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Electronic Engineering students' interactions through forums in the virtual component of a blended learning course*

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Abstract

This article originates from a research project that gathers findings regarding social interaction in a group of students of ESP (English for Specific Purposes) in the virtual component of a mixed learning environment. The group consists of 23 Electronic Engineering students from Universidad Santo Tomás in Tunja. Our purpose is to give evidence of the construction of knowledge and meaning related to a specific subject, using technical English. In order to show how this community interacted and what this process represents in the experience of English learning in a higher education context, interaction processes are reported on from a qualitative perspective through transcriptions of the forums, observations and the application of a survey. Results reveal that the Electronic Engineering students established a social bond that led them to become a virtual learning community in which they shared ideas, agreed on meaning and constructed knowledge through the use of English for Specific Purposes.

Key words: Mixed learning, forum, university, English for specific purposes, interaction.

Interacciones de estudiantes de Ingeniería Electrónica a través de foros, en el componente virtual de un curso de aprendizaje mixto.

Resumen

Este artículo deriva de una investigación que presenta algunos hallazgos respecto de la interacción social de un grupo de estudiantes de ESP (Inglés con Propósitos Específicos) en el componente virtual de un ambiente de aprendizaje mixto, con 23 estudiantes de Ingeniería Electrónica de la Universidad Santo Tomás en Tunja. Nos proponemos mostrar cómo ellos construyen conocimiento y significado relacionado con una disciplina específica, utilizando inglés técnico. Aquí se reporta los procesos de interacción desde una perspectiva cualitativa, mediante transcripciones de los foros, la observación y la aplicación de una entrevista, con el fin de mostrar cómo esta comunidad interactuó y qué representa este proceso en la experiencia de aprendizaje del Inglés en el contexto de educación superior. Los resultados revelan que en esta investigación los estudiantes de Ingeniería Electrónica crearon un lazo social que los condujo a una comunidad de aprendizaje virtual, en la cual compartieron ideas, establecieron significado y construyeron conocimiento a través del uso de Inglés con propósitos específicos.

Palabras clave: aprendizaje mixto, foro, Universidad, Inglés con propósitos específicos, interacción.

Interactions des étudiants de génie électronique à travers des forums faisant partie du composant virtuel d'un cours d'apprentissage mixte

Résumé

Cet article est le résultat d'une recherche qui présente quelques découvertes par rapport à l'interaction social d'un groupe d'étudiants d'anglais sur objectifs spécifiques, dans le composant virtuel d'un environnement d'apprentissage mixte, avec 23 étudiantes de Génie Électronique de l'Université Santo Tomás à Tunja. Nous avons l'intention de montrer comment ils construisent la connaissance et le signifié lié à une discipline spécifique, en utilisant l'anglais technique. Ici on reporte les processus d'interaction dès une perspective qualitative, à travers des transcriptions des forums, l'observation et l'application d'une interview, dont le but est celui de montrer comment cette communauté-là a interagit et ce qui représente ce processus dans l'expérience de l'apprentissage de l'anglais dans le contexte des études supérieures. Les résultats révèlent que dans cette recherche, les étudiants de Génie Électronique ont créé un lien social qui les a conduit à une communauté d'apprentissage virtuel, dans laquelle ils ont partagé des idées, ont établi des signifies et ont construit de la connaissance à travers l'utilisation de l'anglais pour objectifs spécifiques.

Mots clés: apprentissage mixte, forum, Université, Anglais pour objectifs spécifiques, interaction.

A interação dos estudantes do curso de engenharia eletrônica nos foros virtuais como componente de ambientes de aprendizagem misto

Resumo

O artigo é resultado de uma pesquisa que apresenta alguns achados relativos à interação social de um grupo de estudantes de Inglês com Propósitos Específicos (ESP), no componente virtual de um ambiente de aprendizagem misto, com 23 alunos do curso de Engenharia Eletrônica da Universidade Santo Tomas de Tunja (Boyacá/Colômbia). Nosso propósito é mostrar como eles constroem conhecimento e significado relativo com uma disciplina especifica, utilizando inglês técnico. Aqui se apresentam processos de interação desde uma perspectiva qualitativa, por meio de transcrições dos foros, a observação, e a aplicação de uma entrevista, com o fim de mostrar como esta comunidade interatua e que representa este processo na experiência de aprendizagem do inglês no contexto da educação superior. Os resultados revelam na pesquisa que os alunos de Engenharia Eletrônica criaram um tecido social que os levou a uma comunidade de aprendizagem virtual, na qual compartilharam ideias, estabeleceram significados e construíram conhecimento a traves do uso do inglês com propósitos específicos.

Palavras chave: aprendizagem mista, foro, universidade, inglês com propósitos específicos, interação.

Introduction

Social interaction in English learning contexts has led students to create chains of communication. Thus, interaction can be explored in different educational environments through computer-mediated communication (CMC) that promotes the use of technological tools for different pedagogical and researchable purposes.

Interaction in online settings is different from the face-to-face classes. However, it is possible to design and implement activities to promote interaction even in a virtual setting. One of these activities is forums, which let English for Specific Purposes (ESP) students share and construct knowledge and experiences, convey meaning, validate and test ideas, change their minds and internalize new co-constructed knowledge.

The process of interaction depends on each group. Every ESP learning community displays some characteristics and features regarding how they interact. That is why it is important to study the process of interaction students go through in order to recognize who they are, their interests, preferences, styles and needs related to the use of English for Specific Purposes. In this research, I studied the characteristics of the process of interaction within a community of Electrical Engineering students, who required a virtual space to expand their learning process.

