

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.

^a Universidad Metropolitana (Puerto Rico, United States). Correspondence: Alice J. Casanova, Doctoral Program. College of Education, Universidad Metropolitana, PO Box 21150, San Juan, PR 00928 (Puerto Rico, United States). casanova1@suagm.edu.

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.

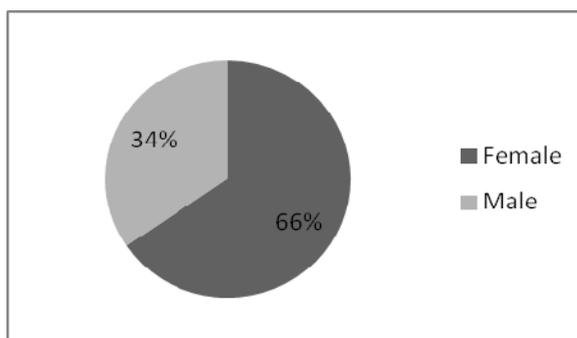


Figure 1. Participants by gender

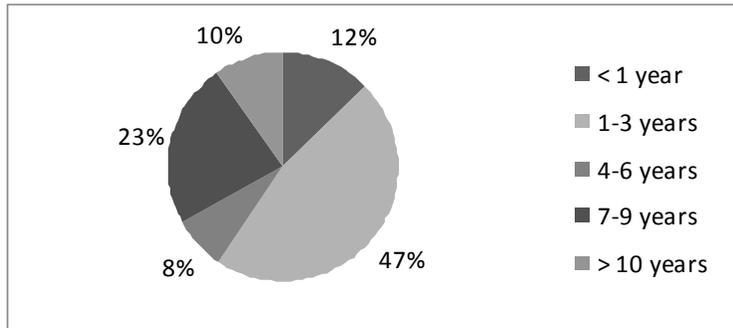


Figure 2. Participants by teaching experience in virtual education

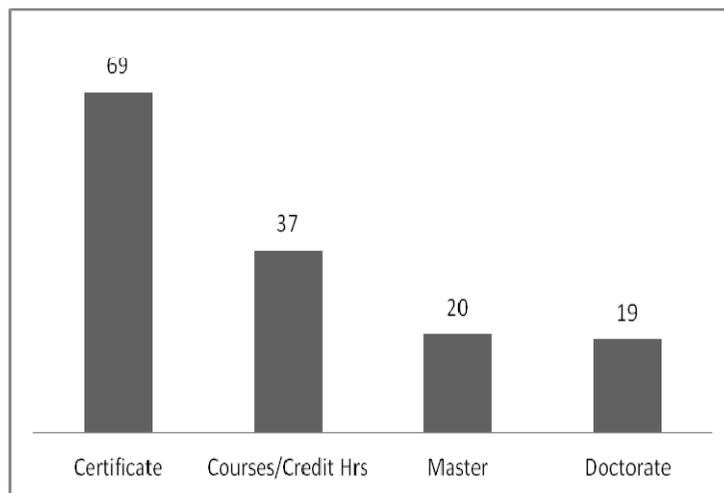


Figure 3. Participants by type of credentials and/or training earned

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.

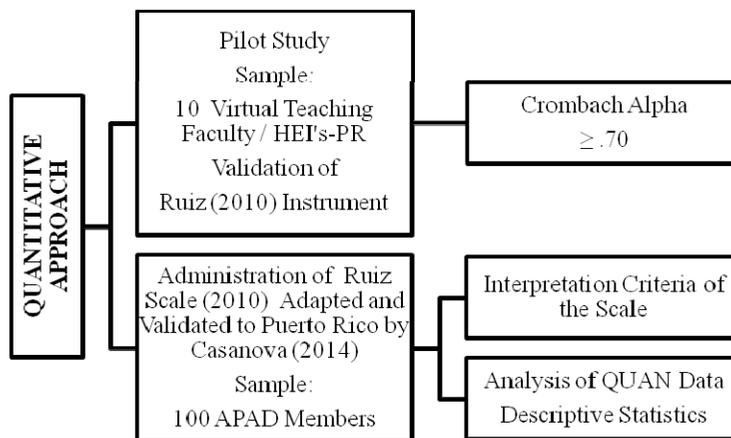


Figure 4. Quantitative Approach Procedure

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.

