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Participant Interaction in a Latin American Online Leadership Training Course

Manuel E. Contreras
Mary Dolan

Integration and Regional Programs Department
Inter-American Institute for Social Development

INTER-AMERICAN DEVELOPMENT BANK
July 2006. Working Papers Series I-61

Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library

Contreras C., Manuel E.

Participant interaction in a Latin American online leadership training course / Manuel E. Contreras, Mary Dolan.

p. cm. (INDES Working paper series ; I-61)
Includes bibliographical references.

1. Leadership—Computer-assisted instruction. 2. Web-based instructions. 3. Leadership—Study and teaching. I. Dolan, Mary. II. Inter-American Institute for Social Development. III. Series.

HM1261 .C76 2006 303.34 C76—dc22

The document is one of a series of studies sponsored by the Inter American Institute for Social Development (INDES), concerning the main economic and social phenomena affecting the development of Latin America and the Caribbean, as well as possible teaching methodologies to approach such topics. The purpose of the Working Paper Series is to highlight the findings and conclusions from studies carried out by the Institute and to promote the exchange of ideas on subjects related to management for social development and on training related to these issues.

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Inter-American Institute for Social Development
1350 New York Avenue, N.W.
Washington, D.C. 20577
Stop B200
E-mail: indes@iadb.org
Fax: 202-623-2008
Web Site: www.indes.org

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Participant Interaction in a Latin American Online Leadership Training Course

Manuel E. Contreras [1]
Mary Dolan [2]

Working Papers Series I-61
Washington, D.C.
2006

[1] Academic Coordinator and Senior Lecturer of the Inter-American Institute for Social Development (INDES) at the Inter-American Development Bank. He teaches Public Policy, Organizational Learning and Leadership since 1999. Developed the first online course at INDES in 2004 and is a major actor in the expansion of distance learning. He has PhD in Economic History from Columbia University and an MA in Area Studies (Latin America) from the London School of Economics.

[2] Research and Teaching Assistant at INDES. She has a Masters from Georgetown University in Spanish and Portuguese Literature and Cultural Studies as well as a certificate for teaching English, both as a second (TESL) and foreign language (TEFL).

CONTENTS

Abstract

This paper draws on current research and analyzes participant interactions in a 12-week leadership online training course with students from 14 Latin American countries. The paper systematizes the experience of the Inter-American Institute for Social Development (INDES) and constitutes a case study of an experience in a regional, non-academic online training course. The research concentrates specifically on the effects of and influences on different types of interaction, particularly taking into consideration the intricacies and interrelations of participation, critical thinking, achievement and their relationship to gender. The paper quantifies student-to-student postings in the different online discussion conferences, relates the postings to activity types as well as learning outcomes, and gauges the levels of critical thinking in the postings. The analysis is carried out by gender in order to highlight similarities and differences between male and female participants. Finally, other forms of interaction (student-to-content, interface and, instructor) are briefly analyzed using student reports and surveys. Our results suggest positive influences of interaction for an online course, illustrated by positive correlations between grades for written course work and number of postings in the activity conferences as well as total number of postings in all conferences. Additionally, results also point to certain gender preferences for particular discussion forums, but due to the small sample size, no definitive conclusions could be made.

Introduction[3]

The quantity and quality of participant interaction is key for successful online courses (Beuchot and Bullen, 2005; Bullen, 1998; Dennen, 2005; Harasim, 2000; Jiang and Ting, 2000; LaPointe and Gunawardena, 2004; Ng and Murphy, 2005; Sims, 2003; Swan, 2001; Swan and Shea, 2005; Swan and Shih, 2005). Participant interaction has been studied extensively from a variety of perspectives. Yet all research reports exclusively on university courses with students predominantly from a single country. Moreover, most of the reported research is from populations in Anglophone countries (mostly the United States, Britain, Canada and Australia).

This paper reports a study of participant interactions in a 12-week leadership online training course with students from 14 Latin American countries. The paper systematizes online course procedures used by the Inter-American Institute for Social Development (INDES) and constitutes a case study of an experience in a regional non-academic online training course. The research concentrates specifically on the effects of and influences on various types of interaction, particularly taking into consideration the intricacies and interrelations of participation, critical thinking and achievement, and how they relate to gender. In so doing, it also contributes to the minute body of literature reporting on experiences from non-Anglo countries and, more specifically, from a Latin American perspective.

The implications of this investigation serve a dual purpose, one for INDES and the other for the more general audience interested in online education, especially as it pertains to the Latin American context. For INDES, the results and conclusions aim to further enhance and develop the design, execution and evaluation of a successful online course. By providing the contemporary body of research with a unique study group, we intend to broaden the spectrum of research to highlight the intrinsic differences and similarities inherent within the course. With the expansion of online education to international and multicultural audiences, we venture that such observations and considerations will be useful for drafting, implementing and improving online courses that operate across diverse populations and cultures. Given that our work concentrates on Latin American communities, we have a special interest in cultural differences between our target population and Anglophone countries that may or may not impact the nature of interaction and how one should design and facilitate an online course. Considering our focus on socio-cultural influences and student-to-student interaction in the unconventional realm afforded by online learning, we have also deemed it fundamental to address the role of gender in our investigation.

In the interest of determining the effects of interaction in an online course, we delineated three broad areas for interactive characteristics to be investigated. First, we concentrated predominantly on student-to-student interaction, as opposed to other types of interaction, in part because it is the participation registered in the online forums and also because of the INDES emphasis on the participatory nature of management for social development and its social constructivist approach to learning. As a starting point, we considered the number or

[3] We thankfully acknowledge the help of Jorge Ugaz in generating all statistical results and analysis, and the useful and constructive comments of Karen M. Mokate and the external reviewer to previous drafts. All errors and omissions remaining are our own responsibility.

frequency of student postings in various conference types to analyze any general trends regarding where and when postings occurred. We then determined any correlation between student learning as determined by pre-tests, post-tests, and course achievement with frequency of postings.

Second, in order to address the quality of the postings as opposed to simply their number, we analyzed each posting in three different activity discussions for levels of critical thinking, and we ventured conclusions on the variations and trends in high/low levels of critical thinking to activity types and characteristics, including the instructions and requirements for each activity.

The third area of investigation provides a brief analysis of the interactive qualities of an online course other than those between students, providing a more comprehensive view of the role of interaction in this particular online course.

The research questions considered are organized around the three key areas analyzed by this paper and include:

1. Quantitative participant-participant interaction / Frequency of postings:
    - Are there any general trends in where and how often participants post messages over the duration of the course?
    - Do any gender differences arise in this quantitative analysis of the postings?
    - Are there any correlations between frequency of postings and learning outcomes?

2. Qualitative participant-participant interaction / Critical thinking:
    - Is there an evolution of higher levels of critical thinking throughout the course?
    - Do any trends appear in the various levels of critical thinking?
    - How might the activity types and instructions have contributed to the variations in the levels of critical thinking?
    - Are there any significant gender differences reflected in the levels of critical thinking?

3. Participant-content, interface and instructor interaction:
    - To what extent did participants value these types of interaction as important for their overall educational experience?
    - Was there significant interaction with each of these: between learners and the content, between learners themselves, and between learners and instructors?
    - Did that contribute in any way to the overall interaction of the course?
    - Are there any gender differences in the above forms of interaction?

Background

Interaction

With the introduction and expansion of online learning, scholars have begun to dedicate more time and research to investigate the intricacies of executing a successful online course. The virtual environment provides a large arena with a mosaic of research topics and concentrations. As Bernard and others (2004) and Wallace (2003) demonstrate in their comprehensive literature reviews on distance education, the insights of these studies span a wide range of topics and influences related to online learning. Of particular concern for these scholars is the relation of the specific characteristics of an interactive online course (e.g., social aspects and community building) with actual learning outcomes.

The lack of physical interaction and proximity, traditional characteristics of education in face-to-face classroom environments, as well as the widely accepted value of participation in the structuring of knowledge and learning, have resulted in a significant number of the studies on distance education focusing on measuring and defining the amount, quality and types of interaction that characterize online learning. Scholars initially defined three types of interaction in concordance with Moore's (1989) typology, that is to say: student-to-student, student-to-teacher and student-to-content. Later, Hillman, Wallis and Gunawardena (1994) added the student-to-interface interaction, i.e. "the interaction between learner and the technological medium in order to interact with the content, instructor and other learners." (Chen 2001, p. 461).[4]

Generally speaking, the four types of interaction for online education are accepted and have been incorporated into the abundance of studies that analyze student participation. Regardless of the type of interaction, most researchers agree that interaction itself is considered one of the central elements of learner support as sustained by Thorpe (1999). What do we mean by interaction? In answering this, we must first distinguish interactivity from interaction. Wagner (1994, 1997) makes an interesting distinction when he argues that interactivity focuses "on the attributes of the *technology system employed* in distance learning" (our emphasis) while interaction is concerned with "behaviors where individuals and groups directly influence each other." As previously stated, interactions can occur between the learner and the instructor, among learners, and between learners and the content.

Within this general debate on interaction, gender has also played a role in several studies for online courses due to the unconventional realm of interaction provided by distance education. Given that gender roles imposed by socialization tend to silence women or at the very least discourage active participation in traditional learning environments, online conferences provide a very different space for communication. Rather than competing for "airtime," given the time restraints in a traditional classroom, asynchronous discussions permit any number of postings at any given time. Despite this conspicuous distinction between online and face-to-face dialogue, the effects on learning and participation according to gender provide yet

[4] Anderson (2003) proposes six types of online interaction, incorporating Moore's original three and adding three more: namely, teacher-to-content, teacher-to-teacher and content-to-content. Considering our specific interest in student interaction and participation, these additional types of interaction were not analyzed.

another expanse of uninvestigated territory. Among the literature produced on the subject, Anderson and Haddad (2005) do argue that women perceived more learning that is positive in online courses than face-to-face ones, and the difference stems from the issue of the expression of voice. However, Gunn (2003) argues that the virtual discussions "lose none of the socio-cultural complexity or gender imbalance that exist within society" (p. 14). Due to the study's concentration on interaction, particularly student-to-student, we found it essential to consider the socio-cultural element of gender in our investigation.