In terms of ESP learning in a communicative activity like forums, it is necessary to consider not only the level of participation but also how the learning experience occurs and what methodological and contextual factors influence this process. In addition, I provide a concept of interaction from conclusions I drew based on previous research and my own experience in the field. I also guide the ESP teachers and researchers through a methodological design for Blended Courses and interpret and discuss previous research in the field. Some specific aspects of this research are displayed by means of interaction analysis by using

forums as technological tools and the primary instrument for data analysis. Besides, I include observation and an in-depth interview to validate information. Pedagogical implications are discussed and future research suggested.

1. Research Question

In order to have a focus to analyze the interactional process displayed by the Electrical Engineering students, the following question emerges:

How do ESP students construct knowledge about Electrical Engineering issues and convey meaning in a process of interaction through virtual forums at *Santo Tomás* University?

2. Objectives

2.1 General

- To characterize Electrical Engineering students´ social interaction in a virtual learning community.
- To analyze how ESP students construct knowledge and convey meaning through their interactions.

2.2 Specific Objectives

- To describe the use of English in forums among Electrical Engineering students.
- To display the communicative strategies Electrical Engineering students use to convey meaning and construct knowledge as a community.

3. Theoretical Framework

3.1 Social Constructivism and Interaction

Social constructivism is a theory of learning that supports the process of interaction because, through this conception, students overcome stand-alone participation (Pang & Ngoh ,2005, p.102), share what they know and think about a topic or an issue, develop their critical thinking skills and offer solutions to different problems from different worldviews. In EFL learning, social constructivism also promotes the improvement of language proficiency because there is not only a tutor correction but also peer feedback. In this way students become more aware of their strengths and weaknesses in terms of learning.

Interaction can be defined as the integration of the following aspects. First, collaborative dialogue: "It is language use mediating language learning. It is

cognitive activity and it is social activity" (Swain, 2000, p. 97). Second, negotiation: Ellis (1990) states that in the Interaction Hypothesis when L2 learners face communicative problems and they have the opportunity to negotiate solutions to them, they are able to acquire new language…defined as "discussion to reach agreement"(p.48). Third, co-construction: "the joint creation of a form, interpretation, stance, action, activity, identity, institution, skill, ideology, emotion or other culturally-related meaning reality" (Jacoby & Ochs 1995, p.171). Therefore, interaction is an individual and social process human beings experience when they are in contact with others and the environment around them. It involves the cognitive development and the relationships among the participants. Besides, it leads to learning, the construction of meaning and a sense of collaboration.

Bearing in mind the previous definition of interaction, which is the one I compiled, integrating what researchers such as Gunawardena (1997), Henry (1992), and Clavijo (2008), among others, proposed and calling on my own experience as a virtual environments researcher, I see interaction as a process in which different stages and phases are present depending on the context in which it occurs. In the teaching-learning processes, meaning making and the construction of knowledge are key factors in any interactional situation.

On the one hand, meaning making implies not only sharing, comparing or adding information, but it also requires a collaborative effort in which the participants agree, disagree, debate and support their viewpoints in order to reach a consensus. Participants must understand and respect others' views and how this negotiation can lead to a process of clarification, the proposal of new concepts and the expansion of the topics supported by examples. On the other hand, co-construction of knowledge involves interrelated processes of meaning making and the capacity to test and validate hypotheses from theory and experience. At the end, the participants summarize the agreement and apply the new knowledge illustrating their understanding (Gunawardena, 1997).

In the study titled *Negotiation for meaning in synchronous EFL chat* done by Worajittiphon (2010), the participants were eleven Thai students and eleven English speaking participants on a voluntary basis. According to the researcher, he analyzed the triggers that caused comprehension difficulties and the strategies used by the Thai speakers to solve communication problems through the analysis of chat scripts, interviews and reflective notes written by the Thai speakers. The findings showed that the triggers that caused comprehension difficulties were lexical/semantic, morphosyntactic and global. Furthermore, the strategies

used by these students were confirmation check, request for help, word substitution, rephrase, dictionary and avoidance.

Social interaction is one of the key aspects in the development of this project because it aims to describe, analyze and interpret how communities of ESP students interact among themselves in a Blended Environment. In this way, social interaction involves the exchange of ideas, feelings, knowledge and theory among other aspects; it also takes into account the differences among cultures accepting the variety of world views and collaborating to reach an agreement from several opinions. Some recent studies regarding interaction in EFL illustrate the use of technological tools in order to promote communicative activities in learning environments. One of the studies is called: *Discuss, reflect and collaborate: a qualitative analysis of forum, blog and wiki use in an EFL Blended Learning course* by Miyazoe & Terry Anderson (2012). In this research, ten Japanese students and a Chinese student participated. The authors investigated the qualitative changes in writing proficiencies in response to using three online writing tools: discussion forums, blogs and wikis. In this case, a questionnaire, an interview and text analysis were combined for triangulation. The researcher created two virtual platforms for the students. One of them had a social focus and the students used their real names to speak about personal topics as in the wikis.

The other platform focused on topic based discussion in forums and wikis for translation. In this second platform the students used pseudonyms to participate. At the end, according to the author "The students acknowledged different utilities and skills associated with different purposes of each online writing tool and their abilities to write academic English showed qualitative improvement".(Miyazoe et al., & Terry Anderson 2012, p.150).

