the instrument in the literature review and the regulatory framework on which it is based, that is, the UNE 66181 standard. In this sense, it is premised that this norm meets the attributes of an opinion of experts, that is, it is considered an informed opinion of people with experience in the subject, which are recognized by others as qualified experts, and they can provide information, evidence, judgments and assessments (Escobar and Cuervo, 2008).

With regard to the reliability of the instrument of information collection, a measurement is reliable or safe, when applied repeatedly to the same individual or group, or simultaneously by different researchers, provides the same or similar results (Sánchez and Guarisma, 1995). In this same discursive line, different authors indicate that the reliability of a measuring instrument refers to the degree to which its repeated application to the same individual or object produces the same results and the accuracy of data in the sense of stability, repeatability or precision (McMillan and Schumacher,

2010; Hernández *et al.*, 2010). In this study, it is displayed that the reliability of the instrument for obtaining the same results when it is applied by different investigators and the use of free scales of deviations, since each item is dichotomic.

3.3. The graphic quality of the EduTool® instrument.

Figure 2 shows the representation in the space of two MOOC quality triangles (Baldomero *et al.*, 2015c). On the one hand, the ideal orthic triangle of MOOC supreme quality indicates an equilateral triangle (for all three dimensions of the instrument) by the highest scores in all quality dimensions (cut to the axes in the point 1 is the thereof). This ideal triangle is called orthic because it is the highest quality projection area and it will serve as a reference for measuring the "lack of quality" of the MOOC courses. On the other hand, the second triangle has been shown the actual quality triangle (hatched area) of a MOOC course anyone when the tool is applied to it, which intersects with the mentioned axes above at lower points to 1.

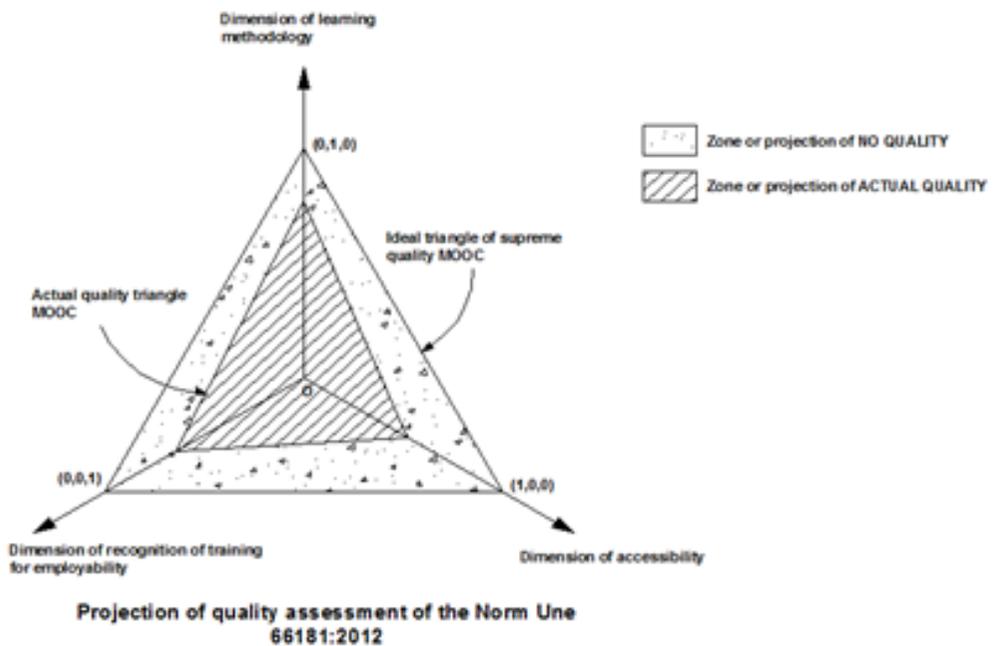


Figure 2. Representation of isometric triangles of quality of MOOC. Source: Baldomero and others (2015c).

4. Conclusions

This article will come to the same conclusions as in other studies, where it is evidenced that the MOOC courses of NIETTT have a solid educational foundation in their formats (Glance *et al.*, 2013). So, in general, we can say that the evaluation of the analyzed quality courses in this platform have a quality score slightly above average (Roig *et al.*, 2014).

As for the two offered MOOC courses by the NIETTT, and unlike other studies (Roig *et al.*, 2014), there is a significant difference in educational terms between them, as it can appreciate differences in the degree of homogeneity of the quality thereof. In this sense, this instrument would analyze the quality (single and average) of the NIETTT MOOC offer and the degree of homogeneity of the offered quality for it.

Therefore, although these two courses have broken into the network training relevantly, It is observed in the evaluation by the Ministry of Education, Culture and Sports of Spain that there is a lack of quantitative quality in terms of virtual training (13% and 11% of participants culminated the courses respectively). Because of this, MOOC courses, as a new educational response within a techno-social environment, the Net, have not yet reached a break with online training models of e-learning (Roig *et al.*, 2014). It is necessary to find new research ways to open an interdisciplinary center of attention and reflection on the shortcomings of those sub-factors of the analyzed dimensions in this research.

In this way, it could accredit to NIETTT with certified MOOC courses and prevent the supply of training activities with weaknesses in inappropriate teaching methodologies from the current educational theories and impeding, as far as possible, the tendency to standardization of knowledge and serious problems to address individual differences due to overcrowding, which leads to a unidirectional communication design, teacher-centered and based on the content.

In any case, the assessment of the quality of these courses is on the research agenda for the future (Baldomero *et al.*, 2015c). In this regard, more studies about some indicators of e-assessment quality in online courses is necessary, as well as longitudinal studies (Stödberg, 2012) or comparative ones (Balfour, 2013). And more specifically, continue researching to answer questions about methods to improve reliability, validity, authenticity and safety of user assessments, or techniques which could offer effective automated assessment and immediate feedback systems; and how they can be integrated into open learning environments (Oncu and Cakir, 2011) to provide more usability guarantee to quality tools that can be developed, alleviating the high degree of user abandonment..

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