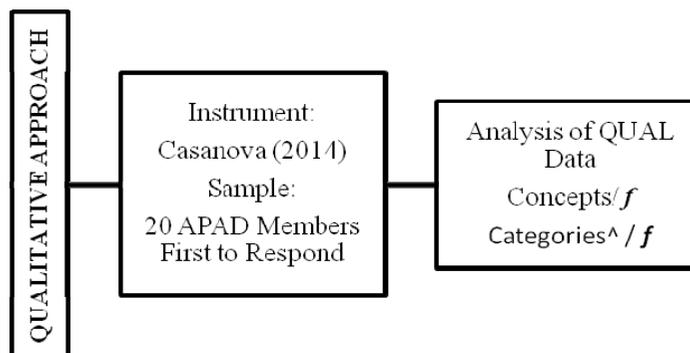


Figure 5. Qualitative Approach

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).

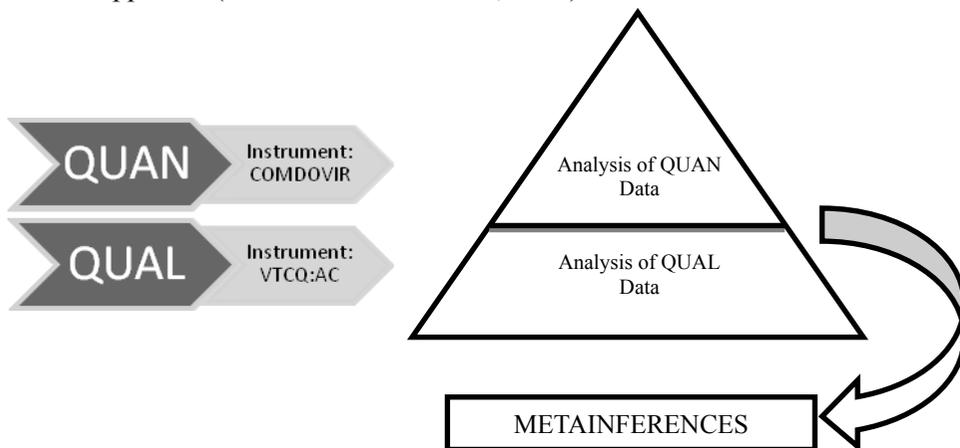


Figure 6. Combined Analysis of QUAN & QUAL Data Sets

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).

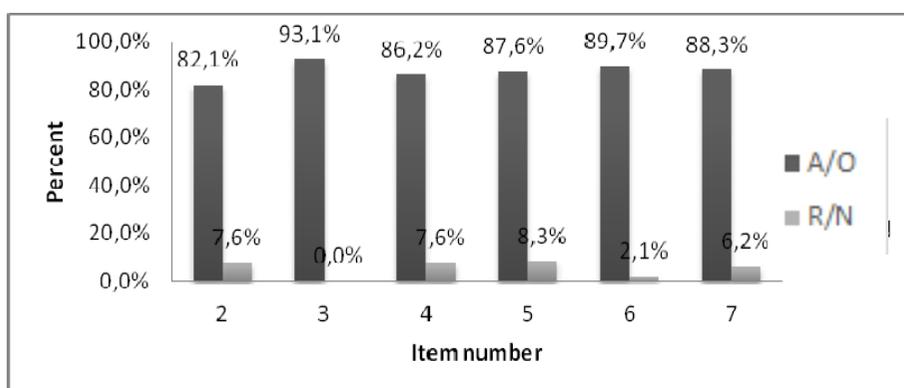


Figure 7. *Pedagogical dimension: Percentage of responses on the items associated to instructional design*

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).