Another study that has to do with interaction and students' perceptions on virtual learning communities is called *Internet perceptions, online participation and language learning in Moodle forums: A case study on nursing students in Taiwan* by Yang & Nina Chiulan Lin (2010). This research intended to investigate forty seven nursing students' perceptions on online participation and their online participation in forums. It involved the performance of students in writing progress tests and the analysis of interaction and participation in the forums, specifying the roles that the students assumed in their exchanges. The author concluded that in terms of writing progress "fluency rather than accuracy could be enhanced in an online setting" (Yang et al., & Nina Chiulan Lin. 2010, p. 2649). The students were

more interested in writing and participating than correcting mistakes in terms of language. This study also pointed out how the students' attitudes towards the internet affected learners' motivation, interests and performance in internet based learning environments (Peng, Chin-Chung Tsai, Ying-Tien Wu, 2006, p.75). This study is related to my research explained in this article since it enhances students to learn English through the use of forums as technological tools that offer a space to interact about a specific field.

3.2 Communities of Practice

A community of practice is a group of people who share an identity because they have some interests, ideas, professions in common. They form relationships and bonds that lead them to learning through engaging in interest based activities and discussions. Nowadays, there are different communities of practice that emerge from social networks such as Instagram and Pinterest, which promote learning without barriers due to the contact we can have with other cultures around the world. According to Wenger (2007) "Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (p.1). They must meet three crucial criteria: the domain, the community and the practice (Wenger, 1993).

> 1. The domain: A community of practice has an identity defined by a shared domain of interest. Membership therefore implies a commitment to the domain and therefore a shared competence that distinguishes members from other people. (Wenger, 1993, p. 1).
>
> 2. The community: In pursuing their interest in their domain, members engage in joint activities and discussions, help each other and share information. They build relationships that enable them to learn from each other (Wenger, 1993, p. 2).
>
> 3. The practice: Members of a community of practice are practitioners. They develop a shared repertoire of resources: experiences, stories, tools, ways of addressing recurring problems—in short a shared practice. This takes time and sustained interaction. (Wenger,1993, p.2).

The interaction process in this community of practice was shaped by all these previous aspects. This process of interaction is easier within specific communities of practice because of the contextual factors that enable them understand one another in social practices, including the educational experience in the university context.

3.3 Interaction through Computer Mediated Communication

In the field of EFL, many teachers and students have used technology in different settings. Through these technological tools teachers take advantage of a wide variety of resources. For example, students can access information from different cultures and parts of the world. Additionally, one of the most important uses of this technological revolution is the ease with which people can communicate with others. In this case, EFL students have the opportunity to chat with native speakers and learn about other people's knowledge, experiences and worldviews. Thanks to technology, there are fewer boundaries. In this way, social interaction is possible; however, it is important that EFL teachers guide their students through these technological tools and promote interaction as a crucial part of the English language learning process.

CMC has been implemented in EFL settings in order to take advantage of the broad variety of technological tools it provides for teachers and students when learning a foreign language. One of the concepts that emerges from the implementation of CMC is interaction. This concept implies the negotiation, creation of meaning, and co-construction of knowledge among the participants involved.

The concept of CMC has predominated in EFL teaching when implementing Blended Learning (BL) courses. As Huifen (2010) stated: "Computer mediated communication helps create a virtual social learning environment, in which a foreign language is learned through interaction, negotiations and accommodation to each individual and his or her peers" (p. 717).

3.4 Interaction in EFL and ESP Environments

Interaction is a process that can be seen and addressed from different perspectives, for example, the cognitive and meta-cognitive viewpoints. Levin et al.(1990) stressed that "this process can be perceived from lower functions or cognitive level as in sharing and comparing information and at a higher level or metacognitive" (p. 7), where the previous knowledge and experience of the participants change and new constructs are internalized to finally reach an agreement or conclusion (Gunawardena, 1997).

Integrating the commonalities of the studies done in the field such as those by Gunawardena, Henry and Levin (1990) among others, it is evident that the process of interaction goes through different interrelated phases that are

present in it. However, the studies also agreed that every context is different and that is why the interaction process varies depending on different situations, participants and environments in which it is carried out. Following I describe some of these studies: Levin et al.(1990) presented messages maps that displayed the relation among the messages posted and the amount of times participants are given answers by the rest of the group. Henry (1992) proposed research on discussion boards by studying units of meaning. Another way to study forums is through the analysis of the performance of each participant in the forum and how his or her learning process is carried out during a period.

Going beyond the quantitative and instrumental view of the analyses of forums Henry (1992) proposed a system of content analysis for the forums in a qualitative way, summarized in the following categories: 1) content with the social dimension of the conference (forum) exchanges; 2) content relating to the interactive dimension of the conference; 3) content indicating the application of cognitive skills; and 4) content showing metacognitive skills.

Considering these previous aspects, Gunawaderna et al.(1997) proposed a new model to analyze interaction from a constructive perspective, which is described as follows: "Phase 1.Sharing/comparing of information; phase 2.Exploration of dissonance; phase 3. Negotiation of meaning-construction of knowledge; phase 4. Testing and phase 5. Agreement statements."(p. 110)

Although there are several studies, such as the ones proposed by Huifen (2010), Menezes (2009), Shin (2010), Clavijo, Hine & Quintero (2008) and Lear, Ansorge & Steckelberg (2010) among others, regarding interaction in the EFL-classroom through computer mediated communication, it is necessary to propose more methodologies which lead to the application of the principles of practicability, adaptability and applicability (see Right to education Project, 2008, p.1) to help English teachers interpret their practices in a more coherent way. In the reflection of these practices, I start with some of the research done in the field of EFL and ESP teaching.

In his research called *EFL learners* perceptions of CMC to facilitate communication in a foreign language, Lin (2010) unveiled the students' perceptions about the use of CMC in and out of the classroom. According to the researcher, "It is important to know about the benefits and barriers when using technology…" (p. 713). But the most important questions posted in this research were: ¨When students engage in CMC activities, what communicative

behaviors do they demonstrate? Specifically, do the behaviors promise an improvement in communicative competence, while producing a satisfactory global picture of its use in foreign language classrooms?" (Huifen, 2010, p.715). This was a qualitative case study research project that examined asynchronous and synchronous communicative experiences of EFL learners who were taking an EFL writing course through a blended model.

To illustrate the relevance of the process, Menezes et al. (2009) in their project at the University of Ontro Petro, in Brazil, investigated *interaction in an EFL online environment*. Students at that university were given some weekly tasks. They had the chance to keep copies of their tasks and at the end; they could choose five tasks to be graded by the professor. The author stressed on the importance of the process rather than the product. The basis of the English courses was the socio-cultural theory and the communicative approach described by Howatt (1984, p.60). The researcher intended to know about the student's use of the online environment and the process they went through for each assignment.

Considering the previous aspects, different kinds of interaction are possible. Up to a point, in an online environment a one way interaction (teacher-student or student-teacher) might become an interactional situation within a community. Ru-Chu Shin (2010) in his research, *Blended Learning using video-based blogs: Public speaking for English as second language students* proposes the application of a widely implemented technological tool. This research project was developed by at the national Pingtung University of Science and Technology in Taiwan. The author used a Blended Learning model for an ESP course called Public Speaking. This study combined quantitative and qualitative aspects through peer and instructor feedback, blogs, interviews, self-reflection and a learning satisfaction survey. This study had four primary Blended Learning elements: classroom, instructor, technology and students. The author makes the following conclusion "Computer assisted simulation and learning activities promote collaborative learning" (Ru-Chu Shin, 2010, p.885).

On the other hand, Lear et al. (2010) explored interaction through their project called *Interactivity/ Community Process Model for the Online Education Environment*. This research was developed in four Midwestern post-secondary institutions where the students were surveyed about their perceptions of interactivity and community building in their online classes. Some of them were also interviewed to explain the findings of the quantitative survey. They

concluded that classes like accounting and finance might not able to provide as much discussion as in the theory based classes.

3.5 Virtual Communities of Learning

According to Schwier & Dykes, M. (2004) "A learning community is a group of individuals engaged intentionally and collectively in the transaction or transformation of knowledge. Although learning communities emphasize outcomes in education their power resides in their ability to take advantage of, and in some cases invent, a process for exchanging ideas and learning collectively" (p. 2).

In the development of this project about the creation and implementation of a virtual learning environment directed to Electrical Engineering students, I noticed that this kind of community emerged because these students shared a repertoire of knowledge and experiences that they brought into the classroom. That is to say, they had an educational and social background that was crucial to be included and explored when the students participated in the virtual classes through forums. In addition, they came together in the transaction and transformation of knowledge. From the previous considerations, the Electrical Engineering students formed a virtual learning community.

4. Research Design

4.1 Type of Research

According to Zainal (2007) "Case study method enables a researcher to closely examine the data within a specific context. In most cases, a case study method selects a small geographical area or a very limited number of individuals as the subjects of study. Case studies, in their true essence, explore and investigate contemporary real-life phenomenon through detailed contextual analysis of a limited number of events or conditions and their relationships" (p.62). This is a descriptive-interpretive case study because it describes the process of interaction carried out by twenty two students of Electrical Engineering in a virtual learning environment.

4.2 The Participants

I chose to work with twenty two ESP Electrical Engineering students since they studied at 7 a.m. and at 7 p.m.; that is to say, they were available in two shifts. Most of them came from different regions of Colombia, and their average age ranged from 19 to 25 years old. They were mixed groups (women and men) and in terms of the English language, these groups were very

heterogeneous. Some of them had a low intermediate level and the rest had a beginner level.

4.3 Data Collection Instruments

4.3.1 Forum interactions. According to Ko & Sammons (2010) "other helpful devices for personalizing a class include a discussion forum, where students can introduce themselves […] and forums allow students to analyze and synthesize a wide variety of material" (p.56). In this project, I define a forum as a technological tool that can lead to interaction among material, students and teachers. This tool can be used methodologically to create chains of communication among students.

4.3.2 Field notes. Marshall (2004) defines observation as "the process which entails the systematic noting and recording of events, behaviors, and artifacts (objects) in the social setting chosen for study" (p. 306). ¨ The observational record is frequently referred to as field notes, it means the detailed, nonjudgmental, concrete descriptions of what has been observed¨. (p. 305). Bearing in mind this concept classroom observation was performed by the researcher-teacher using a format to keep track of the number of and quality of students' interactions.

4.3.3 In-depth interview. In order to validate the information gathered from the primary source, which is the forums, I interviewed some of the participants to get a clearer, more coherent and bias-free perception of the process of interaction among the students. According to Liamputtong (2009) "the essence of in-depth interview is the assumption that people have essential and specific knowledge about the social world that can be articulated by verbal messages" (p.7).

5. Data Analysis

Considering the previous research done on interaction, such as the models proposed by Henry, Gunawardena, and Levin et al. (1997), among others, and a data-analysis I conducted during the data collection process and which displayed some of the subcategories that led to general categories. In this preliminary data-analysis I focused on two fundamental aspects. The first consideration was the research question: How do ESP students construct knowledge and convey meaning in a process of interaction through forums in the virtual component of a Blended Environment? In this sense, the second consideration was the definition of interaction compiled and interpreted in this research: Interaction is defined as a social, cognitive and metacognitive process in which language

learning can occur, due to the participation and negotiation of students and teachers, who construct different meanings in different learning situations (Swain, 2000; Ellis, 1990; Jacob & Ochs, 1995). These two aspects were connected in order to do the analysis, in which I went through different stages such as axial coding, color-coding and memo writing. The process of interaction among the students was always developed in English.

Findings

Table 1. Interaction process in three categories displayed by Electrical Engineering students in an ESP course.

Research Question. How do ESP students construct knowledge about Electrical Engineering issues and convey meaning in a process of interaction through virtual forums at Santo Tomás University?		
Sub-questions	**Categories**	**Subcategories**
* What are the phases in terms of construction of knowledge and meaning making Electrical Engineering students go through when they interact in a virtual learning community? * How do Electrical Engineering use English related to their field of study in a process of interaction? * What are the communicative strategies Electrical Engineering students use to convey meaning and construct knowledge? * What do Electrical Engineering students reflect about in a process of interaction?	• Students' basic level of interaction through sharing, comparing and reflection. • Conveying meaning to reach agreement and overcome disagreement among Electrical Engineering students. • Students' advanced level of interaction through co-construction of knowledge about Electrical Engineering.	1. Students sharing of information and commonalities regarding their discipline 2. Social bond as a starting point in interaction. 1. Electrical Engineering students forming a Community of Practice. 2. Meaning negotiation displayed by Electrical Engineering students. 1. Flow of Communication displayed by the students in the forums. 2. Interaction strategies used by Electrical Engineering students.

5.1 Student's Basic Level of Interaction through Sharing, Comparing and Reflection

In this category I evidenced 3 aspects: 1. the social bond created among the students and why this organization is necessary in any interactional process. 2. Sharing and comparing where I illustrated the strategies they used in this stage. 3. I highlighted through examples how these Electrical Engineering students reflected upon the topics posted in the forums.

This category is called *students' basic level of interaction through sharing, comparing and reflection* because in the analysis of the forums, the Electrical Engineering students showed a level of interaction that was more at a social level. At the beginning of the virtual course the students created a social bond that let them participate in the forums and wrote about themselves and the topic posted. In the creation of this bond a new subcategory which is denominated *Students sharing of information and commonalities regarding their discipline* emerged:

5.1.1 Students sharing of information and commonalities regarding their discipline

This subcategory was the one that was displayed most frequently by the Electrical Engineering students. In the process of construction of the students' messages they took into account or reviewed what they interacted about in face to face classes and generally posted in the forum the conclusions they had arrived at during the live class sessions. Moreover, they activated schemata about the topics seen in other subjects such as controlling and circuits. Since the students belonged to the same discipline, most of their entries posted at the beginning of the course reflected a tacit agreement; that is why they were more interested in participating and sharing information with the others than in creating dissonance or disagreement. The question posted in forum # 1 was: What is the role of your profession in society? They had to consider the positive and negative aspects.

Table 2. Forum 1

What is the role of your profession in the society?
 by C. G.-
The Electrical Engineering, offers society a better way of lifestyle, being present in fields of industry, automating and controlling all the process that are made in companies; Also in telecommunications, that are very important now, and even come to move into fields as medicine by developing systems that allow a clear and reliable diagnosis, and addition to solutions to many problems. The electricals is not a Career the future is a carrer the present.
 Re: by A.M. -
My career is very important in our society, with Electrical Engineering offer different solutions to the problems of a particular region. Electrical Engineering application has several branches where it develops important roles in the development of a society that is constantly evolving. So the electricals are introduced in fields such as: communications, electro medicine, control, automation, telematics and many others with which it is intended to make life easier both for people and optimize It.
 by C.G. - Wednesday, 3 August 2011, 10:59 AM
I'm agree.It's true Andres, the electricals has many fields of development, making it an important profession that involves society.

Excerpt taken from the Virtual platform

In the previous example, table 2, C.G. referred to his profession by bringing in conclusions from face to face classes and his educational background. C.G. named different applications of Electrical Engineering such as industry, automation, medicine and telecommunications. At the end, he gave his opinion: "The Electricals is not a career of the future is a carrer of the present [sic]."

A.M. also participated in forum # 1 sharing the information that was relevant to him and repeating some of the information posted by C.G. For instance, when he named the fields of Electrical Engineering such as communications, electro-medicine, control… and he also gave an opinion: "my career is very important in our society…"

From observation (field notes # 1 August), the interaction in the first forum was limited in terms of content and length of the messages. In the example C.G. replied to his classmate's message confirming the information provided. However, there were not more contributions to the topic and that is why that interactional process among them came to an end.

5.1.2. Social bond as a starting point in interaction. This was another subcategory that emerged from the analysis of interaction among the Electrical Engineering students. In any interactional process, learning occurs not only at the individual level but also at the social level. The social relationship among the Electrical Engineering students was strong and contributed to the discussions as students brought in their knowledge and projects done in the field in order to learn together in a social environment. As Vygotsky (1978) stated, "learning also occurs at the social level" (p.4). The students shared not only a social relation created among themselves but also an academic bond based on what they had learned during five semesters in different subjects such as controlling, monitoring, systems of communication and their own practices in laboratory classes. From observation done in the languages lab (August-November, 2011), I noticed that students who were friends sat together and started writing. When they had doubts about a word, they asked me or helped each other providing answers for the questions students had.

In forum #3 about nanotechnology, table 3, A.R. made fun of a classmate, J.S., regarding her intervention. From observation #3 August 15th, 2011 at the languages lab, when my students were participating in the forum, I realized that they were motivated writing their contributions to the forum about nanotechnology. Then, one of them started laughing when he was replying to one of his friends. After that, he stood up and went to his friend's seat to ask her if she had received the message. In the end, she read it and both laughed. In addition, I realized it was just a way to share and have fun between two friends as evidenced in the following entries:

Table 3. Forum 3

Why was nanotechnology created? You can give examples.    by J.S. nanotechnology could be useful for mankind in medicine and it is clear these enviromental problems we are experiencing now. but with so much potiential technology can prevent humans use it to their advantage or at least that of the people. nanotechnology would be good or bad depending on the hands to fall.
 by F.R. – Re: Why was nanotechnology created? You can give examples. i gree, because this field are very importany for developing of de new materials an divices like a biomaterials.
 by A.R. – Re: Why was nanotechnology created? You can give examples. im disagree with juana because she hasn't any idea about the develop with nanomatrials, it in most of the cases is good. i think she think thath because she have been watching a lot of dumb movies, which have no idea about waht are they talking about.

Excerpt taken from the Virtual platform

5.2 Conveying Meaning to Reach Agreement and Overcome Disagreement among Electrical Engineering Students

According to Gunawardena et al. (1997), "negotiation implies the clarification of the meaning, identification of areas of agreement among conflicting ideas, proposal and negotiation of new statements, embedding compromise, co-construction" (p.426).

This category denominated *conveying meaning to reach agreement and overcome disagreement among Electrical Engineering students* displays processes such as conveying

meaning where the students agreed, disagreed and tried to reach an agreement regarding the topics posted in the forums. The concept of community of practice is crucial since in this category for two reasons. First, I explain how the Electrical Engineering students' process of interaction was specific. Second, because the participants of this project were English learners, I show how their interaction practices helped them improve their English level. This category responds to the research question of this project (How do ESP students construct knowledge about Electrical Engineering issues and convey meaning in a process of interaction through virtual forums at *Santo Tomás* University?) by illustrating negotiation and meaning making when disagreement emerged.

5.2.1 Electrical engineering students forming a community of practice. The Electrical Engineering students belonged to a community of practice which according to Wenger (1993), must meet three crucial criteria: the domain, the community and the practice.

Regarding the domain, these Electrical Engineering students shared all the knowledge they had in common about their discipline from other subjects which they brought in the English classes helped them to understand the different topics explored and help me know them in a broader way.

In the second aspect, as they shared knowledge and practice regarding their discipline, they formed a community of students who took the same classes and worked on similar kinds of projects as requirements for other subjects. Moreover, they formed a community of English students with a similar educational background.

Table 5. Forum 1

Forum 1 What is the role of your profession in the society?  by: J.S. Electrical Engineering has contributed to the communication systems ofcontrol and response to human beings have greater comfort,contributed in large part to evolution. and entering more thoroughly toissues that made electrical television sets with bulbs from tPCs or microcontrollers, microprocessors, DSPs and FP.As. has increasingly become the subject area on which ontemporary society has been ounded…

The third aspect is the practice, since they belonged to the same university program, they were involved in similar practices and projects. For example, they were asked to make different robots. Due to the similar characteristics these Electrical Engineering students displayed, from observation done in several classes (Forums 1-10 August-November, 2011) I noticed that it was easier for them to understand their messages in the interactional process compared to any other regular English groups in which there were a mix of students from different disciplines. Their messages showed that they knew about their discipline and shared a tacit agreement because they knew about the topics discussed in face to face classes which were extended to the virtual forums:

Table 6. Forum 1

Re: F.Z:

I agree with my partner considering that today a major disciplines is electricala but keep in mind that not only is dedicated to society to human life is also very important in large industries and very wasteful in work and risk.(incomplete forum)Excerpt taken from the Virtual platform

Excerpt taken from the Virtual platform

The previous excerpts taken from the virtual platform evidenced how J.S. used vocabulary related to Electrical Engineering which was difficult for me to understand because I was not familiarized with those short forms such as: DSPs and FP.As. Since they are a community of Electrical Engineering students, they understood what they were talking about and were able to agree by adding more information, as F.Z. did. There was a coding system in terms of vocabulary, concepts and practices in this community that enabled them to interact among themselves. However, when a person from a different discipline tried to decipher that code, that person needed further explanation (as in my case).

The research developed by Yang et al. (2010) is related to my study with Electrical Engineering students because these students were more concerned about fluency and meaning making rather than accuracy in terms of English use when they participated in the forums. My study also expressed the positive and negative students' attitudes about the use of forums. For the delivery of materials, the

Moodle platform was also used. Moodle is based on socio-constructivist pedagogy, with a goal of providing online learning with a set of tools (Brand, 2005).

5.2.2 Meaning negotiation displayed by electrical engineering students. In this community of practice of Electrical Engineering students, participants showed agreement and, on occasions, disagreement throughout their messages.

They compared the information provided and shared their knowledge on the topic. In most of the forums, they repeated the examples given and agreed on the comments confirming the validity of the other Electrical Engineering students' opinions. They used expressions such as: "It's true," "I agree," and so on. There was also a tacit negotiation or agreement in terms of knowledge, which was present mostly when there was no conflict in the interaction process (Gunawardena, 1997). This is a common characteristic shared by a community when there is an in-depth agreement within a group. Here, the consensus is taken for granted and it does not move to a higher level as evidenced in the following excerpt:

Table 7. Forum 1

What is the role of your profession in the society?
 Re: A.M: My career is very important in our society, with Electrical Engineering offer different solutions to the problems of a particular region. Electrical Engineering application has several branches where it develops important roles in the development of a society that is constantly evolving. So the electricals are introduced in fields such as: communications, electro medicine, control, automation, telematics and many others with which it is intended to make life easier both for people and optimize it
 Re C.G: I'm agree. It's true Andres, the electricals has many fields of development, making it an important profession that involves society. What you say I can use it in many fields of Electricals such as control, communications etc…bye…

Excerpt taken from the Virtual platform

As evidenced in the previous intervention, table 7, most of the students agreed on the roles they had as Electrical Engineering students and future professionals. They liked to use the examples and reflections from face to face classes or make an extension of their ideas to contribute to the forum. In the above example, C.G. agreed with what A.M. said regarding the areas and applications of Electrical Engineering and used expressions such as "It's true" to express agreement.

My research is similar to the study done by Worajittiphon (2010) regarding the use of communication strategies in order to convey meaning such as adding information, clarifying words and asking for help among others as evidenced in the previous excerpt.

5.3 Students' Advanced Level of Interaction through Co-construction of Knowledge about Electrical Engineering The higher level functions also called metacognitive skills (Henri, 1992), correspond to a change or modification of previous knowledge and the co-construction of knowledge at an individual or social level where students can go beyond sharing, comparing and even constructing meaning in order to test against existing cognitive schema, personal experience, and literature (Gunawardena, 1997).

In this category denominated *students' advanced level of interaction through co-construction of knowledge about Electrical Engineering*, I present the dynamics of the messages displayed by the Electrical Engineering students which showed the flow of communication and the interaction strategies they used. One of the factors that made interaction possible among the students was collaboration. This category responds to the research question: How do ESP students construct knowledge about Electrical Engineering issues and convey meaning in a process of interaction through virtual forums at *Santo Tomás* University? Because it explains the process students went through when they interacted in the forums.

5.3.1 Flow of communication displayed by the students in the forums. The forums presented different topics. However, they were not all provoking for the students to participate further. From observation (field notes) I noticed that the Electrical Engineering students participated more in the forums when they were in the laboratory class than when they answered the questions from home. They preferred to work by posting responses in the forums during class. They accessed to the virtual platform and answered the question posted in the forum, then they looked for their friends in the platform or chose the entry that caught their attention to answer.

Table 9. Forum 2

robotics!
 by A.G: - Wednesday, 3 August 2011, 04:34 PM ther robotics is just one of the millions of the differents applications that it have. but the contribution is based on the advance of our civilization and our society, because it makes esaier some hard tasks, wich a human can't realize, we got the hope that some day the coexistance may be a normal and routiner thing. the robotics until now is developing step by step, but i know that some day, all our dreams and all the things that we think about robots and human relatioship will come true. Teacher: What did you mean when you wrote the ¨coexistence may be something normal?...
Re: robotics!
 by J.F. - Wednesday, 3 August 2011, 04:45 PM yes,is very true, the robots are made for facilitate and give comfortable to the humanity. for this reason actually the robots that build have the function of perform some work that previously have that make the common people.

Excerpt taken from the Virtual platform

The previous excerpt is an example of the student-student interaction and the teacher-student interaction which proved that when communication was present, there was a connection about the topics posted, in this case regarding robotics.

From observation (field notes # 2, August 10), I noticed that the flow of communication was consistent even though some students were not given any answer. This was the reason why the process of interaction was not present through all the entries posted by the students. The participants of a forum forming part of a community spoke about topics that appealed to them, topics they had chosen. In the development of the topics on Electrical Engineering for the online component, the students presented some ideas discussed in face to face classes. From the previous excerpt taken form the virtual platform, it is evident that the

organization of the ideas in many interventions and replies is the same: the students wrote some of the in-class ideas, researched more relevant information and wrote their comments. The last part of their messages is either a reflection or a brief report about the projects developed regarding the topics explored in class and in the online part of the course. They were willing to construct knowledge within a community of an Electrical Engineering program. In fact, the students highlighted the sense of collaboration required in the construction of knowledge in a community as it was evidenced during the interview:

> Teacher: *¿contribuyeron con lo que los demás opinaban en el foro? ¿Cómo lo hicieron? (and what do you think? Did you really contribute to your classmates' entries in the forum? How did you do it* ?)Student 6: "*ahhh, pues, todos participamos de una forma activa, dando nuestros puntos de vista y aportando nuevas ideas en los diferentes temas que se trataron. ¿Cierto?" (ahhh, well, all of us participated actively, expressing our viewpoints and supporting new ideas about the different topics discussed. Right?*) (looking at his classmates)

Excerpt taken from the interview.

As evidenced in the previous excerpt taken from the virtual platform and the opinion student # 6 expressed, class members tried to participate actively in each forum and there was a continuous involvement in the activity even though not every forum entry provoked an answer from other students.

5.3.2 Interaction strategies used by electrical engineering students. The Electrical Engineering students belonging to a specific community of practice also had a repertoire of strategies in order to communicate. In this way, this subcategory called *Interaction strategies used by Electrical Engineering students* emerged. It responds to the research subquestion: What are the phases in terms of construction of knowledge and meaning making Electrical Engineering students go through when they interact in a virtual learning community?

The process of interaction is different depending on each community of practice, in this project the Electrical Engineering students appealed to their educational background, their projects and the literature review they did for the online classes. From the observation done in the virtual platform (field notes August-November, 2011), I realized that the students' comments reflected the conclusions reached in face to face classes. The Electrical Engineering students took into account their classmates' opinions from face to face classes in order to write and participate about the topic in the virtual platform.

Table 10. Forum 3

the creation of nanotechnology  Re by N.S: Nanotechnology was created so human beings can improve even more their interaction with this world, with each other, and to gain a greater comprehension about the world surrounding them. By this creation, we can start to understand better those things we find in our day-by-day.
 Re: the creation of nanotechnology By J.S: i'm agree, i think the development of the comprehension of our self is one of the important things of nanotechnology. A studie of realy little estructure make us untderstand from another perspective the way how we live and help us to improves in technology and life
 Re: the creation of nanotechnology by M.P: Nanotechnology can be used for improve the lifes of people. also nanorobots can be used for helpful people with cancer diseases

Excerpt taken from the Virtual platform

Interaction was perceived by the Electrical Engineering students as a process of communication not only between teacher-student but mainly a process in which a community of students who studied and were interested in the same discipline communicate, sharing ideas and information, conveying meaning and collaborating to reach a conclusion.

As demonstrated from the postings, most of the students did not move to the level of answering more than twice or use what was concluded for the next interventions. Though the English professor summarized most of the final thoughts, the interaction was student-student. From the previous intervention,

I conclude that it is important to present not only different kinds of topics chosen by the students regarding their discipline but also other topics of general interest to make students participate more actively.

The students participated collaboratively and they also considered it important to speak more about projects and innovations regarding Electrical Engineering. These discussions offer more opportunities to interact, as stressed by student # 7 "*No se de pronto hablar más sobre proyectos, oh [sic], nuevas innovaciones de la carrera, eh eh eh, ver el punto de vista de cada uno y que más aportaríamos.*"

Excerpts taken from the interview.

Wrapping up, in this category denominated *students' advanced level of interaction through co-construction of knowledge about Electrical Engineering*, the students worked more at a cognitive level which required them to socially construct knowledge and integrate, internalize and change their minds about a topic. On very scarce occasions, the Electrical Engineering students explored the topics through the postings of their classmates constructing knowledge and meaning within their community of practice. The flow of communication was present in most of the forums and they showed a great sense of collaboration to participate in the forums. Moreover, it is noticeable how they used some interaction strategies to interact as a community of practice. The flow of communication was consistent and they revealed some strategies they used to interact. On the other hand, they cooperated to construct knowledge about different topics posted in the forums which were appealing to them.

Conclusions

The research question proposed for this project is *How do ESP students construct knowledge and convey meaning in a process of interaction through forums in the virtual component of a Blended Environment?* and the definition of interaction I coined: interaction is defined as a social, cognitive and metacognitive process in which language learning can occur, due to the participation and negotiation of students and teachers who construct different meanings in different learning situations (Swain, 2000; Ellis, 1990; Jacob & Ochs, 1995). In this research, interaction was evidenced in the students' postings in forums about different topics regarding Electrical Engineering issues. These forums let the students interact as a community of practice where they expressed their ideas, shared conceptions and experiences, negotiated meaning, and co-constructed knowledge about a specific field using technical English, since they were ESP students. In this way,

the discussion boards or forums were an opportunity for the students to participate actively in an egalitarian way and to refresh the concepts discussed in face to face classes. Even though the forums were used synchronously and asynchronously there were no time constraints for the students to participate at any time.

In many forums, the most common aspects evidenced were students' basic level of interaction through sharing, comparing and reflection since these are cognitive skills that require students to employ a lower level of thinking. In very few cases, the Electrical Engineering students incorporated others' ideas or newly constructed knowledge in their repertoire in order to write and contribute more in the forums. These functions are considered metacognitive skills. Even though this research reported only on the virtual component through the forums, the students also had a space to reinforce and research about different topics, to improve and practice their English in order to contribute in more proper and coherent ways.

The Electrical Engineering students went through different categories in their process of interaction which are interrelated along the process. In the first category, called *Students' basic level of interaction through sharing, comparing and reflection*, the students created a social bond in which they came together in order to share knowledge and experiences regarding topics on Electrical Engineering. In this sharing of experiences, they used specific strategies such as: adding information, providing knowledge from theory and practice, repeating information, expressing the same ideas with different words and comparing information. In the second category called *Conveying meaning to reach agreement and overcome disagreement among Electrical Engineering students*, the students worked as a community of practice, in terms of Electrical Engineering. As demonstrated in the students' interaction in the forum, they mostly agreed with their classmates regarding the different topics. However, when a disagreement in terms of language or concepts emerged, they tried to convey meaning through further explanation or relying on literature review. In the third category, denominated *Students' advanced level of interaction through co-construction of knowledge about Electrical Engineering*, the students constructed knowledge as a community through their cooperation, the flow of interaction and the different strategies they used in order to participate in the forums and provide ideas, knowledge and experience about the topics.

The kind of interaction analyzed and interpreted was student-student in an online virtual community within a social context through the use of forums.

However, this technological tool has been implemented in order for students to interact not only at a social level but also at a topic discussion level. It is also important to recognize the advantages forums have in terms of language learning, self-correction and peer-correction. Although the main focus of discussion boards is meaning making and social-bond creation, it is also crucial to identify learning strategies that lead to the mastery of the foreign language because on occasions, there is a tendency to consider only the fluency of the messages posted in the forums and leave aside the use of the FL itself.

The Electrical Engineering students formed a community of practice that displayed specific characteristics in terms of social interaction such as asking questions to get verification, asking for clarification of a confusing point, asking for help in doing a language task, negotiating meaning and co-constructing knowledge together.

It is important to recognize the social features that students display when they participate in forums because they are specific depending on the group. In this research project the students were polite, even if they disagreed on a topic and they also showed how a community worked and communicated. Furthermore, critical thinking and problem solving were skills shown by the students in some forums. Most of the entries and replies posted by the students reflected a sense of collaboration, in which the students contributed, read their classmates' ideas and constructed knowledge.

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