Frequency of postings: quantitative analysis of participant-participant interaction

One of the more common ways of analyzing student-to-student interaction is through the quantitative analysis of online postings. Quantitative research has concentrated predominantly on the influences and effects of participation. Although results do not expressly demonstrate uniformity, they all provide further insight into the abundance of variables that need to be considered in studying online interaction. Based on quantitative data and educational theories, Harasim's (2000) findings show that interactions by participants reflect high levels of learning and more meaningful analyses. Conversely, the results of Jiang and Ting (2000) show no significant correlation between number of student responses and students' perceived learning. Clearly, other factors must exist that justify these disparities. Perhaps due to such inconsistencies and discrepancies, researchers have begun to explore other possible variables that influence interaction and its relation to the construction of knowledge. Sutton's (2001) argument for vicarious learners, those that benefit by observing and processing the actions of others without actually engaging in observable products or actions themselves, may provide one such example of why research results do not parallel one another. In light of these arguments, our main concern in focusing on the frequency of postings is neither to dispute nor support these findings, but rather to investigate general trends and the correlation between the number of postings and learning outcomes in the context of these studies.

Critical thinking: qualitative analysis of participant-participant interaction

Many authors have argued for the need to explore the qualitative aspect of participant postings. Specifically, Goldman and others (2005) cite "quisitive research" as a research strategy to merge quantitative and qualitative approaches in order to encompass a more global view of interaction. One such study deduces that higher quantity participation directly correlates to higher quality participation (Dennen, 2005). Other scholars who cited low levels of critical thinking argue that such results do not necessarily reflect low levels of learning. Ng and Murphy (2005) support Anderson's "equivalency theorem" that states that though there are at least three types of interaction (with other students, the teacher and content), a high level of just one of these may be sufficient for satisfactory learning to take place. These studies demonstrate a general trend throughout the research focusing on the importance of critical thinking as an area in the investigation of interaction in an online course.

The issue of critical thinking has further significance for this study in that it parallels the INDES view of management for social development[5] as more than the "the technical process of diagnosis, planning, programming, and design" but also the "relational and political processes for dialogue, mobilization, deliberation, consensus-building, and decision-making" (Mokate and Saavedra, 2006, p. 6) because:

> "*Critical thinking requires an openness to the 'other;' the ability and the receptivity to explore all sides of a complex question, and having done so, the self-confidence to select among the possibilities without ignoring or denigrating the positions you reject*."

Moreover,

> "*developing critical thinking requires the continual application of your cognitive abilities to new and often difficult problems and issues.*" (Tilghman, 2005)

The combination of previous research, the INDES philosophy of management for social development, and social constructivist approach propelled us to examine levels of critical thinking, making it a central concern of qualitative investigation of student-student interaction.

On a basic level, critical thinking refers to the mental process of assessing and evaluating information. It implies reflecting upon the meaning and value of propositions and ideas as well as analyzing the supporting evidence in order to form conclusions on a specific subject or material. According to McLoughlin and Luca (2000, p. 2) critical thinking is:

> *"… the capacity to go beyond information given, to adopt a critical stance, to evaluate, to have metacognitive awareness and problem solving capacities. Having the capacity to be an autonomous thinker and make reasoned judgments…"*

Research from the field of cognitive psychology has caused many instructors to adopt the philosophy of fostering critical thinking skills as opposed to traditional forms of rote learning. This evolution is also supported by the shift from teacher-centered to student-centered educational atmospheres, although there are arguments that this style has not been fully developed in many Latin American countries (Fedorov, 2005).

Participant-content, interface and instructor interaction

In the interest of providing a more comprehensive view of interaction in the Leadership Training course, this study ventures to provide some information on other types of interaction such as student with content, interface and instructor. Although, in accordance with INDES philosophy and this course's social constructivist approach, we primarily focus on participant-

[5] Defined as "a field of action (or practice) and knowledge focused strategically on the promotion of social development. Its objective is to create public value and so contribute to "the reduction of poverty and inequality, as well as to the strengthening of democratic states and citizenship." (Mokate and Saavedra, 2006, p. iii)

to-participant exchanges, we recognize other types of interaction that influence learning outcomes. For this reason, we use self-reported surveys in order to gauge the value of these tools in the overall educational and online experience.

Course Characteristics

Context, structure and content

The present course was specifically designed for individuals working in both governmental and nongovernmental Latin American organizations and offered by the Inter-American Development Bank's Social Development Institute. The Institute offers training programs in the interest of strengthening the managerial capacity of social programs and project managers in order to improve social services in these regions. The diversity of nationalities and the purpose of the course as training, as opposed to education, distinguish this study from the already large canon of research on interaction in distance education. As a training course, there were no degrees offered or any university affiliations. Another defining factor of the target group is that all participants were full-time professionals. The majority of the investigations published thus far predominantly deal with one country, degree-awarding institutions, as well as a mixture of graduate, undergraduate, full, and part-time participants.

The twelve-week course, adapted from the previous version offered for the first time in October of 2004, took place between July and September 2005, consisted of a weeklong introduction, four thematic modules, and a concluding week of activity. The four modules constituting the content of the Leadership course, based on Heifetz's (1994) leadership framework, were:

1. Authority (2 weeks)
2. Technical and Adaptive Problems (1 week)
3. Leadership with Authority (2 weeks)
4. Leadership without Formal Authority (5 weeks)

The tutors prepared overview materials for the content and provided additional reading materials (both required and suggested) for each module. The course had two tutors, one for each section. Participants were expected to dedicate at least 10 hours per week and participation was not only mandatory but evaluated as well, constituting 40% of their final grade.

The course Leadership without Formal Authority aimed to: offer a new vision of exercising leadership, differentiate between authority and leadership, and provide an analytical framework and applicable strategies for exercising leadership without formal authority.

The learning objectives were to:

1. Differentiate between formal versus informal authority and technical versus adaptive problems, and recognize examples of each.
2. Analyze the implications of the aforementioned concepts in relation to exercising leadership without formal authority.
3. Use an analytical framework in order to identify opportunities for exercising leadership without formal authority; and implement strategies for executing such leadership as it applies to the realities of the workplace.
4. Evaluate one's own, as well as one's colleagues', participation in the online discussions.
5. Perform as an autonomous learner within the virtual classroom, assuming responsibility for one's own learning and contributing to that of one's colleagues.

Learning activities

The course was composed of 25 activities, and three of the written activities comprised 60% of the final grade. The remaining 40% was determined by the participation in online conferences and group discussions, and was evaluated by the participants themselves with a predetermined rubric. All online conferences and discussions were designed for asynchronous communication and any real-time online chats that may have occurred were incidental.

Table 1 presents an analytical breakdown of 23 of the 25* assignments into a series of teaching and learning activity categories. It also provides an example of how the course addressed these categories and an assessment of how many activities fell under each category. For examples, see Appendix 1: Learning Activity Examples.

As the table shows, the category of Authentic Enquiry proves to encompass a majority of the activities, followed by Conceptual Learning and Problem Solving. Considering the course's focus on applied strategy, it is not surprising that the majority of the activities demonstrate characteristics of Authentic Enquiry.

* The first two activities were not included here due to their characteristics of social and technical orientation.

Table 1: Teaching and learning activities

Teaching/learning activities	Examples of how the course addresses each type of activity	Course activities within each category
Conceptual Learning Ideas, theories, principles of information systems, bodies of knowledge.	Reading assigned texts. Conference dialogues. New texts because of course discussion.	A5, A6, A9, A10, A11, A12, A15, A16 **8 Activities**
Problem Solving Deductive powers, inferential reasoning, testing assumptions, decision making.	Determining relationship between concepts. Deciding over conflicting interpretations. Proposing concrete actions.	A3, A4, A11, A16, A25 **5 Activities**
Object and document analysis Contextualization and interpretation using texts, documents, pictures, objects.	Graphing concepts.	A7, A8 **2 Activities**
Data gathering and synthesis Research skills, methodology, evaluation, reporting and quantification.	Reading conflicting sources, synthesizing and defining meaning of terms. Proposing new definitions.	A13, A14, A18, A20, A22, A23 **6 Activities**
Case studies Evaluation of systems by observing and analyzing simulated situations or processes.	Role-play and proposing actions.	A17, A21 **2 Activities**
Presentations by teachers Demonstrations, overviews, framing, highlighting key information or salient points.	Synthesis after each major thematic discussion. Guidance and orientation throughout the course. Feedback on written work.	Not Applicable
Collaborative learning Sharing knowledge, collective decision making, forming learning communities.	Offering definitions of terms and discussion. Group activities that include analyzing cases, analyzing texts and writing short texts collaboratively.	A5, A17, A19, A21 **4 Activities**
Authentic enquiry Learner as practitioner, connecting theory to practice, taking responsibility for knowledge.	Applying concepts to concrete life situations. Analysis of real life situations.	A3, A6, A7, A8, A9, A12, A13, A14, A18, A19, A20, A21, A22, A23, A24 **15 Activities**

Source: First column adapted from UMUC-Verizon Virtual Resources Site, Module: Teaching/Learning Strategies. http://www.umuc.edu/virtualteaching/module1/systems.html

Learner demographics

In the interest of knowing the learners, a notion deemed of vital importance for Online Distance Learning (ODL) design and implementation (Rowntree, 2005), an explicit effort was made to gather general as well as more specific information on participants' background, experience and perceptions of the course. Surveys and data extracted from applications to the course served as the basis for the statistics generated on learner demographics, summarized in Table 2. Two surveys were conducted, one at the beginning and another at the end. These provided information on computer/online experience and student perceptions of the course and learning, respectively. General background characteristics were derived from the online applications of each participant.

Regarding basic learner characteristics, the participant pool encompassed a significant amount of diversity in terms of age and nationality. Participants' ages ranged from 24 to 62, with an average age of 41.2 years. The course had a total of 35 participants, 33 of which passed the course. The latter, who were used for the purposes of this study, resided in 14 different Latin

American countries, although two of them maintained their Spanish and Belgium nationalities. However, a certain level of uniformity appeared in terms of the participants' educational background, with more than half concentrating in the social sciences. This can be explained in great part by a course prerequisite that the applicant exercise some responsibility in the planning, design, implementation, and/or evaluation of initiatives that promote social development in national, provincial (regional, state, departmental), local, or municipal areas. Despite this apparent consistency, significant variations were present, with some learners having educational backgrounds as diverse as medicine and architecture. In terms of gender, the group demonstrated an almost even split, with 19 males (54%) and 16 females (46%).

The initial survey conducted for this course revealed that 68.6% of the participants rated their computer expertise at an intermediate level and only 17.1% considered themselves experts and 8.6% beginners. With respect to online education, overall 57.1% of the participants had some experience with distance education, although a gender breakdown demonstrates that a majority of the female participants (68.8%) already had familiarity within this arena, but more male participants categorized themselves as having more computer experience.

As far as Internet access goes, the numbers show that the majority accessed the virtual classroom from their home (42.9%) or office (22.9%). It is interesting to note that no women indicated connecting both from their home and office, while 36.8% of the men did. These numbers suggests a certain disparity between the work of men and women, perhaps implying greater flexibility for men to determine when and where they work. The fact that women predominantly spend more time working at home also denotes the greater sacrifice of free time made by women in order to participate in the course; which may be further supported by the fact that 62.5% of the female participants do their course work over the weekend compared to the 47.4% of the males that work on the weekends. Again, the distribution of the male percentages in this case shows more permissive schedules than those of the females since women "typically have more family/work responsibilities and time demands than most adult men" (Kramarae, 2001, p. 6).

Table 2: Learner demographics

Characteristics	Description	Gender				Total (35)	
		Male (19)		Female (16)			
		Number	Percentage	Number	Percentage	Number	Percentage
Age	Under 30	1	5.3%	2	12.5%	3	8.6%
	30-40	6	31.6%	6	37.5%	12	34.3%
	40-50	11	57.9%	6	37.5%	17	48.6%
	Over 50	1	5.3%	2	12.5%	3	8.6%
	Average	41.9 years		41.2 years		41.6 years	
Nationality	Argentina	2	10.5%	1	6.3%	3	8.6%
	Belgium	1	5.3%	0	0.0%	1	2.9%
	Bolivia	2	10.5%	3	18.8%	5	14.3%
	Brazil	1	5.3%	0	0.0%	1	2.9%
	Chile	3	15.8%	0	0.0%	3	8.6%
	Colombia	1	5.3%	0	0.0%	1	2.9%
	Costa Rica	0	0.0%	1	6.3%	1	2.9%
	Dominican Republic	0	0.0%	2	12.5%	2	5.7%
	Ecuador	0	0.0%	2	12.5%	2	5.7%
	El Salvador	1	5.3%	0	0.0%	1	2.9%
	Guatemala	0	0.0%	2	12.5%	2	5.7%
	Honduras	1	5.3%	0	0.0%	1	2.9%
	Paraguay	1	5.3%	1	6.3%	2	5.7%
	Peru	4	21.1%	3	18.8%	7	20.0%
	Spain	0	0.0%	1	6.3%	1	2.9%
	Venezuela	2	10.5%	0	0.0%	2	5.7%
Background	Arts & Humanities	0	0.0%	3	18.8%	3	8.6%
	Business	1	5.3%	1	6.3%	2	5.7%
	Education	1	5.3%	1	6.3%	2	5.7%
	Engineering	4	21.1%	1	6.3%	5	14.3%
	Social Sciences	10	52.6%	9	56.3%	19	54.3%
	Other	3	15.8%	1	6.3%	4	11.4%
Level of computer experience	Expert	3	15.8%	3	18.8%	6	17.1%
	Intermediate	14	73.7%	10	62.5%	24	68.6%
	Beginner	1	5.3%	2	12.5%	3	8.6%
	Missing	1	5.3%	1	6.3%	2	5.7%
Experience with online education	None	8	42.1%	3	18.8%	11	31.4%
	Yes	9	47.4%	11	68.8%	20	57.1%
	Missing	2	10.5%	2	12.5%	4	11.4%

Table 2: Learner demographics (cont.)

Characteristics	Description	Gender				Total (35)	
		Male (19)		Female (16)			
		Number	Percentage	Number	Percentage	Number	Percentage
Connection location	Home	7	36.8%	8	50.0%	15	42.9%
	Office	3	15.8%	5	31.3%	8	22.9%
	Home & office	7	36.8%	0	0.0%	7	20.0%
	Internet café	1	5.3%	1	6.3%	2	5.7%
	Other	0	0.0%	1	6.3%	1	2.9%
	Missing	1	5.3%	1	6.3%	2	5.7%
When do you typically do course work?	During the week	8	42.1%	5	31.3%	13	37.1%
	On the weekends	9	47.4%	10	62.5%	19	54.3%
	Missing	2	10.5%	1	6.3%	3	8.6%

Methodology

For the purposes of this study, we implemented a variety of approaches based on our conceptualization of interaction, and we compared them in order to determine levels of interaction. In the interest of examining a wide array of influential factors on interaction, we decided to study student postings quantitatively and qualitatively, and to gauge the impact of instructor, content, and interface.

Frequency of postings: quantitative analysis of participant-participant interaction

This study begins with a general vision of the frequency of participant posting results, and then looks more specifically at where (which conference) the postings were made and by whom (according to gender). There were four types of conferences identified: the Café or social arena; activity discussion boards pertaining to course content; learning discussion boards where students were asked to reflect on their learning experience; and group work where there were no instructor interventions and participants worked in small groups. For the general trend of frequency of postings, of the 35 participants, 32 were incorporated in quantitative analysis (2 were eliminated for not completing the course because their presence was neither consistent nor constant, and one for being a significant outlier in the Café postings). This data is then related to the students' learning outcomes using Pearson's correlation, defined as learning and achievement, and in these results the Café outlier was reinstated because of our keen interest regarding frequency of postings with learner outcomes, as opposed to a more general vision.

In order to determine student learning, the difference of scores between the entrance and exit exams was used. Each exam consisted of 20 multiple-choice questions, the only difference in

the two tests was the wording of the questions, and the same content and thematic material were covered. Each question reflects the knowledge and application in the right proportion to what was taught in the course. We used these exams in order to gauge learning because they were specifically designed for this objective and in concordance with the recommendations from the Evaluation Group of the World Bank Institute Level-2 Evaluation Toolkit. The Toolkit aims to assist in the development, administration and analysis of tests that intend to measure student learning (http://siteresources.worldbank.org/WBI/Resources/L2-Toolkit-Overview.pdf). The internal consistency reliability coefficient (Cronbach's alpha) of the pre-test was 0.58 and 0.78 for the post-test. The participants' final grades were used to determine student achievement.

As will be shown below, the frequency of postings results are somewhat comparable to those that arise in the qualitative research, in which three activity discussions are analyzed for their levels of critical thinking as well as activity type and in terms of gender contributions. The comparison seeks to conclude if there is any correlation between participation and critical thinking.

Critical thinking: qualitative analysis of participant-participant interaction

In all discussion analysis participation was measured by postings, that is to say each message or reply that was sent by a participant. As Cooke and Ralston (2003) point out, determining the unit of analysis for the qualitative investigation of an online discussion is perhaps the most difficult element to deal with (p. 317). Their study investigates diverse models for studying participation in online discussion forums. By examining several methods, the research highlights the strengths and weaknesses of the various ways of defining the unit of analysis. On the one hand, analyzing participation according to each message sent proves very subjective to the extent that a message may contain one or more of the qualitative categories for which it is being measured. On the other hand, splicing a posting according to which part pertains to each qualitative element can be equally subjective in terms of where and how many times the investigator or evaluator decides to break down the posting. Despite this difficulty, each message was coded according to the general and overall information conveyed because participants were expressly asked to provide brief and concise messages. The assumption was that a single posting, being short, was not as likely to contain multiple components.

Defining ranges of critical thinking presents a complicated task that many scholars have attempted to broach. As Ng and Murphy (2005, p. 92) point out:

> "*A number of models for the evaluation of the quality of learning in computer conferencing are available in the literature. The focus of these frameworks varies, depending on the purposes of the evaluation and the interest of the researchers.*"

Meyer (2004) analyzed four different frameworks for gauging levels of critical thinking: two were developmental models (King and Kitchener's Reflective Judgment Model and Perry's model of intellectual development and ethical behavior) and two encapsulated levels of

thinking (Garrison's four-stage critical thinking model and Bloom's taxonomy of learning). Meyer concludes that the Garrison model evaluated interaction more on the analysis level and is more explicit about its practical implementation. Garrison's structure also possessed a more straightforward style than that of the other frameworks analyzed. In light of these conclusions about the Garrison model and the number of its previous applications (Contreras 2005; Meyer 2003), this framework seemed most appropriate for determining the levels of critical thinking that emerged in the Leadership Course. A synthesis of Garrison's model is shown in Table 3.

Table 3: Stages of critical thinking

Category	Indicators	Socio-cognitive Processes
1. Triggering	Recognizing the problem	Presenting background information that culminates in a question
	Sense of puzzlement	Asking questions Messages that take discussion in new direction
2. Exploration	Divergence within online community	Unsubstantiated contradiction of previous ideas
	Divergence within single message	Many different ideas/themes presented in one message
	Information exchange	Personal narratives/descriptions/facts (not used as evidence)
	Suggestions for consideration	Author explicitly characterizes message as exploration, e.g., "Does that seem right?"
	Brainstorming	Adds to established points but does not systematically defend/justify/develop
	Leaps to conclusions	Offers unsupported opinions
3. Integration	Convergence among group members	Reference to previous message followed by substantiated agreement, e.g., "I agree because…"
	Convergence within a single message	Building on, adding to others' ideas Justified, developed, defensive, yet tentative hypotheses
	Connecting ideas, synthesis	Integrating information from various sources: textbook, articles, personal experience
	Creating solutions	Explicit characterization of message as a solution
4. Solution	Vicarious application to real world Testing solutions Defending solutions	(No examples provided)

Source: Garrison and others, (2001, p. 15-16) taken from Meyer (2004).

One co-author coded the messages for three of the activity conferences according to the criteria set forth in the Garrison model. The three activities were chosen because of the relation to the academic content of the course as well as their distribution over time, in the beginning, in the middle, and at the end. In addition, the three evaluated discussions were chosen because they contained higher numbers of postings than other forums developed in the

same period, which permitted results that are more robust. The evaluator that coded the discussion postings had done so before with the other researcher in a previous study with a high degree of consistency (Contreras, 2005). Those postings where discrepancies were present were discussed and resolved, thus establishing clear criteria. With this experience, only one evaluator proved necessary. However, we recognize that the model, as well as the method of implementing it, has its shortcomings. As previously mentioned, each message may contain several critical thinking characteristics, which requires the evaluator to determine the overall essence of the message, a process that is not completely objective. We also acknowledge that having more researchers coding the messages may have increased the results' internal reliability.

Participant-content, interface, and instructor interaction

Aware that interaction and participation cannot be limited to simple definitions and numbers of student-to-student exchanges (Moore, 1989; Hillman, Willis and Gunawardena, 1994), we further investigated the influence and impact of other interactive course characteristics such as that with the instructor, the content and the interface. These results were gathered from two self-reported surveys. In order to gauge the effectiveness of the tools implemented throughout the course, two separate surveys were employed. One was an exit survey that invited participants to review the value of various elements of the course, both on a scale and with open-ended commentaries, which predominantly concentrated on course content.

In the interest of gaining more specific feedback on the learner experience in the Leadership course, not only for the purposes of this study but also for improving the course overall, Roblyer and Wiencke's (2003) rubric for evaluating interaction in distance courses was sent to all participants approximately a month after completing the course. The basic components assessed by the rubric covered the various types of interaction considered relevant for online courses as determined by an array of previous studies. As the comprehensive literature review demonstrates, promoting interaction primarily involves issues of community building, instructional designs, technological resources, and both learner and instructor engagement. Several studies verify the need as well as the student initiative to create a social atmosphere in the virtual classroom which "facilitates learner-to-learner" interaction (Roblyer and Wiencke, 2003), thus recommending ample spaces and opportunities for fostering this type of interaction.

In terms of instructional design, the authors also cite an array of investigations that address how different activity types, as well as course design and instruction, affect the manner and volume of interaction. Several researchers emphasize that the technological interface and resources used also influence the levels of interaction by the learners. Roblyer and Wiencke (2003) suggest increased use of two-way forms of communication via the Web. The rubric also takes into account evidence of learner engagement as a measurable property of interaction, as well as that of the instructor. Levels of high instructor engagement adhere to notions of the importance of "consistent, timely, and useful feedback to the students" (Roblyer and Wiencke, 2003, p. 89). Each of these components was ranked on a scale of 1-5, indicating low to high levels of interactive qualities. These properties parallel the concerns of our research and adequately address the prevailing investigative issues of online interaction.

Given that the results of this section are self-reported, they may not adequately represent the effects of these different types of interaction. The results may reflect cultural, emotional and individual characteristics related to learning, rather than demonstrating unbiased learning outcomes. However, we find student reflection on and perception of learning as significant factors influencing participation. The self-reported surveys not only allow us to gauge the effectiveness of other interactions in the course, but may also provide clues as to the socio-emotional and cultural paradigms of the participants.

This rubric was sent to the participants one month after the termination of the course; only 16 responses were received out of 33. It can also be argued that the time lapse may affect the student response, since the course experience may not be as fresh in their minds. Further, the volunteer response format and the low number of responses could skew the results in unpredictable ways.

Results

Frequency of postings: quantitative analysis of participant-participant interaction

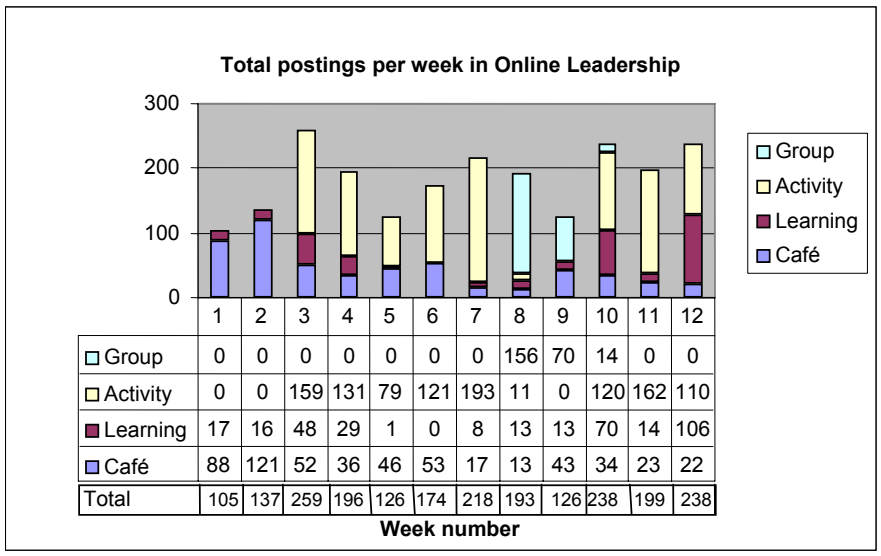
As previously mentioned, our investigation started with a quantitative analysis of all discussion postings throughout the course and disaggregated between postings in the four types of conferences: Café (the social arena), Activities, Learning (a particular discussion board dedicated to participant reflection on their learning processes and utility of activities to their everyday lives) and Group work. Results shown in Figure 1 indicate that there were 2,209 postings throughout the duration of the course from 32 of the participants.[*] The majority of the postings, 49.2%, appeared in the Activity discussions, 24.8% in the Café, 15.2% in Learning, and 10.9% in Group activities.

The data was then divided into weeks in order to determine any evolution trends or relation between the number of postings and time. Figure 1 shows the fluctuation of postings throughout the course.

Findings indicate that in the first two weeks, the emphasis is on postings in the Café. This was done to promote the first two stages of Salmon's (2004) four stage E-moderating model, namely access and motivation, and online socialization. Learning activities did not start until week three to initiate the third stage of information exchange and continue on to the fourth (knowledge construction) and final stage of development in the remaining nine weeks, as intended by the course design.

[*] In the interest of gathering general information in quantitative terms on the fluctuation, evolution and gender influence on the number of postings, one of the participants that proved an extreme outlier of the group was eliminated from the frequency of postings results. This participant represented more than 11% of the overall participation (almost four times the average of number of postings per participant at 3%), predominantly due to his contributions in the Café. Two other participants from the original 35 were also excluded from this analysis for not passing the course as well as not participating in later conferences.

Figure 1: Total postings per week in online leadership course



	1	2	3	4	5	6	7	8	9	10	11	12
Group	0	0	0	0	0	0	0	156	70	14	0	0
Activity	0	0	159	131	79	121	193	11	0	120	162	110
Learning	17	16	48	29	1	0	8	13	13	70	14	106
Café	88	121	52	36	46	53	17	13	43	34	23	22
Total	105	137	259	196	126	174	218	193	126	238	199	238

To determine the social implications of gender in distance education, the information gathered was further distributed according to gender. Like Anderson and Haddad (2005), we wondered what difference an asynchronous virtual atmosphere offered in terms of providing an unconventional social arena in which women and/or men may or may not feel the effects of socially conditioned behavior. Intuitively, one assumes that the absence of having to compete for airtime would generate a more vocal female community. Although overall, frequency of postings data suggests that men participated more, when analyzed on average female postings appear to outnumber male postings. The results, summarized in Table 4, suggest more women participation in the realms of the Café and Group work and to a lesser extent, in the Learning conference.

Table 4: Average number of postings per person

	Average number of postings per person				
	Cafe	Learning	Activity	Group	Total
Female (15)	18.2	11.5	33.6	9.3	72.6
Male (17)	16.2	9.6	34.2	5.9	65.9
Overall (32)	17.1	10.5	33.9	7.5	69.0

Learning and achievement

Having accumulated frequency of postings results for the number of postings in the course, we used Pearson's correlation to assess the relationship between levels of interaction with learning (measured by a pre- and post-test) and student achievement (measured by the final course grades).*

Comparing the frequency of student postings in each type of discussion conference (Learning, Activity and Group as well as the sum total of all of these) with pre and post-test results, as well as the final course grade, demonstrated some correlations. However, no significant correlations were found in terms of student learning (pre- and post-test scores) and interaction of any kind.

There was a correlation between the final grade for the written activities, which comprised 60% of the final grade, and the number of postings in the activity forums ($r = .361$, $p < .05$). Similarly, written grade and total number of postings in all forums were positively correlated ($r = .350$, $p < .05$). However, there were no significant correlations between the final course grade (written activities and participation) and Group conference postings, nor between final grade and Learning conference postings.

Critical thinking: qualitative analysis of participant-participant interaction

As stated before, participation in the discussion forums consisted of 40% of the final grade. The particular discussions evaluated were unknown to the participants until the time of evaluation in order to promote consistent interventions in all of the assigned discussion activities. The activities selected for critical thinking were activities 6, 11 and 16 because of their relation to course content, as well as their distribution throughout the duration of the course. Although each activity centered on the theoretical underpinnings of the course, the tasks required for completing each were not uniform.

The results of the distribution of levels of critical thinking summarized in Table 5 show the number and type of postings made by participants in each activity discussion. As illustrated in the table, the total number of postings in each activity increased over time from 117 to 175 and finally to 194. This perhaps demonstrates an evolution in the attitude of the participants during the course of the program, which could be explained by notions of socio-emotional development and community building as integral parts of the academic experience and of the building of critical thinking, a conclusion drawn by Beuchot and Bullen (2005) but not supported by the frequency of the postings breakdown of interventions in Figure 1. There does not appear to be any pattern of evolution or progression over time (from activity to activity) in terms of advancement in levels of critical thinking either. Similar to other studies (Contreras 2005; Meyer 2004) the majority of the postings reveal *Exploration* and *Integration* characteristics (over 90% in activity 6, 60% in activity 11 and practically 80% in activity 16). Throughout the three discussions, interventions of the *Exploration* type dominated (73.5% in

* The previously excluded active participant was reinserted in our findings in this case because of our specific interest in the relationship between the frequency and number of postings with learning and achievement. Also, the participant's postings in academic conferences were not so striking in difference to the other participants.

activity 6, 39.4% in activity 11 and 48.5% in activity 16), which somewhat parallels the findings of Ng and Murphy (2005) about the lack of deep critical thinking in the online discussions analyzed. High levels of critical thinking, even in face-to-face courses, tend to be rare or at least represent a lower percentage of the total comments contributed because they are the most cognitively demanding and require time deeper for reflection.

Table 5: Levels of critical thinking in the leadership without formal authority course

Category	Activity 6		Activity 11		Activity 16		Total	
	Number of Postings	%	Number of Postings	%	Number of Postings	%	Number of Postings	%
Triggering	5	4.3%	36	20.6%	59	30.4%	100	20.6%
Exploration	86	73.5%	69	39.4%	94	48.5%	249	51.2%
Integration	20	17.1%	35	20.0%	30	15.5%	85	17.5%
Solution	2	1.7%	10	5.7%	5	2.6%	17	3.5%
Other	4	3.4%	25	14.3%	6	3.1%	35	7.2%
Total	117	100.0%	175	100.0%	194	100.0%	486	100.0%

Breaking down the coded messages by gender demonstrates some differences in male versus female participation; with some interesting trends emerging that warrant further investigation. As shown in Table 6, men appeared to dominate the cognitive level of *Solution* (associated with testing and defending solutions), contributing over 75% of these postings; however, the marginal number of *Solution* messages, only 17 in total, may not be sufficient for reaching definitive conclusions regarding differences in male/female participation in this area. This trend also appears in the *Triggering* category, with male postings registering a total of over two thirds of this type of postings. Women, on the other hand, were predominant in the *Integration* category, associated with seeking convergence and creating solutions. Interestingly enough, these three activities illustrate men as more actively participating in the discussions; however, overall averages from Table 4 exhibit higher numbers of female postings in all discussions except the activity ones. Chi Square analysis suggests that there is a difference in the participation of males and females in the activities; however, despite the high significance, the results cannot be taken yet as definitive because of the sample size and low number of interventions.

Table 6: Levels of critical thinking in all activities according to gender

Category	Total (activities 6, 11, & 16)						
	Number of Postings		Distribution of postings (%)		Total Number of Postings	Total contributions (%)	
	Female (n=16)	Male (n=19)	Female	Male		Female	Male
Triggering	33	67	15.9%	24.0%	100	33.0%	67.0%
Exploration	114	135	55.1%	48.4%	249	45.8%	54.2%
Integration	44	41	21.3%	14.7%	85	51.8%	48.2%
Solution	4	13	1.9%	4.7%	17	23.5%	76.5%
Other	12	23	5.8%	8.2%	35	34.3%	65.7%
Total	207	279	100.0%	100.0%	486	42.6%	57.4%

Participant-content, interface, and instructor interaction

Although this study primarily concentrates on participation in terms of student-to-student postings, we are aware that other forms of interaction must be considered, particularly in light of the investigations conducted by Moore (1989), Ng and Murphy (2005) and Hillman, Willis and Gunawardena (1994). These scholars argue the importance of participants' interaction with other elements of the learning environment: student-content, student-instructor and student-interface. According to these studies, as well as implications of others (Sutton 2001), the four types of interaction must be considered, even though a high level of just one may be sufficient for satisfactory learning to take place.

Figure 2: Self-reported usefulness of course elements for generating learning

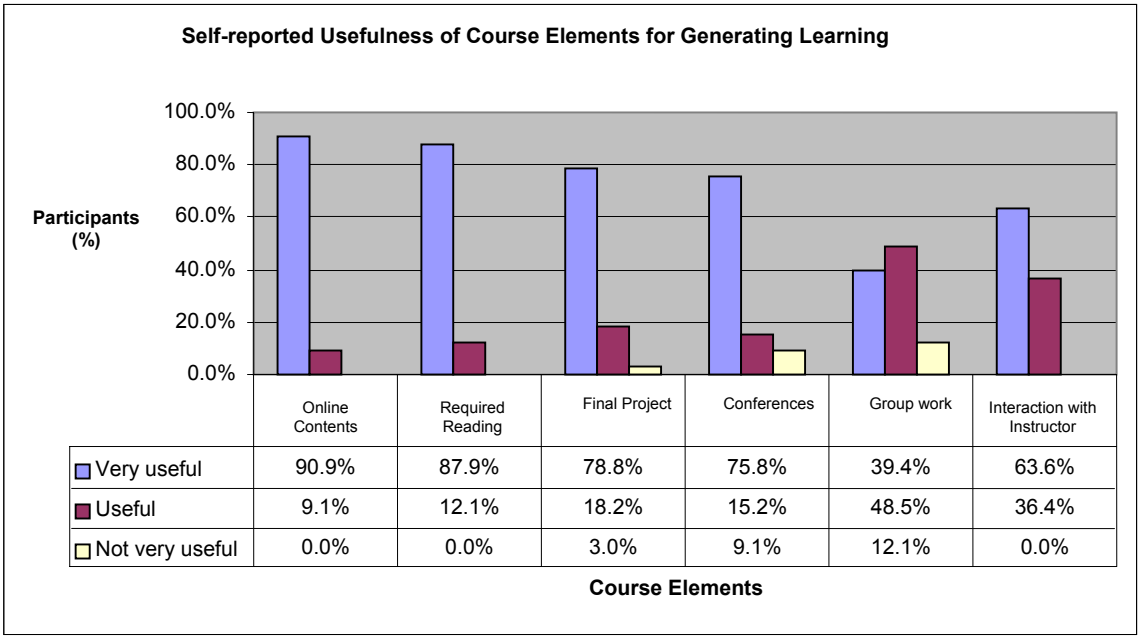


Figure 2 illustrates the results of the exit survey, gathered from 33 of the students, indicating the participants' perceived utility of several course components. Overall, the students reported significant learning gains from the course content identified here as online contents, required reading and the final project, with practically 80% and above maintaining the value as 'very useful.' The satisfaction with online contents speaks well of the materials developed and the synthesis they provided. However, this must be contextualized. The theoretical framework we based the course on was developed in the Unites States and although Heifetz's book has been translated into Spanish, it was not accessible in most of the countries where participants came from. There is considerably less access to books and journals in Latin America than in developed countries. Another reason may be that as this was a training course geared to practitioners, their access to alternative sources of "content" is significantly more limited than for those in academic courses in universities.

In terms of person-to-person interaction, the ratings were not very high. The discussion forums maintained a high degree of satisfaction, with 97% ranking them as "very useful" or "useful." In relative terms, the group work did not prove a very popular learning tool, receiving the lowest rating of all the interactions gauged in the survey; 12.1% reported it as "not very useful," almost 50% as "useful," and only 39.4% finding it "very useful." Interestingly enough, the interaction with the instructor was not rated as one of the most useful interactions, although previous studies had suggested it was one of the more important types of interactions perceived by students (Bullen, 1998; Swan, 2001), and yet is still ranked higher than group work where there were no instructor interventions. However, this should not seem surprising considering the social constructivist approach implemented in the course.

Further information was solicited from the participants one month after completing the course using a rubric designed by Roblyer and Wiencke (2003) specifically requesting the students to rank a variety of interactions. This rubric was selected not only because it considered five different interactive elements (social and rapport building designs, instructional design, interactivity of technology resources, evidence of student engagement and evidence of instructor engagement) but also because of its previous applications and consistency ratings. Given that we sent the rubric to participants one month after termination of the course, not all responded. Of the 33 graduating participants, we only received 16 responses, the results of which are summarized in Table 7.

Table 7: Student's rubric ratings of course interaction (N=16)

Ratings of Elements	Rubric Elements									
	Element #1 Social/Rapport-Building Designs for Interaction		Element #2 Instructional Designs for Interaction		Element #3 Interactivity of Technology Resources		Element #4 Evidence of Learner Engagement		Element #5 Evidence of Instructor Engagement	
1 = Low	0	0%	0	0%	1	6%	0	0%	1	6%
2 = Minimum	0	0%	0	0%	4	25%	1	6%	1	6%
3 = Moderate	1	6%	1	6%	6	38%	3	19%	1	6%
4= Above average	6	38%	8	50%	3	19%	6	38%	6	38%
5= High	9	56%	7	44%	2	13%	6	38%	7	44%
Weighted Average	**4.5**		**4.4**		**3.1**		**4.1**		**4.1**	
Interactive level	high/above average		high/above average		minimum/moderate		above average		above average	

Average rating for course's overall level of interactivity: 20 (high)

As is apparent in table 7, the social/rapport building designs of the course scored highest, then the instructional design, followed by instructor engagement and learner engagement respectively, with technological resources scoring the lowest. Overall, the course maintained a high level of interactivity according to the rubric and student response. However, due to the low number of responses received, no definitive conclusions can be made regarding these elements of interaction in the course.

Another type of interaction evident in the course is student-to-instructor; not only did we have the participant report satisfaction on this element of the course, but we were also able to generate some quantitative results as well. In examining the two sections of the course, we determined that the number of interventions by each tutor were quite similar and warranted the continued combination of the two sections as opposed to presenting the data separately. The numbers show that the instructor interventions, both overall and on average, were a little higher than the participants' interventions in the Café and Learning arenas and with similar averages in the Activity discourses. Table 8 summarizes the average number of postings by the instructors and participants in each of the different conference types.

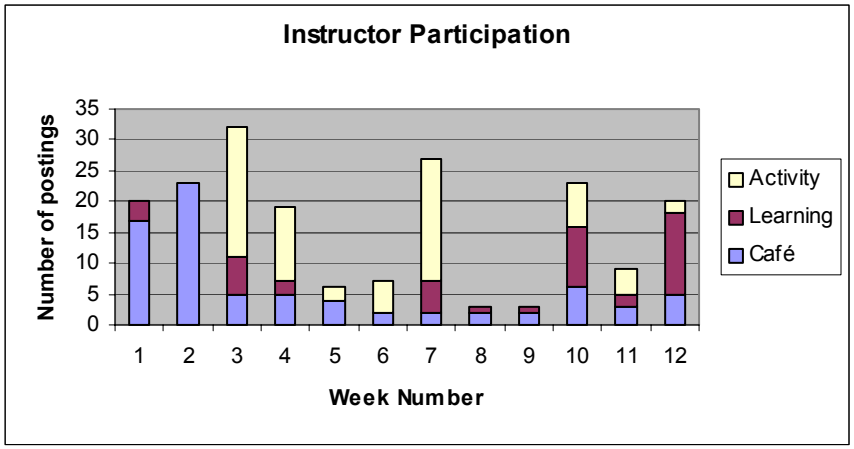
Table 8. Average number of postings: instructor vs. participant

	Forum				
	Café	**Learning**	**Activity**	**Group**	**Total**
Instructor	38	21,5	36,5	0	96
Participant	17,1	10,5	33,9	7,6	69

The numbers reveal much more active participation on the part of the instructor in the Café, with an overall average of 38 postings compared to the participant average of 17.1. Again in the Learning conferences the instructor dominates, doubling the average student postings of 10.5 to 21.5. However, the average instructor activity posting was only slightly more than that of the average student, 36 postings compared to 33.9 from participants. The moderate intervention on behalf of the tutor in the Activity discussions reflects the social constructivist focus of the course. One also should take into account that two weeks of the course are dedicated to group work in which the instructors do not intervene and where participants had an average of 7.6 postings.

Figure 3, which charts the instructors' distribution of postings throughout the twelve weeks, reveals interesting parallels with the participant results in Figure 2. Comparing the two figures side-by-side reveals the apparent trends in distributing participation, which may be attributed to the notion that participants mimic their tutors' online postings.

Figure 3: Instructor participation



Discussion

Frequency of postings: quantitative analysis of participant-participant interaction

The high contribution in the Café in the first two weeks was promoted by the course design and may support notions on the importance of creating socio-emotional relations in distance courses proposed by Swan (2003) and Salmon (2004). Unlike other courses studied (Contreras, 2005), this course does not demonstrate an evolutionary increase of participation throughout its duration. Rather, the data shows more of a fluctuation of participation which may be attributed to outside influences and the particular assignments for each week, among other factors.

Evidence may suggest that the abundance of female postings in comparison to male ones in the group atmosphere may reflect socialized female characteristics, specifically that she does not pertain to the public realm, a theory that suggests public attention and action are socialized male spaces relegating females to the more private spaces, such as the home. Small

groups provide more reduced and intimate spaces for participation, distinct from the plenary discussions that may be more closely associated with the public arena. In the same vein, it appears as though men still dominate in the Activity arena, an interesting outcome considering the historical relationship between men and the creation/domination of bodies of knowledge. These observations remain unsubstantiated, however, and the data gathered supports notions such as that put forth by Gunn (2003) which suggests that "social and educational interaction that takes place through electronic channels loses none of the socio-cultural complexity or gender imbalance that exists in more traditional learning environments" while still warning that "It also seems that this imbalance may be largely culturally determined so generalization may be an unrealistic proposition" (p. 15). However, the small sample size does not allow any conclusions to be drawn on this matter.

The study does reveal that the number of student-to-student postings overall and in activity discussions does correlate with the final grade for written course work. This serves to support the notion that increased participation relates in some way to increased student achievement. The lack of correlation between interaction and learning, as gauged by the pre- post-test results, stems perhaps from the low internal reliability coefficient, suggesting that the pre-post-tests may not have been adequate measures of student learning. One possibility includes the validity of the pre and post-test utilized in order to gauge student learning. The internal consistency reliability coefficient (Cronbach's alpha) of the pretest was 0.58 and 0.78 for the post-test. Improvements on these values as well as increased trials will serve to increase the validity of the pre and post-tests as adequate forms of gauging student learning.

Another factor to be considered relates to the cultural difference in the learning styles. According to Hofstede (1980), Latin America ranks high on the power index, which suggests an acceptance and expectation of hierarchical structures of authority, which some scholars have related to the teacher and student interaction (cited in Yildiz and Bichelmeyer, 2003). This proposed attitude towards education might oppose the social constructivist approach of the course and have adverse effects on the relation between learning and participation. Additionally, as Bates (1999) points out:

> *"In other non 'Western' cultures [specifically those that do not pertain to the USA, Britain, Canada and Australia where online courses are predominantly offered], there is a great respect shown by students for the teacher, and it is culturally alien to challenge the teacher or even express an opinion on a topic […] in our courses there appears to be major differences between ethnic groups in their willingness to participate in online forums"* (p. 6)

The ethnic groups referred to were predominantly from Canada and Mexico, although there were participants from other parts of the world. The possible juxtaposition of our 'Anglophone' pedagogical practice and the Latin American participants may parallel Bates' findings regarding cultural influences in online learning and prove one reason why there were relatively low correlations between participation and learning outcomes. In the same vein, many see Latin America as a region with a strong oral tradition as opposed to a written one, meaning that final evaluations are oral and typically student achievement is gauged by oral participation or quizzes as opposed to written papers. Such an academic attribute sharply

contrasts with the Anglo-Saxon educational written tradition, a characteristic that is paralleled by the online discourses of any distance course. These cultural attributes may also serve to explain the disparity between participation and learning outcomes. It might also be argued that, as Lake points out (1999), "online discussion encouraged introverts and students of non-Anglophone cultures—who are more reflective and tend not to respond so quickly in face-to-face discussion—to express their views, as discussing online gave them more time to consider others' views and write their own responses." (Cited in Fung, 2004, p. 137).

The correlation between number of Activity postings and total number of postings with student achievement (final grade) suggests some relation between increased interaction and higher achievement.

Critical thinking: qualitative analysis of participant-participant interaction

The first stage of critical thinking the Garrison model refers to is *Triggering*. Questions and general puzzlement regarding background information mark this type of posting. For example, when one of the participants asked: "Is Heifetz's focus conditioned by its context or independent of it?" (Activity 11) the question not only referenced the material covered for the activity but also requested clarification on the issues covered.

The subsequent level consists of attempts to gather, share and generally make sense of the ideas and themes presented and termed as *Exploration*, as demonstrated in this case:

> *"I agree with what you say about persuasion. To persuade is to generate in others the idea that our interpretation in a very specific moment is more powerful than others and opens new doors. It is a mix between persuasion and seduction . . . what do you think . . .???"* (Activity 16)

This posting illustrates the participant's reaction and interest in another's posting, *exploring* the effects and importance of persuasion; however, it does not develop or support the opinion offered, thus lacking any significant contribution to the development of the issues and how they relate to one another, as well as their real world application.

However, the element of *Integration* shares characteristics with that of *Exploration*, it further elaborates on the topical concerns, generating more of a global vision of the matter. One such example incorporates the various facets of an integrated response:

> *"You suggest in your response that cultures look for saviors and it made me think of an Argentine soccer player whose fame reached international heights. Frequently, articles were published where he was consulted on matters of politics, religion, economics, etc, etc. The individual stood out for his soccer abilities, however the pressure of the media turned him into an 'opinionologist.' Ortega y Gasset mentioned the risk of one individual with dominion in one subject pressured into being an expert in all fields. I believe that this occurs with authority figures as well. We forget that they are human, with defects as well as virtues. It is always much easier to act as the judge in a*

> *situation than to assume the responsibilities that correspond to each of us. Don't you think?"* (Activity 11)

The author of this posting clearly links several different sources and experiences; however, the conclusion remains tentative and does not appear clearly connected to the examples provided.

Building on *Integration* comments in which the author makes direct connection to the theory or conclusion with real-life situations in order to evaluate and support their validity provides another level of critical thinking defined as *Solution*. The response to the previous posting illustrates one such example of this:

> *"I am absolutely in agreement. It is because of this that many times leaders are not in abundance but scarce. And unfortunately for those that like to act only as judges the incentives are given to perpetuate their situation, maintain their status and not assume more responsibilities that highlight the errors of others. I will give an example of the political scene in my country: the governing party has enjoyed four consecutive presidential periods in power and continues to reinforce their influence. However, the principle opposition party is plagued by being controlled by the whims historical figures that do not permit any changes within their party to the point that they boycott their own election processes in order to maintain control of the party, choose losing candidates and guarantee their status as the opposition, and as such the judges of what the government does. By relinquishing this responsibility for development, the politicians limit the development of the people."* (Activity 11)

This type of analysis and validation of the previous conclusion demonstrates the reflection of the participant on the original comment and the participant's generating support for the said statement in order to justify it.

According to Hammond (2005), it is not sufficient to simply record levels of critical thinking quantitatively. One must consider the task or type of activity required of the participants. Examining the tasks solicited for each activity provides preliminary evidence for the differences in levels of critical thinking, as suggested in the Contreras (2005) study.

Activity 6, assigned during the third week of the course, provides the first discussion board based on course materials. Due to the nature of the activity, that the participants provide real examples that relate to the theoretical material covered, it proves an example of both Conceptual Learning as well as Authentic Enquiry, as defined in Table 1. One such intervention in the discussion demonstrates the dual nature of the activity in that not only does it provide a tangible example of one of the theoretical terms covered but also provides reasoning on the importance of the chosen example:

> "*I chose this example, because traditionally, in Chile, politicians are associated with a certain level of formality causing them to all act in similar ways [. . .] in order to increase their 'informal authority'[…] and to*

> *demonstrate that they are not common, everyday people, but [this woman's] way of differentiating herself [by doing the exact opposite] has provoked considerable recognition from the politically uninvolved."*

Considering the basis of the activity may help to explain the high levels of *Exploration* postings: 74.1% of the total postings. Simply asking students to provide examples does not necessarily generate debate, deemed necessary for enhancing critical thinking (Bullen, 1998). No interaction is explicitly required, nor are the participants asked to defend their positions. Furthermore, one should account for the fact that the discussion took place during the third week of the course; this may have had an effect on the type of student responses. Participants may have been hesitant to challenge others' points of view as they were still building a community; according to Swan and Shih (2005) social aspects of online discussions are perceived as more beneficial than interactive ones by students.

Conversely, Activities 11 and 16 predominantly demonstrated characteristics of Conceptual Learning and Problem Solving; the activities were associated with these categories because they were based on course content and asked participants to clarify meaning. Throughout the online conference participants worked with one another in order to clarify concepts, meanings and interpretations as demonstrated in the following excerpt:

> Participant 1: "*The strategy of provocation by making observations, formulating questions, interpreting, and executing actions is one way of attracting attention. In addition to the already proposed risks, I would ask, isn't it an additional risk to believe that the interpretation that one makes is not biased by their own convictions and/or considered a truth by the individual who is exercising leadership without formal authority?"*
>
> Participant 2: *"That's a very interesting question, it would seem impossible to make a provocation that isn't biased by one's own convictions. However, I believe that it is fundamental to understand that by attracting attention by questioning and action, one generates a <u>debate</u> that necessarily invites questioning by the group. After this public analysis, and if my 'provocations' are considered important for the group, the initial attention will become more solidified."* (Emphasis in original).

The exchange between these two participants in Activity 16 exemplifies the negotiation of meaning and interpretation with the conceptual subjects addressed in the assigned reading, making it characteristic of Problem Solving and Conceptual Learning activities, respectively.

Despite the two activities falling within the same assignment categories, the instructions for each differed, perhaps explaining the variation in critical thinking levels for each. Activity 11 requested a critique by the students of the theoretical content of that week's module. The simple structure of the activity reflects the solicitation of a particular type of debate interaction characterized by interventions of *Integration* and subsequently *Solution*, as illustrated by the higher percentage of these postings in activity 11, at 20% and 5.7%, respectively. Other elements for consideration for this conference include the use of a student

moderator instead of the instructor. Intuitively, one suspects the participants focus more on the tutor postings for clarification or interpretation of the material, associated with the studies of Dennen (2005), Swan (2001), and Swan and Shih (2005), which characterize student-instructor interaction as more beneficial for learning outcomes than student-to-student interaction. However, with a participant as the discussion moderator, the responsibility of synthesis, explanation and analysis reside solely with the participants, possibly contributing to the increased levels of critical thinking by the students.

Although activity 16 shares similar characteristics with those of activity 11, namely its categorization in Table 1, the instructions for the task illuminate the variation between the two. The activity required participants to post two questions regarding the content covered and respond to at least one. It appears that this structured type of interaction may have limited the number of *Integration* messages. The majority of the posting were *Triggering* (30.4%) and *Exploration* (48.5%). The pattern of the dialogue illustrates the participants completing the necessary steps of the activity without seriously engaging in any real debate. Requiring participation in this way did not stimulate critical thinking, which parallels the findings of Bullen (1998) that concluded mandatory participation in some ways adversely influenced critical thinking, in that students participated without having any significant contribution.

Having analyzed the three activities separately, there appears to be some congruence between the types of activities, their classification and the levels of critical thinking produced. As McLoughlin and Luca (2000, p. 8) have argued, in order for online discourses to develop higher order cognition, "the learning environment must be designed [...] so that tasks are engaging and cognitively demanding, students have active roles and online tutors scaffold thinking processes."

A certain parallel appears when the totals are compared with the gender breakdown, specifically the female contributions, in that the fluctuation of the critical thinking present corresponds to the change in activity types. As shown in table 9, activity 16 (which required the posting of 2 questions and a response); not only do women contribute almost half of the *Triggering* messages, the total number of them also has increased to 59 compared to 5 in activity 6, and 36 in activity 11. The difference in this category, particularly comparing activity 11 and 16, as they comprise the same types of tasks, demonstrates that requirements of an activity can greatly influence the cognitive production in interaction. The development and vacillation of the female message types further support the argument that task types and requirements affect critical thinking outcomes.

Table 9. Levels of critical thinking according to gender in activities 6, 11, 16

Category	Activity 6					Activity 11					Activity 16				
	Number of Postings		Distribution of Postings		Total Number of Postings	Number of Postings		Distribution of Postings		Total Number of Postings	Number of Postings		Distribution of Postings		Total Number of Postings
	Female (n=16)	Male (n=19)	Female	Male		Female (n=15)	Male (n=18)	Female	Male		Female (n=15)	Male (n=18)	Female	Male	
Triggering	1	4	1.7%	6.8%	5	6	30	10.2%	25.9%	36	26	33	28.9%	31.7%	59
Exploration	44	42	75.9%	71.2%	86	30	39	50.8%	33.6%	69	40	54	44.4%	51.9%	94
Integration	11	9	19.0%	15.3%	20	17	18	28.8%	15.5%	35	16	14	17.8%	13.5%	30
Solution	0	2	0.0%	3.4%	2	2	8	3.4%	6.9%	10	2	3	2.2%	2.9%	5
Other	2	2	3.4%	3.4%	4	4	21	6.8%	18.1%	25	6	0	6.7%	0.0%	6
Total	58	59	100.0%	100.0%	117	59	116	100.0%	100.0%	175	90	104	100.0%	100.0%	194

Cultural influences and attitudes toward the educational processes is another factor to consider in examining the low levels of critical thinking in the activities. As previously mentioned, Latin American students may be more accustomed to a teacher-centered atmosphere and thus found the social constructivist approach to be foreign, seeing as it is predominantly considered a 'Anglophone' mode of teaching. Bates elaborates on this, indicating:

> *"there is a tendency in 'Western' courses from the USA, Britain, Canada and Australia to encourage critical thinking skills, debate and discussion, where students' views are considered important, and where the views of teachers can be legitimately challenged and where student dissent is even encouraged"* (p. 6)

This sort of interaction, while advocated in the Leadership course, may have been culturally foreign to the Latin American participants. Although many educational programs in Latin America advocate for teaching to concentrate on the development of critical thinking, Fedorov (2005), reporting from Costa Rica, argues that there is still a significant gap between theory and practice, suggesting that this teaching style remains unfamiliar in most academic settings. This notion is also supported by Conceição's (2002) personal account with online education within the United Sates model of teaching:

> *Being born and raised in a conservative area of Latin America, I held assumptions about learning that were characterized by a teacher-centered approach with the design of instruction controlled by the instructor and learner performance influenced by the consent of the authority figure [...] the online learning design and implementation focused on a learner-centered approach, which prevented reinforcement of the instructor power position and affirmed and used the cultural experiences and knowledge of all the class members.* (p. 43)

Although this represents an individual experience, it does serve to support the cultural assumptions proposed thus far regarding student participation and the development of critical thinking.

Participant-content, interface, and instructor interaction

The apparent equivalency in ranking between conferences and student-to-instructor interactions for generating learning (Figure 2) may indicate a certain predisposition toward a more traditional teacher-centered pedagogy. If one considers the study by Yildiz and Bichelmeyer (2003), which addresses cultural differences that prove very influential in student participation, one may argue that these results reflect Latin America as a "high power distance culture" in the Hofstede index. Such ranking suggests that in an academic atmosphere the instructors are seen as authorities and the participant simply absorbs their knowledge (Yildiz and Bichelmeyer, 2003, p. 177). The fact that participants rated instructor interaction higher than group work in the exit survey (Figure 2) may also support these cultural conjectures. Bullen (1998) addresses a similar issue; however, instead of viewing the

cultural background as being influential on student participation, he focuses on the need to consider the impact of participants' experience and exposure to dialogical teaching methods.

In the same sort of sociological vein, disaggregating the results of this survey according to gender demonstrates a certain parallel between student participation and student's perceived learning. Females demonstrated significantly more postings in both group work and the Learning discussion board (Table 4) compared to those of men. Perhaps a parallel with this behavior is reflected in the surveys, where 50% of the women reported the group work as 'very useful' contrasted with only 26.3% of the men reporting it as such. Similarly, the survey results show that 56.3% of the women found the Learning conference as 'very useful' compared to the 42.1% reported by men (See Appendix 2: Evaluation survey results). These results parallel Swan's proposal (2001) that higher values of student perceived learning directly correspond to higher quantitative levels of interaction. However, due to the small numbers of this study no definitive conclusions can be made, thus warranting further investigation.

The conclusions of an external evaluator regarding INDES course design are equally interesting in this regard (Uribe, 2006). The report shows strong reliance on the part of INDES on course contents in order to generate and design other learning activities. The observations suggest various interface design changes, as well as some needed alterations in academic focuses in order to enhance the dialogical approach that is the espoused goal of INDES social constructivist pedagogy.

Conclusions

This paper has contributed to the body of research on interaction in online courses; specifically providing investigative results on a unique course compromised of diverse participants from Latin America, a region that does not receive significant attention in the existing literature. We also have provided some preliminary discussions regarding cultural, specifically Latin American, considerations for further development, as well as broached some gender-related issues. Moreover, this study provides an analysis of an online leadership-training course, distinguishing it from current research that predominantly focuses on strictly academic courses. As is with practically all studies, no definitive and universal conclusions can be made. However, this investigative study does purport to contribute to the ongoing advancement of online research.

From a quantitative perspective, tracking the frequency of postings throughout the course did not demonstrate any significant trends on where and how often participants post messages, which may reflect issues related to course design. Predominantly, our results suggest the positive effects of interaction for an online course, showing correlations between written grade and the number of postings in the activity conferences ($r = .361$, $p < .05$) and the written grade and the total number of postings in all conferences ($r = .35$, $p < .05$). These results do support the notion that increased participation correlates with higher achievement; however, due to the small number of participants, this warrants further investigation as to the consistency of these results and their possible causal connection. An experiment would be needed to propose causality. Although the correlations between interaction and student

learning and achievement could have been higher, what the results do demonstrate is the influence of other activities and activity types that may increase or decrease the amount of postings.

As far as determining gender differences in participation, results may have suggested certain gender preferences for particular discussion forums, but due to our small sample size, no definitive conclusions could be made. However, the results suggest that women prefer Group work, while the men tend to dominate the activity forums, perhaps demonstrating the socio-cultural conditioning of patriarchal societies. The female preference for Group work and the Learning conference may also be connected with their high frequency of participation in these two arenas. Both observations warrant further investigation.

By venturing to assess the qualitative dimensions of participant-participant interaction through critical thinking, not only have we attempted to explain high and low levels of critical thinking but we have also demonstrated a need to develop enhanced methods for measuring it. There were no evolutionary trends found in the fluctuation of critical thinking levels. However, we revealed how activity types and instruction can generate critical thinking, something to be considered in the design and implementation of an online course, as supported by Sims (2003, p. 89): "Effective interaction is not only multi-dimensional … but also dependent on the ways in which learning activities and teaching strategies are implemented." Of equal interest is the data illustrating that males and females participate differently in the activity discussions. Although further specifications could not be determined due to the lack of sufficient numbers, these findings may serve to initiate further research in view of the fact that to date, no other published studies have assessed gender implications on critical thinking.

Finally, regarding participant–content, interface and instructor interaction, the surveys demonstrated that the course maintained a high level of interaction; however, the results only begin to scratch the surface of how the content, instructor, and interface helped to determine learning outcomes. While all scored satisfactorily on the surveys, self-reporting has its own methodological drawback, in that it is not entirely objective. Furthermore, the second survey, having only received responses from half the students in the course, did not provide an adequate sample size to draw any conclusions. Nonetheless, the reports do suggest the importance of these types of interaction for the overall learning experience.

The policy implications for INDES are that the design of the learning activities is essential in order to increase interactions and the level of critical thinking in them. Activities that require participants to ask questions of each other are particularly potent in encouraging higher levels of critical thinking, although the results suggest that the rigidity of instruction may also hinder prolonged debates. Similarly, the role played by the instructor is important in encouraging this and not being too eager to provide answers and clarifications that with more time can generate deeper learning processes. This is of special significance in an educational culture more at ease with the instructor still being "the sage on the stage." Thus, modeling by senior INDES instructors when instructors are being trained is important, as is making instructors fully knowledgeable of adult and distance learning pedagogy in their training to become an online tutor. This is especially so because:

> "*... online learning has a different setting from the conventional classroom, online educators need to use some special techniques and perceptions to lead to success. Moreover, adults have special needs and requirements as learners compared with children and adolescents, thus online educators should know how adults can learn best because of their special characteristics."* (Huang, 2002).

This paper documents the postings in the Café and the role it played in providing social presence throughout the whole duration of the course. Indeed, it illustrates Salmon's (2004, pp. 32-33) statement that "learning involves much more than a simple shift in cognition or the experience of using a computer. Online learning offers the 'affordance' of online socializing and networking." This is atypical of the studies consulted, which only concentrate on the academic or activity-related discourses. It is important to underscore the important role the Café played in the course, with over 17 messages posted per person per week in this forum.

We underscore that over half the participants had previous experience in distance learning and less than 10% accessed the course from an Internet Café. So, the results inform on the behaviors of the educated middle to upper-middle classes in Latin America. As the Internet penetrates the region further and more people have access to this type of education, changes in the way future participants approach postings and interaction among themselves with the tutor as a facilitator must be monitored and adjustments made.

The paper has the usual limitations of studies based on methodologies used here: that is, no knowledge of outside communications such as e-mails, issues of accounting for vicarious learners (those that participate passively as opposed to actively), problems of consistency in coding, difficulty of assigning a whole posting to only one category, limitations of the pre/post test, as well as the final grade for gauging learning and achievement. The self-reported surveys and the Roblyer and Wiencke rubric also lack sufficient numbers to make definitive conclusions regarding the influences of their interactive qualities. A further drawback is the use of literature predominantly pertaining to Anglo Saxon experiences (95% of referenced sources are in English) to analyze a Latin American reality. This further illustrates the overall structural shortcomings of this type of research: namely, the lack of literature on interaction analysis in Spanish. On the other hand, due to the overwhelming segment of readership in Latin America, this limitation also provides an opportunity if this paper is translated. The paper has the potential to introduce current and scholarly research written in English to a broad array of readers in Latin America who otherwise would have probably not had access to the current debates, nor the literature surrounding them.

Appendixes 1: Learning activity examples

Teaching/learning activities Type	**Course Example**
Conceptual Learning Ideas, theories, principles of information systems, bodies of knowledge.	Activity 6: After reading module one of the online content and discussing it in pairs and reviewing the tutor's synthesis and response to questions and issues that arose (Activity 5); in this activity provide examples that illustrate the concepts of a) formal authority b) informal authority c) social function of authority Think of examples that pertain to your contextual reality and briefly explain them in the conference for Activity 6.*
Problem Solving Deductive powers, inferential reasoning, testing assumptions, decision making.	Activity 11: This individual activity requires one to share their opinions, doubts and critiques of Heifetz's proposal about formal authority and strategies for carrying it out. **
Object and document analysis Contextualization and interpretation using texts, documents, pictures, objects.	Activity 7: See the outline for "The Social Function of Authority" in the section of Materials for the course. Fill in the outline according to the individual context of the organization that you work for.*
Data gathering and synthesis Research skills, methodology, evaluation, reporting and quantification.	Activity 14: Review the modules covered so far, as well as the conference discourses. In light of this material, apply the concepts developed so far to your personal experience. To do so, provide a brief context and here are some guiding questions to be considered: 1. In the context described, what authority do you have? 2. In situation being confronted, are you dealing with adaptive or technical problems? 3. What is the adaptive problem? Who needs to do the work? 4. What strategies will you use for mobilizing individuals or the group in question? 5. What does this imply for you? What changes will you have to make?*
Case studies Evaluation of systems by observing and analyzing simulated situations or processes.	Activity 17: Read the case study on Martin Luther King, keeping in mind the reflection questions at the end of the document. Discuss the questions in your assigned group discussions. In your analysis, please limit yourself to the information provided in the case. There will be a coordinator for each group who will be responsible for providing a synthesis of the group discussion in terms of the questions asked.

* Also classified as an *Authentic Enquiry* activity
** Also an example of *Conceptual Learning* activity

Appendix 1: Learning activity examples (cont.)

Teaching/learning activities Type	**Course Example**
Presentations by teachers Demonstrations, overviews, framing, highlighting key information or salient points.	N/A
Collaborative learning Sharing knowledge, collective decision making, forming learning communities.	Activity 17: Read the case study on Martin Luther King keeping in mind the reflection questions at the end of the document. Discuss the questions in your assigned group discussions. In your analysis, please limit yourself to the information provided in the case. There will be a coordinator for each group who will be responsible for providing a synthesis of the group discussion in terms of the questions asked.
Authentic enquiry Learner as practitioner, connecting theory to practice, taking responsibility for knowledge.	See Activity 6, 7 or 14 above.

Appendix 2: Evaluation survey results

Characteristics	Description	Gender				Total (35)	
		Male (19)		Female (16)			
		Number	Percentage	Number	Percentage	Number	Percentage
Rating for achievement of course objectives	Very good	11	57.9%	11	68.8%	22	62.9%
	Good	7	36.8%	4	25.0%	11	31.4%
	Average	0	0.0%	0	0.0%	0	0.0%
	Poor	0	0.0%	0	0.0%	0	0.0%
	Very poor	0	0.0%	0	0.0%	0	0.0%
	Missing	1	5.3%	1	6.3%	2	5.7%
Rating of the forums for generating learning	Very useful	14	73.7%	11	68.8%	25	71.4%
	Useful	2	10.5%	3	18.8%	5	14.3%
	Not very useful	2	10.5%	1	6.3%	3	8.6%
	Missing	1	5.3%	1	6.3%	2	5.7%
Rating of group work for generating learning	Very useful	5	26.3%	8	50.0%	13	37.1%
	Useful	11	57.9%	5	31.3%	16	45.7%
	Not very useful	2	10.5%	2	12.5%	4	11.4%
	Missing	1	5.3%	1	6.3%	2	5.7%
Rating of interaction with instructor for generating learning	Very useful	11	57.9%	10	62.5%	21	60.0%
	Useful	7	36.8%	5	31.3%	12	34.3%
	Not very useful	0	0.0%	0	0.0%	0	0.0%
	Missing	1	5.3%	1	6.3%	2	5.7%
Rating of content materials for generating learning	Very useful	16	84.2%	14	87.5%	30	85.7%
	Useful	2	10.5%	1	6.3%	3	8.6%
	Not very useful	0	0.0%	0	0.0%	0	0.0%
	Missing	1	5.3%	1	6.3%	2	5.7%
Rating of required & suggested reading materials for generating learning	Very useful	16	84.2%	13	81.3%	29	82.9%
	Useful	2	10.5%	2	12.5%	4	11.4%
	Not very useful	0	0.0%	0	0.0%	0	0.0%
	Missing	1	5.3%	1	6.3%	2	5.7%
Rating of final project for generating learning	Very useful	14	73.7%	12	75.0%	26	74.3%
	Useful	3	15.8%	3	18.8%	6	17.1%
	Not very useful	1	5.3%	0	0.0%	1	2.9%
	Missing	1	5.3%	1	6.3%	2	5.7%

Appendix 2: Evaluation survey results (cont.)

Characteristics	Description	Gender				Total (35)	
		Male (19)		Female (16)			
		Number	Percentage	Number	Percentage	Number	Percentage
Rating of Learning Forum 5=Very useful---- 1=Not useful	5	8	42.1%	9	56.3%	17	48.6%
	4	6	31.6%	5	31.3%	11	31.4%
	3	2	10.5%	1	6.3%	3	8.6%
	2	0	0.0%	0	0.0%	0	0.0%
	1	2	10.5%	0	0.0%	2	5.7%
	Missing	1	5.3%	1	6.3%	2	5.7%
General quality of the course	Very high	13	68.4%	7	43.8%	20	57.1%
	High	4	21.1%	8	50.0%	12	34.3%
	Average	0	0.0%	0	0.0%	0	0.0%
	Low	0	0.0%	0	0.0%	0	0.0%
	Very low	1	5.3%	0	0.0%	1	2.9%
	Missing	1	5.3%	1	6.3%	2	5.7%
Level of learning in the course	Very high	13	68.4%	8	50.0%	21	60.0%
	High	5	26.3%	7	43.8%	12	34.3%
	Average	0	0.0%	0	0.0%	0	0.0%
	Low	0	0.0%	0	0.0%	0	0.0%
	Very low	0	0.0%	0	0.0%	0	0.0%
	Missing	1	5.3%	1	6.3%	2	5.7%
Quality of course experience	Very good	16	84.2%	13	81.3%	29	82.9%
	Good	1	5.3%	2	12.5%	3	8.6%
	Average	0	0.0%	0	0.0%	0	0.0%
	Poor	1	5.3%	0	0.0%	1	2.9%
	Very poor	0	0.0%	0	0.0%	0	0.0%
	Missing	1	5.3%	1	6.3%	2	5.7%

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