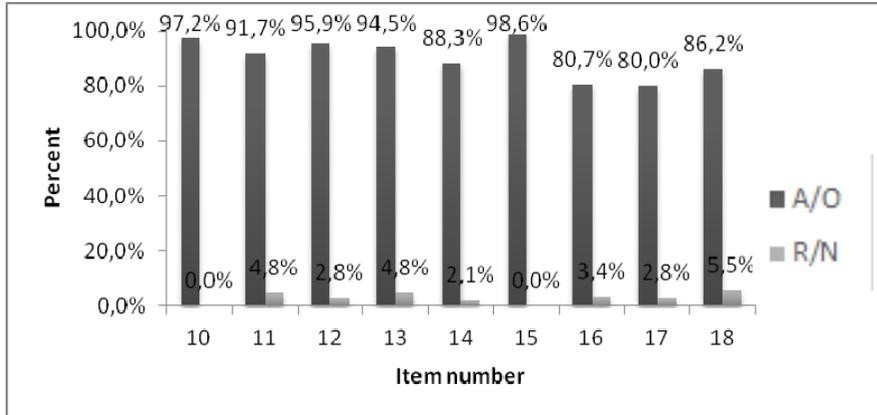


Figure 8. Pedagogical dimension: Percentage of responses on the items associated to academic management

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.

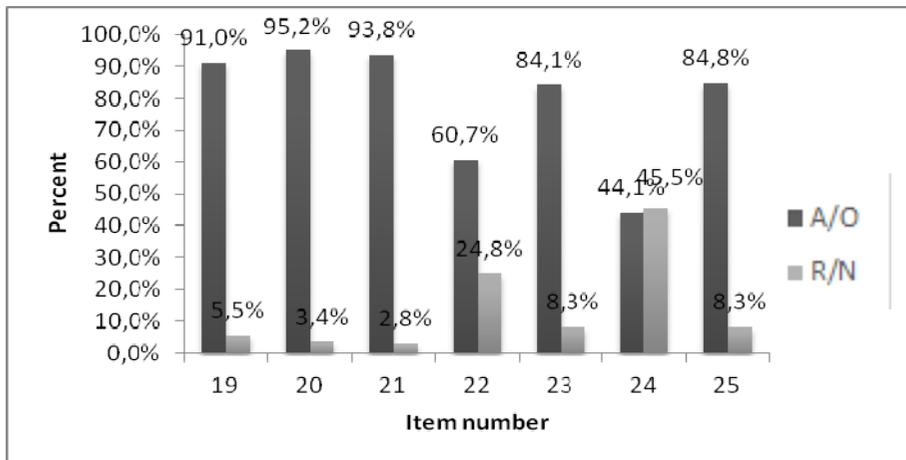


Figure 9. Technological dimension: Percentage of responses on the items associated to the design of learning ambiance

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).

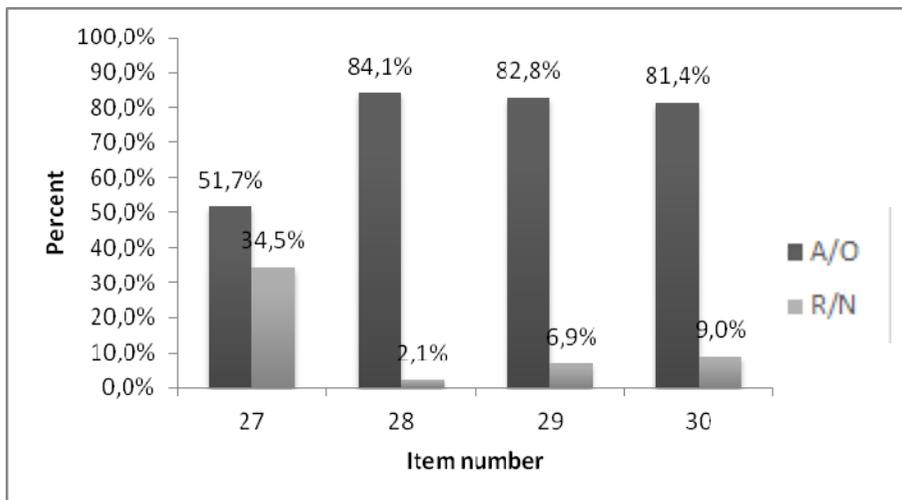


Figure 10. Technological dimension: Percentage of responses on the items associated to management of technology tools

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).

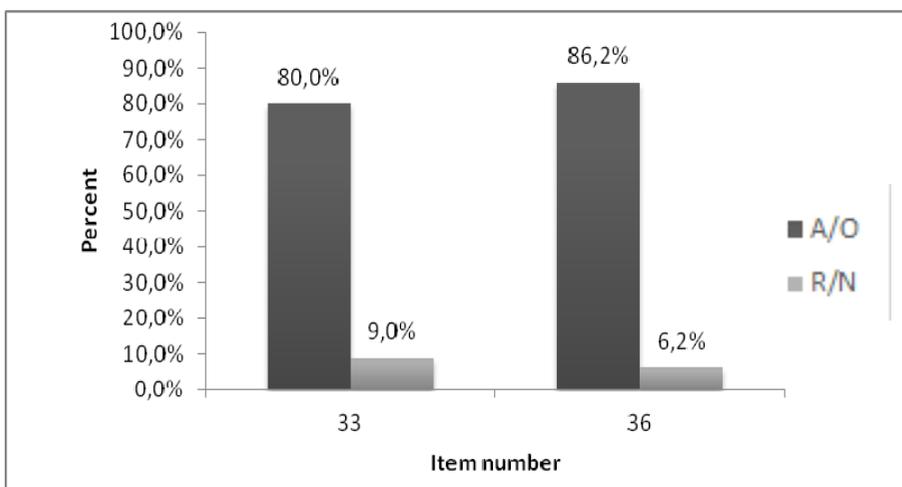


Figure 11. Interpersonal dimension: Percentage of responses on the items associated to communication aspects

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).

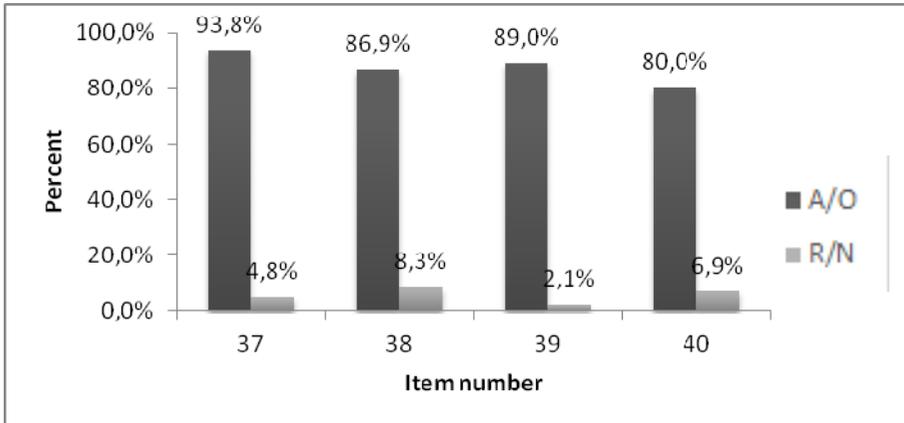


Figure 12. Interpersonal dimension: Percentage of responses on the items associated to social aspects

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).

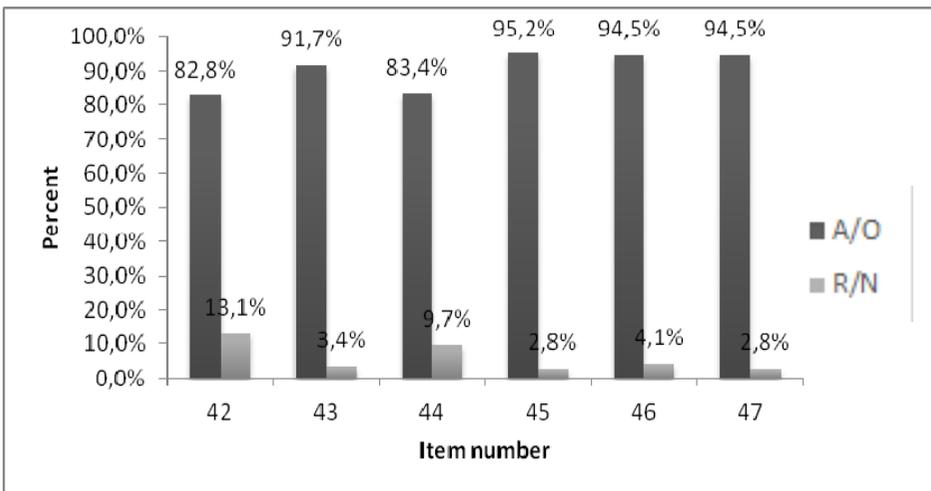


Figure 13. Management dimension: Percentage of responses on the items associated to managing the course

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>
		∑ 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.
		∑ 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.
--	--	--	--	----------------------------------

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.
----	---	-----	--	---

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>
--	--	--	--	--

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%	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	
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%).
--	--	--	--	---

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.

References

- Abel, R. (2005a). *Achieving Success in Internet-Supported Learning in Higher Education: Case Studies Illuminate Success Factors, Challenges, and Future Directions*. Lake Mary, FL: The Alliance for Higher Education Competitiveness.
- Abel, R. (2005b). Implementing Best Practices in Online Learning. *EDUCAUSE Quarterly*, 28 (3), 1-6. Retrieved from http://www.ahec.org/e-learning_study.html.
- Bonilla-Romeu, M. (2009). *Educación Virtual: Nuevo Paradigma en el Proceso de Enseñar y Aprender*. (2da. Ed.). San Juan, PR: Publicaciones Puertorriqueñas.
- Conceicao, S., (2006). Faculty Live Experiences in Online Environment. *Adult Education Quarterly*, 57 (1), 26-45.
- Creswell, J. (2008b). *Research Design: Qualitative, and Mixed Methods Approaches*. Third Ed. Thousand Oaks, CA: Sage.
- Creswell, J. & Plano, V. (2011). *Designing and Conducting Mixes Methods Research*. 2nd Ed. Thousand Oaks, CA: Sage.
- Creswell, J. W. (2013a). *Qualitative Inquiry Design: Choosing Among Five Approaches*. Thousand Oaks, CA: Sage.
- Galvis, R. (2007). De un Perfil Docente Tradicional a un Perfil Docente Basado en Competencias. *Acción Pedagógica*, 48-57
- García, L, Ruiz, M., & Domínguez, D. (2008). De la Educación a Distancia a la Educación Virtual. *International Review of Research in Open and Distance Learning*, 9, (1). 1-9
- García, L. (2006). *La Educación a Distancia: De la Teoría a la Práctica*. Barcelona: Editorial Ariel.
- Gaytan, J. (2006). Distance Education versus Classroom Instruction: A Literature Review of Meta-Analysis Studies. *Business Education Forum*, 61(2), 53-55
- Gaytan, J. (2007a). A Review of Empirical Research Related to Online Teaching and Learning. *Texas Business and Technology Educators Association Journal*, 10(1), 21-25.
- Gaytan, J. (2007b). Visions Shaping the Future of Online Education: Understanding its Historical Evolution, Implications, and Assumptions. *Online Journal of Distance Learning Administration*, 10(2). Retrieved from <http://www.westga.edu/~distance/ojdla/>
- Gaytan, J. (2008). Understanding Teaching with the Internet in Business Education: A Grounded Theory Study. *The Delta Pi Epsilon Journal*, 50 (1). 31-44.
- Gaytan, J. (2009). Analyzing Online Education through the Lens of Institutional Theory and Practice: The Need for Research-based and Validated Frameworks for Planning, Designing, Delivering, and

- Assessing Online Instruction. *The Delta Pi Epsilon Journal*, 51 (2), 62-75.
- Henderson, R. & Chapman, B. F. (2007). Best Practices for E-Learning Course Development. *Journal of Applied Research for Business Instruction*, 4 (5), 1-6.
- Henderson, R. & Chapman, B. F. (2010). E-Learning Quality Assurance: A perspective of Business Teacher Educators and Distance Learning Coordinators. *The Delta Pi Epsilon Journal*, 52 (1), 16-31.
- Hernández, R., Fernández, C., y Baptista, P. (2006). *Metodología de la Investigación*. México: McGraw-Hill Interamericana.
- Herrera, L., Mendoza, E., & Buenabad, M., (2009) Educación a Distancia: Una Perspectiva Emocional e Interpersonal. *Apertura*, 9 (10). 62-77.
- Holstead, M., Spradlin, T., & Plucker, J. (2008). Promises and pitfalls of virtual education in the United States and Indiana. Center for Evaluation & Education Policy. *Education Policy Brief*, 6 (6), 1-16.
- Huber, L. (2013). *AQUAD: Análisis de Datos Cualitativos*. Retrieved from <http://www.aquad.de/es/>
- Huertas, M. (2003). *Percepción de los Estudiantes y de la Facultad del Bachillerato en Administración de Sistemas de Oficina sobre un Programa de Educación a Distancia*. (Unpublished Doctoral Dissertation). San Juan, PR: Universidad Interamericana de Puerto Rico, Recinto Metropolitano.
- Jamison, S. G. (2007). *Online Law School Faculty Perceptions of Journaling as Professional Development: Influences, Barriers and Pitfalls*. (Unpublished Doctoral Dissertation). Minneapolis, MI: Capella University. Retrieved from Dissertations & Theses: Full Text (Publication No. AAT 3249904).
- Kinney, T. y Taylor, J. (1998). *Investigación de Mercados*. Colombia: McGraw-Hill Interamericana, S.A.
- Lan, H. (2007). *A Case Study of the Implementation Process of Web-based Distance Education Programs in Zhongshan University, China: Problems, Strategies, and Policy Implications*. (Unpublished Doctoral Dissertation). Minneapolis, MI: University of Minnesota. Retrieved from Dissertations & Theses: Full Text Dissertations & Theses: Full Text. (Publication No. AAT 3268996).
- Lewis, T. O. (2007). *The Preparation of Faculty to Teach Online: A Qualitative Approach*. (Unpublished Doctoral Dissertation). Blacksburg, VA: Virginia Polytechnic Institute and State University. Retrieved from ProQuest Information and Learning Company. UMI Number: 3256126.
- Madjidi, F., Hughes, H. W., Johnson, R. N., & Cary, K. (1999). *Virtual Learning Environments*. ERIC ED429565.

- Martínez de Sandoval, L. (2003). *La Educación Virtual: Consideraciones acerca de su Filosofía y Práctica*. (Unpublished Doctoral Dissertation). Cincinnati, Ohio: Union Institute and University. Recuperado el 29 de noviembre de 2011. Retrieved from Dissertations & Theses: Full Text (Publication No. AAT 3088542).
- Mayes, T. (2001). *Learning Technology and Learning Relationships In Teaching & Learning Online*. Londres: Kogan Page Limited.
- Meléndez, J. (1998). *La Educación a Distancia y las Destrezas de Pensamiento: Un Estudio de Caso de las Destrezas de Pensamiento de los Cursos de SEDUE del Sistema Universitario Ana G. Méndez*. (Unpublished Doctoral Dissertation). San Juan, PR: Universidad Interamericana de Puerto Rico, Recinto Metropolitano.
- Meléndez, J. (2010). *La Educación Virtual en Puerto Rico*. In C. Rama & J. Pardo (Eds.). *La Educación Superior a Distancia: Miradas Diversas desde Iberoamérica*. Madrid: INTEVED.
- Mishra, P. & Koehler, M.J. (2007). Technological Pedagogical Content Knowledge (TPCK): Confronting the Wicked Problems of Teaching with Technology. In R. Carlsen, K. McFerrin, J. Price, R. Weber & D. Willis (eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2007* (pp. 2214-2226). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).
- O'Neil, T. (2006). *How Distance Education has Changed teaching and the Role of the Facilitador*. Slovabia: E-Leader.
- Omen-Early, J. & Murphy, L., (2009) Self Actualization and E-Learning: A Qualitative Investigation of University Faculty's Perceived Needs for Effective Online Instruction. *International Journal of E-Learning*, 8 (2), 223-240.
- Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura. (2008). *Estándares de Competencia en TIC para Docentes*. Retrieved from <http://www.eduteka.org/EstandaresDocentesUnesco.php>
- Rama, C. & Pardo, J. (Eds.) (2010). *La Educación Superior a Distancia: Miradas Diversas desde Iberoamérica*. Madrid: INTEVED.
- Rama, C. (2010). La Tendencia a la Despresencialización de la Educación Superior en América Latina. *Revista REID*, 13(1), 39-72.
- Rodríguez, C. (2005). *La Triangulación como Estrategia de Investigación en Ciencias Sociales*. Retrieved from <http://www.madrimasd.org/revista/revista31/tribuna/tribuna2.asp>
- Rodríguez, C., Pozo Llorente, T., Gutiérrez Pérez, J. (2006). *La Triangulación Analítica como Recurso para la Validación de Estudios de Encuesta Recurrentes e Investigaciones de Réplica en Educación Superior*. RELIEVE, 12 (2). Retrieved from http://www.uv.es/RELIEVE/v12n2/RELIEVEv12n2_6.htm

- Ruiz, C. (1991). Desarrollo de una Escala de Actitud hacia la Innovación Educativa. *Revista Investigación y Postgrado*, 6 (1) 49-91.
- Ruiz, C. (2000). Análisis de Factores y Desarrollo de Instrumentos. *Revista Paradigma*, 21 (1) 9-42.
- Ruiz, C. (2006). *Instrumentos de Investigación Educativa: Procedimientos para su Diseño y Validación*. Barquisimeto: Ediciones CIDEG
- Ruiz, C. (2010). *Conceptualización y Medición de la Competencia del Docente Virtual*. (Unpublished Master Dissertation). Salamanca: Universidad de Salamanca.
- Senge, P. (2006). *The Fifth Discipline: The Arts and Practice of the Learning Organization*. London: Doubleday Publishing Group.
- Shulman, L. (1986). Those who understand: Knowledge Growth in Teaching, *Educational Research*, 15 (2), 4-14.
- Smith, D. & Mitry, D. (2008). Investigation of Higher Education: The Real Costs and Quality of Online Programs. *Journal of Education for Business*, (83) 3, 147-152.
- Tashakkori, A. & Teddlie, C. (2010). Overview of Contemporary Issues in Mixed Methods Research. In *Handbook of Mixed Methods in the Social and Behavioral Research* (2nd Ed.). (pp. 1-41). Thousand Oaks, CA: Sage.
- Tashakkori, A., & Teddlie, C. (2009). Integrating Qualitative and Quantitative Approaches to Research. In D. J. Rog & L. Bickman (eds.), *Handbook of Applied Social Research Methods* (2nd Edition). Thousand Oaks, CA: Sage
- Tashakkori, A., & Teddlie, C. (2003). *Handbook of Mixed Methods in the Social and Behavioral Sciences*. Thousand Oaks, CA: Sage.
- Tebes, M. L. (2003). Critical Issues in the Diffusion of Innovation: A Distance Learning Program at a Small Private University. (Unpublished Doctoral Dissertation). Minneapolis, MI: Capella University. Retrieved from Dissertations & Theses: Full Text (Publication No. AAT3102815).
- Teddlie, C. & Yu, F. (2007). Mixed Methods Sampling: A Typology with Examples. *Journal of Mixed Methods Research*, 11 (1), 77-100.
- Ulmer, L., Watson, L., Derby, D. (2007). Perceptions of Higher Education Faculty Members on the Value of Distance Education. *The Quarterly Review of Distance Education*, 8(1), 59-70.
- Wenger, E. (1998). *Communities of Practice: Learning, Meaning and Identity*. Cambridge, MA: Cambridge University Press.
- Zawacki-Richter, O. (2009). Research Areas in Distance Education: A Delphi Study. *International Review of Research in Open and Distance Learning*, 10 (3), 1-17.



© 2015 Casanova Ocasio and Vega Lugo; licensee International Journal of Educational Excellence, Universidad Metropolitana (SUAGM). This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited.