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Chapter: Gender and Diversity in Collaborative Virtual Teams

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Summary

Computer Supported Collaborative Learning Environments (CSCLEs) is one of the innovative technologies that support online education. Successful design and implementation of such environments demand thorough analysis of many parameters. This chapter studies the impact of diversity in learner-learner interactions in collaborative virtual teams through a social and cultural perspective. Social differences include gender, race, class or age. Cultural differences refer to matters like how an individual's cognition, values, beliefs and study behaviors are influenced by culture. Instructors must take into consideration the factors that influence individuals' diversity and invent new ways to implement successful collaboration. This is crucial especially regarding teams scattered on different countries or even continents. Social and cultural differences influence an individual's performance in a learning environment. Such differences must be adequately studied form both the educational organization and the instructors in such a way that the learning procedure will become a positive experience for all the members involved.

Introduction

It is beyond any doubt that adequate education is one of the key factors for successful embedment of the synchronous man to a world that becomes increasingly digitalized. The increased use of Information and Communication Technologies (ICTs) generated a major modification in both the pedagogical and educational methodologies (Andrews & Schwarz, 2002). This refers to the teacher-learner relationship and embraces matters like personalized learning, collaboration, interaction and evaluation.

The approach of participative learning offers the possibility of developing novel learning environments that support collaboration, rapid interaction and feedback, real time communication, information seeking and problem solving. The learner has the opportunity to construct knowledge through a process of discussion and interaction with both other learners and teachers (Michailidou & Economides 2003).

Diversity in CSCLEs is a complex concept. It is one thing to create diversity by recruiting learners, of different nationality, cultural background, race, gender, sexual orientation, religion, discipline, and another thing to develop a supportive educational environment in which individuals of diverse backgrounds can perform at their highest levels and contribute fully to the learning procedure (Chen et al., 2000). Even more challenging is the task of fully integrating the varied knowledge experiences, perspectives, and values that learners of diverse backgrounds bring into the educational environment.

This chapter begins with a discussion concerning the issue of collaboration in virtual teams. Afterwards, diversity in collaborative virtual teams is being studied along with its impact in learner-learner interactions. Some suggestions to the instructors for facilitating effective learning in a collaborative computer supported environment are also included. Finally, the conclusions are presented along with future trends.

Collaboration in Virtual Teams

A virtual team is a group of people who work on interdependently across space, time, cultures, and organizational boundaries on temporary, non-occurring projects with a shared purpose while using technology (Lipnack & Stamps, 2000). Virtual teams are utilized in multiple settings, including education (teams formed among students of distance learning classes), professional development, as well as corporate and community organizations.

The use of virtual teams is growing in popularity especially in work-related and educational organizations. There are many advantages for using virtual teams in an educational setting. These include the creation of learning communities and the opportunity to work collaboratively to generate new knowledge. Working in virtual teams presents unexplored opportunities for peer interaction as teams create new knowledge to resolve the problem assigned. Additionally, it asserts that the best conditions for intellectual accomplishment are environments that are motivated by discovery, the reciprocal feedback between mutually respected individuals and the free exchange of ideas. Conclusively, virtual teams have become a vehicle for distance education, through which group work is accomplished in demanding learning environments (Anderson & Garrison, 1998).

The current analyzes the gender and diversity impact in collaborative computer mediated environments formed basically for educational purposes. Therefore, if the instructors study the diversity issue in a potential learning virtual team then some solutions might occur concerning the embodiment of diversity parameters and their impact in the success factors of a collaborative task.

Diversity intensively influences the performance of a virtual team in an educational setting. Many significant factors constitute diversity like those relate to differences in social and cultural characteristics, gender, ethics, knowledge, educational experiences and future expectations. For most virtual teams to be effective, some degree of diversity is both desirable and necessary. If all the team members have the same perspectives, histories, work experience and academic training, then, theoretically, the creativity and problem solving potential of the team is limited. When facilitated properly, a team will be more effective than a single person will. For example, virtual teams that develop new ideas and problem solving are often composed deliberately of people of various ages, interests, religious backgrounds, or academic disciplines. Therefore, diversity on learning virtual teams has been shown to be positively associated with performance if process challenges are addressed (Chen et al., 2000, Paulus et al., 2002). Although diversity is connected to positive outcomes it also has been linked to negative ones, like difficulties in managing cooperation. While a diverse team can generate a wider array of ideas, solutions and perspectives, it may also require special management to both release and harness that diverse energy. The collection of differences in a diverse virtual team may bring more conflict within the team, if these differences are not facilitated with insight to the idiosyncrasies of the team membership.

Gender is among the characteristics associated with diversity and is known to influence team behaviours (Barrett & Lally 1999). Many surveys were designed to explore whether men and women feel differently about being part of a learning team. More specifically, some questions arose: are there differences in the degree to which men and women are satisfied with team performance? Are there differences between what men and women see as the primary difficulties faced by a team? And if gender differences exist, how do they influence team performance? The assessment of gender and diversity influence in learner-learner interactions in a CSCLE is a crucial issue concerning the determination of the educational value of such an environment (Gunn & McSporran, 2003). In order for educators to balance the benefits of diversity with its possible costs, they must be aware of the factors that constitute diversity and their influence on team performance.

The Impact of Gender and Diversity in Learner-Learner Interactions

In the current section the discussion focuses on the social and cultural differences of individuals that shape diversity in a collaborative virtual team.

Social differences

Social differences focus on race, gender, class, age, or sexual orientation. The individual's identity in these social categories is derived both from the knowledge of what it is like to be part of a particular group (e.g., women) and from the way others view the value of being a member of that group (Abnett et al., 2001).

Gender-based differences in performance and communication style in computer supported learning environments were deemed as an important element for research (Blum, 1999; McLean & Morrison, 2000; Gunn & McSporran, 2003).

Fewer girls and women study or have jobs in engineering or computer science; in schools and homes boys often dominate computer use while females are typically less confident about using technology and have less experience with it (Brosnan & Davison, 1994; Hatton, 1995; Ford & Miller, 1996; Blum, 1999). There have been identified common differences in the behavior of male and female students in technology based instructions. These differences include self-reported levels of confidence in ability to work successfully with technology and patterns of interaction. It was found that women talked less, contributed less frequently, did not receive positive feedback to their contributions and did not appeal to the same sources of support (Barrett & Lally, 1999; Ausburn, 2004).

Similarly, Gunn and McSporran`s (2003) study found gender differences in motivation, confidence level, flexibility and access. Men stated that they were very confident and enjoyed using the online materials whereas women stated they were apprehensive about using the materials and about their overall ability for the technical aspects of the course. In addition, women reported that they had more problems with access such as having to share the computer with other family members or friends. Richardson and Turner (2000) also stated that females responded significantly more negatively toward CSCLEs than males. This outcome may arise from the fact that female students are not as computer literate as male students and therefore less confident. Another explanation may be that some elements of working in such an environment may not be compatible with the needs of female students.

There are also several research studies that found gender differences in the learning outcomes. Studies of gender-related patterns in epistemological knowledge demonstrated that female students tend to view learning from a connected and relational path, rather than an individualistic perspective (Baxter-Magolda, 1992). It was also found that females performed better than males in mixed-gender online courses and generally, female groups demonstrate a more positive attitude towards teamwork and collaboration tasks as compared to males (Young et al., 1999; McSporran & Young, 2001). However, these studies show mixed results. Some found that women are more successful in web-based learning while others found that men performed as well too (Mehlenbacher et al., 2000; McSporran & Young, 2001). This is partly due to culture's role as a moderating factor affecting gender differences (Mortenson, 2002). In individualistic cultures, people tend to be opinion-oriented and straight-forward, whereas in collectivistic cultures, task dominates over personal relationships (Chang & Lim, 2002). Countries such as Canada and USA are typically associated with individualistic cultures, while most Asian countries, such as Singapore and Taiwan, are inclined towards collectivism (Hofstede, 1991). Mortenson (2002) found that the typical gendered behavior was only supported in Euro-American subjects. Males were as likely as females in using supportive modes of communication in Asian subjects. In addition, Watkins et al. (1998) discovered that the gender stereotypes, with females valuing social relationships more, apply only to individualistic western countries.

The existing literature concerning gender differences in a computer conferencing environment has evidently addressed variations in terms of communication styles and participation rates between males and females (McLean & Morrison, 2000). Females tend to display a more socio-emotional behavior, non-aggressive strategies and a stronger compliance concerning others' differentiations. In contrast males are typically associated with aggressive and active strategies. Generally, they support their opinion in a stronger manner and express independence (Barrett & Lally, 1999; Ausburn, 2004). Furthermore, research suggests that women are more comfortable than men with team-based evaluations and rewards. This may be partly due to findings by gender theorists that men's relationships tend to be defined by role and status, while women tend to value relationships based on communication and understanding (Herring, 2000; Gunn & McSporran, 2003; Bostock & Lizhi, 2005).

Analysis of written dialogue in computer mediated communication systems reveals gender variations in message style. In particular, females tend to be more punctual and use frequently apologies, questions, personal orientation and support. Males' language includes strong assertions, self-promotion, challenges and sarcasm (Herring, 2000). Bostock and Lizhi, (2005) studied the gender differentiations occurred in student asynchronous online discussions. The research findings indicated that female groups had significantly more messages per student than male groups. Mixed groups were more variable than single-gender groups while the messages contributed by males in mixed groups were especially changeable. More females were less confident of using computer applications and less positive regarding new technology challenges. They also demonstrated higher average final report marks, although they had expressed fears about finding the course difficult.

Clearly, gender is one of the many factors associated with team performance and cohesion in CSCLEs. Concerning the role of the instructor in managing gender differences in virtual teams with the purpose of promoting collaboration and influencing learner-learner interactions the following list is presented (Barrett & Lally, 1999; Knight et al., 1999; Potter & Bathazard, 2002; Johnson & Aragon, 2003):

- Gender differences and needs may be addressed by tailoring distance programs or by creating peer groups with similar learning backgrounds and interests. The instructor should organize discussions about gender similarities and differences.
- Strategies for promoting inclusion regarding gender issues suggest equally profiling men and women in curriculum illustration in both traditional and non-traditional roles. Care should be taken to be sensitive to diversity in sexual orientation. The instructor should create mixed teams and ask them to play a game or to develop a project.
- An instructor should keep in mind, that male participants will tend to be most comfortable when team's objectives are clarified to the greatest possible extend and the individual roles of team members are defined. Whilst female participants appear to be most comfortable when communication and other group maintenance activities are clearly valued along with task activities.
- Instructors might choose to discuss common gender differences with their team members to raise awareness and understanding. For this purpose they can use teambuilding exercises with discussions of differences in personality types, levels of participation, technology issues, etc.

Ethnic-Racial, Economic-Class differences and barriers occur in most learning groups since it is common for individuals initiated from different races or social classes to participate in the same computer mediated learning environment. Wegerif (1998) showed, through a study of a multi-cultural computer-mediated course, that social factors, like ethnicity have an impact upon the learning procedure. In particular, he stated that when ethnicity differentiations corresponding to language or race differences are not taken under account, lead to decreased participation rates and willingness in collaboration. Similar studies had also been conducted by other researchers (Kember, 2000; Vogel, et al., 2000; Kennedy, 2002). In cases where the learning environment allows racist hints concerning racial or economic-class backgrounds, individuals hurt demonstrate negativism, unwillingness in participation and abstention to any collaborative task. As a result, the team coherence is damaged and the whole learning procedure fails.

One of the key issues facing all educational environments, both traditional and computer mediated (and indeed lifelong learning) is how to create tolerance for minorities in an environment characterized by diversity (Volet, 1999; Obidah, 2000). Intolerance is conceptualized basically as a matter of attitudes, and is said to be constituted by prejudice.

The instructor should confront ethnic or racial differences within the members of a virtual team by using information summarized below (Chow et al., 1999; Chen et al., 2000; Bonner et al., 2004):

- The context supporting the courses in such an environment should be adequate and neutral in terms of ideas and learning outcomes.This develops a sense of equal confrontation among the participants resulting in an increase of involvement in the learning procedure and in satisfactory collaboration terms.
- If racism is an issue in a learning environment, then participants must become acquainted with other cultures and find the courage to challenge stereotypes and appreciate others. The instructor should:
    - ➡ Enable learners to share personal photos (e.g. family, friends and place of origin), videos, ethnic-traditional music, tourist information about their countries, etc.
    - ➡ Provide information about learners’ ethnicities and races.
    - ➡ Organize discussions about learners’ ethnic-racial similarities and differences.

- ➡ Create a common basis of views accepted by all.
- ➡ Unify and integrate apposing views and ideas.

- Illustrations in distance learning delivery can include culturally appropriate personal names and culturally accepted phrases. This illustration embraces the students' background and serves as an engaging point to keep their interest.
- Matters that relate to prejudice and attitudes must confronted through teaching about 'other cultures'. That requires a dismantling of institutionalized practices of racism - whether in employment or education or in social welfare-. It also entails a direct confrontation with racist ideologies - for example in curricula. The instructor should:
    - ➡ Find common ground among conflicting opinions (e.g. two learners from different nations describe a battle between their nations from a single compromised point of view).
    - ➡ Create mixed teams and ask them to complete a project.
    - ➡ Ask learners to collaboratively develop concept maps on controversial issues.

Concerning economic class differences, an instructor should (Paulsen & St. John, 2002; Howard & Levine, 2004; Walpole, 2004):

- Enable the participation of the lowest economic class learners by either encouraging scholarships or tailoring the required economic resources of a project to these learners.
- Provide the appropriate background information to students lacking it due to their economic situation.
- Create mixed teams and ask them to complete a project.
- Encourage learners to share their living experiences.
- Foster mutual understanding and respect.

Age differences and barriers correspond mainly to different life experience, educational background, professional status and maturity (Gaskell, 2000). Age should be taken under consideration in group formation, especially when it influences team effectiveness due to differences that might occur in prior educational background and technology adequacy. For example, it is evident that all participants should be familiarized with technology demands and frustrations especially in a virtual learning environment.

Turner, (2000) conducted a research with the purpose of investigating individual difference factors with respect to computer use generally, as a means of informing e-learning instructional design. The learning team included 170 undergraduate students (103 Chinese and 67 UK) who completed tasks and also a questionnaire on their knowledge of the Internet and how effectively they used it. The results indicated a difference in the affective and cognitive components of attitudes between different age groups, such that the younger age group (17-19yrs) reported more positive attitudes than the older age group (21-32yrs). It is possible that this may relate to differences in education and exposure to the Internet.

In some cases (Chioncel et al., 2003; Mehrotra, 2003), both younger and older learners with the same educational background, reported that participating in an age diverse group was a positive experience. Older learners felt that the younger group respected their opinions and the age mix in the virtual classroom finally provides a multitude of ideas. Instructors noted that older learners fear failure, more than younger learners (Chioncel et al., 2003). There has also being expressed the opinion that older learners have difficulty with multi-tasking and as a result require more understanding from other learners regarding their capabilities. Furthermore, older adult learners are less confident in using information and communication technologies and need more time to remember the necessary information for understanding the material. Consequently, if they feel confident and relaxed being a part of the educational environment, they will learn more.

Older adult learners most commonly have their own views and opinions on certain subjects and therefore they will challenge teachers on the information that they give. The teacher has to invent ways in order to get older adults to challenge their ways of thinking and open their minds to new ways of perceiving knowledge (Mehrotra, 2003). Older adults also have a lot of maturity regarding their studies and will give help and advice to younger students. They have better attendance, are more mannerly and in most cases grateful for the opportunity to learn.

The instructor should confront age differences within the members of a virtual team by using information summarized below (Liang & McQueen, 1999; Merriam & Simpson, 2000):

- Age differences and barriers may be addressed by tailoring distance programs or by creating peer groups with similar learning backgrounds and interest.
- Delivery systems for different age groups relate most prominently to the amount of- and degree of-interactivity. Therefore, instructors must facilitate interactivity procedures between the participants of different age groups introducing both synchronous (e.g. chat) and asynchronous (e.g. email) ways of communication.
- Instructors must also analyze all the evidence concerning the individual characteristics of any participant related to age, like prior educational background, professional skills and expectations and suggest realistic solutions that confront any potential learning issue on an equal basis for each and every learner. In order for this to happen, instructors should receive feedback information (with interviews, interactive exercises, etc) throughout the learning procedure.
- Since older adult learners are more sensitive to failure they need more individual or one-to-one attention.

The above discussion concerning the social differences among learners in a CSCL educational environment is being summarized in Table 1. The first column contains the

Differential Factor corresponding to Social Differences and the second column the Behavioral Attitude affecting Learner- Learner Interactions that might occur in a CSCLE.

Social Differences		
Differential Factor		**Behavioral Attitude affecting Learner-Learner Interactions**
Gender Differences	**Females**	• They display more socio-emotional behavior, non-aggressive strategies and a stronger compliance concerning others' differentiations. • They usually perform better than males in mixed-gender online courses. • They demonstrate a more positive attitude towards teamwork and collaboration tasks. • In dialogues, they tend to be more punctual and use frequently apologies, questions, personal orientation and support. • Analysis of written dialogue in computer mediated communication systems revealed that female groups write more massages per student than male groups. • They have lower confidence with IT applications.
	Males	• They are associated with aggressive and active strategies. • In dialogues, they use language with strong assertions, self-promotion, challenges and sarcasm. • According to some studies males were as likely as females in using supportive modes of communication in collectivistic countries. • They are more confident about using technology.
Ethnic-Racial, Economic-Class Differences	**Present**	• Individuals are being hurt and demonstrate negativism, unwillingness in participation and abstention to any collaborative task. • The team coherence is damaged and the whole learning procedure fails.
	Not present	• There is a sense of equal confrontation among the participants resulting in an increase of involvement in the learning procedure and in satisfactory collaboration terms. • The learners become acquainted with other cultures and find the courage to challenge stereotypes and appreciate others. • The learners form a harmonious, democratic educational environment that supports cultural pluralism.
Age Differences (when prior educational background and technology adequacy are not at the same level among individuals)	**Taken under consideration**	• Team members will correspond better in learning tasks. • Team members may feel more comfortable with each other.
	Not taken under consideration	• Team coherence will be jeopardized. • Many difficulties will occur concerning the achievement of a learning task.
Age Differences (when prior		• Both younger and older learners with the same educational

Social Differences	
Differential Factor	**Behavioral Attitude affecting Learner-Learner Interactions**
educational background and technology adequacy are at the same level among individuals)	background, find that participating in an age diverse group is a positive experience. • Older learners fear failure, more than younger learners. • Older learners are less confident in using information and communication technologies. • It is common for older learners to challenge teachers on the information that they give. • Older learners and in particular adults have a lot of maturity regarding their studies.

Table 1: Social Differences and Behavioral Attitude affecting Learner-Learner Interactions.

Cultural differences

Cultural differences focus on how individuals' values, beliefs, norms, communication styles and study behaviours are influenced by the culture in which they grew up, or live. Cultural differences may help the instructors to understand how students can best adapt to new educational environments (Hughes et al., 2002). Cultural differences are harder to "see" but may be much more important causes of misunderstanding among learners participating in multicultural educational organizations. Taking under consideration relevant cultural differences and preconceptions is a crucial step into creating effective international learning teams (Myers & Tan 2002).

Hofstede (1991) defined a cultural model in which cultures vary along five dimensions: Power distance, Collectivism - Individualism, Femininity - Masculinity, Uncertainty Avoidance, and Long term - Short term orientation. Taken together, these dimensions provide a means of characterizing and comparing different cultures as well as providing a meaning for the use or non-use of computer mediated software. For example, cultures reflecting more "collectivist" tendencies such as Chinese and those in the Middle East may actually use collaborative software more effectively than individualistic cultures like those of the US or Australia (Chung and Adams, 1997).

Cultures can be learned and reflect the patterns of thinking, feeling and acting (Harris, 1987). The underlying theme is that culture is an abstraction from concrete behaviour but not behaviour itself. Culture is transmitted mainly by symbols, constituting distinctive achievement of human groups, including the embodiments in artefacts (Chow, et al., 1999). It is in this sense that culture characterizes the whole way of life of a group. It is a pattern of traditions that can be transmitted over time and space. Three qualities underlie its centrality: it is learnt; much of it exists at a non- or un-conscious level; it helps structure thought, perception and identity (Mayers & Tan, 2002).

Cultural sensitivity must be included in the initial design stages of a collaborative virtual learning environment (Rovai, 2002). A level of cultural sensitivity could be incorporated into the design of the system such that users' individual identities can be expressed, while simultaneously supporting community development. For example, cultural sensitivity is paramount in designing interaction systems (Raybourn 2001; Mudur 2001). In answer to this call, data collected from ethnography, questionnaires, and persona development provide the basis for designing cultural and organizational cues into the community-based system in order to engender identification among the members of the community of practice.

Lessons learned both from face-to-face and computer mediated communication tell us that the quality of successful collaborations depends largely on sharing cultural information like this concerning the **values, beliefs and norms of individuals**. That minimizes uncertainty in interpersonal relationships and enhances interaction and collaboration among the participants (Chow et al., 1999). In much the same way, collaborating organizations, individuals, or communities of practice share cultural information to reduce uncertainty and strengthen notions of common ground (Wenger, 1998). Cultural information often shared across and within members of organizations includes values, goals, and histories that are shared, negotiated, and co-created by the members. The future success of collaborative work in community-based virtual environments requires not only understanding the socio-cultural dynamics that manifest in online communication and communities of practice, but also considering how the design of these environments can support intercultural communication with cultural of organizational contextual cues (Leevers, 2001).

A significant factor relative to the development of a collaborative community is the mutual engagement of participants. Mutual engagement refers to participants' co-creation and negotiation of actions or meanings and relates to **communication styles** that each participant has developed. Consequently, mutual engagement is facilitated by communication, whether occurring in the face-to-face context, or virtually (Fai Wong & Trinidad 2004). Observations of heterogeneous groups, whose members are of different (national) cultural backgrounds, which revealed a wider variety of skills, information and experiences that could potentially improve the quality of collaborative learning (Rich, 1997). An improvement such as this could be obtained in a CSCLE since the number of concurrent conversations that a medium can support along with the reprocessing of massages during communication, can help learners of different cultures to gain a more accurate understanding of each other, thus improving performance (Yu, 2001). Additionally, it has been demonstrated that designing subtle cultural and contextual cues into a text-based collaborative virtual environment such as a multi-user dimension, object-oriented (MOO) is an effective way to encourage collaboration and awareness of intercultural communication including the negotiation of power and exploration of identity (Raybourn, 2001). This aspect is particularly important for non-native speakers. Nevertheless, a direct consequence of cultural diversity is communication distortion because basic modes of communication differ among people from different cultural backgrounds (Easley et al., 2003 a).

Learners have different strategies, approaches, and capabilities for learning that are a function of prior experience and heredity. Individuals are born with and develop their own capabilities and talents. In addition, through learning and social acculturation, they have acquired their own preferences for how they like to learn and the pace at which they learn (Ford 2000).

Therefore, a learner's **study behavior** especially when he is a part of a heterogeneous group becomes more positive in the case of his participation in the cultural co-creation process. The cultural co-creation process includes the formation of a 'new culture' which arises from the interactions in the educational setting between all the participating cultures. In effect, together users co-create a 'new culture' that is neither one nor the other, but a combination of the two, or three, and so on (Lim & Zhong, 2005). The successful future design of intelligent community based system requires considering how the design of these environments support intercultural communication and a greater awareness of cultural orientations in both the organizational and educational context.

Several studies indicate that individual success or failure on a learning task depends upon the level to which learners are able to cross a threshold from feeling like an outsider to feeling like an insider (Wegerif, 1998; Muirhead, 2000). In collaborative learning, students learn by recognizing flawed reasoning of others during a discussion. Prior studies have highlighted the importance of the discussion session in collaborative learning activities (Lave & Wenger, 1991). However, text-based computer mediated communication facilitates important features with respect to communication that are radically different from the face-to-face setting (Dennis & Valacich, 1999). The parallelism afforded by collaborative learning systems is expected to help learners of different cultures to gain a more accurate understanding of each other, thus improving performance. This aspect is particularly salient for non-native speakers, since the spoken language disappears altogether after the utterance (Herring, 1999).

Conclusively, a significant factor that increases the feeling of alienation between the participants in a learning procedure is the different native **language**. This means that there must be defined a common communication language for the course, something that corresponds to a different level of adequate language knowledge for the participants. Although this may always be a problem, it is possible that with a sufficiently strong sense of community, learners with less experience on the language being used would be able to overcome their fears (Myers & Tan 2002).

Table 2 summarizes some of the outcomes corresponding to cultural differences and their impact on learner-learner interactions. The first column contains the Differential Factor related to Cultural Differences and the second column the Impact on Learner- Learner Interactions that might occur in a CSCLE.

Cultural Differences		
Differential Factor		**Impact on Learner-Learner Interactions**
Values, beliefs, norms (when shared among the participants)		• Minimize uncertainty in interpersonal relationships. • Enhance collaboration tasks. • Better implementation of interaction techniques and feedback among the participants in a virtual learning environment.
Communication styles	**When they are developed in a way that enhance communication among the participants.**	• Support information sharing. • Support real time spontaneous communication. • Enhance mutual engagement between the participants (mutual engagement refers to participants' co-creation and negotiation of actions or meanings). • Heterogeneous groups, whose members are of different (national) cultural backgrounds, reveal a wider variety of skills, information and experiences that could potentially improve the quality of collaborative learning. • Multiple concurrent conversations that a medium can support are expected to help learners of different cultures to gain a more accurate understanding of each other, thus improving performance.

Cultural Differences		
Differential Factor		**Impact on Learner-Learner Interactions**
	When they are not taken under consideration.	• Communication distortion may appear because basic modes of communication differ among people from different cultural backgrounds.
Study behaviors (when taken under consideration)		• A learner's study behavior especially when he/she is a part of a heterogeneous group becomes more positive in the case of his/hers participation in the cultural co-creation process. • The cultural co-creation process includes the formation of a 'new culture' which arises from the interactions in the educational setting between all the participating cultures. This new culture is accepted by all members and helps in the development of any study behavior that affects positively the learning procedure.
Language		• Different level of adequate language knowledge for the participants results to limited participation. • With a sufficiently strong sense of community, learners with less experience on the language being used would be able to overcome their fears.

Table 2: Cultural Differences and their Impact on Learner-Learner Interactions.

From the above discussion it has become clear that cultural diversity plays an important role in implementing successful collaboration in virtual environments. Therefore, the instructor could follow some of the recommendations listed below:

- The instructor need to foster critical engagement, to help people to connect with, and own, those aspects which accord with their sense of themselves, and of what is good and right. At the same time it is to reject certain things, to encourage the desire and ability to change values, behaviors, ideas that are unjust or that inhibit well being (Swigger et al., 2004).
- Many people do not explicitly share information about their cultural background or educational organization for a variety of reasons; including diverse orientations toward privacy and public versus private information (Raybourn, 2001). Therefore, the instructor must invent ways to motivate users to identify more strongly with their community of practice, and take the first steps towards opening a chat with others whom they may share

common interests with, but do not know well enough to feel comfortable communicating with in a virtual environment. In order for this to happen:

- ➡ The instructor could organize a discussion forum supporting themes of common interest among the participants.
- ➡ A set of educational tasks (e.g. exercises) given by the instructor would motivate the participants to increase email or chat communication. This would reduce nervousness among the participants and encourage them to support and share their own cultural background.

- Most users who inhabit virtual worlds like to leave their mark on the shared space whether it is through building artifacts (objects) or becoming influential members of the community (Selim, 2003). Allowing each person to contribute to development or design of the space creates more community which could help individuals to surpass cultural differences that hinder collaboration, like language barriers. A graffiti board, or bulletin board, arouses curiosity and participation among the community by arousing interest among teammates—whether it is curiosity about other members of the community, or the shared space itself. The instructor could participate in creating more motivating environments by designing for user fun, curiosity, and fantasy exploration.
- Both designers and instructors could consider giving the right to participating members to express themselves anonymously in a virtual setting –for example only for a few sessions at the beginning of a learning procedure-. Certain anonymity can create more equitable communication (especially for newcomers) reducing the appearance of hierarchy and power in a collaborative environment and fostering more peer-based communication events (Volet, 1999). A virtual tour of the learning space and perhaps a FAQ on the formal and informal cultural norms will help a participant to feel more like part of the team, and thus identify more strongly with the community. A team gallery of interests might be an

informal mechanism for obtaining meta-level information on the team culture and individual identities.

- Avatar movement may be based on common cultural attributes, or common social interests, in addition to movement throughout the space based on keywords and common work products. Educational agents could connect users of common social and cultural interests and provide reasons for the movement in the space. Cultural information about the team (hobbies, families, etc.) may be made available in the learning space via interactive objects (Myers & Tan, 2002). The instructor should encourage learners to interact in real time where there are mutual concerns or interests and evaluate certain cultural characteristics incorporating them into an adaptive community-based virtual environment in order to offer enhanced support for intercultural communication among remote learners.
- Different national cultures emphasize distinct values and are associated with diverse languages. It is apparent that the presence of different languages, and the inability to speak and comprehend these different languages, creates barriers to efficient knowledge sharing throughout the organization. In the case of multinational learning groups a lot of knowledge might be lost in translation or due to the inability to articulate the knowledge in the project's working language (Myers & Tan 2002). A good way to diminish the negative consequences of language barriers is to emphasize active listening skills, patience, and understanding. Despite language differences it is important to enable all members an equal opportunity to be heard. The difficulty of studying and communicating in a second language exacerbates the problem of equal participation, especially in the case of a CSCLE. Until students have built up sufficient fluency in the lower-level language skills (Raybourn et al., 2003) to be able to express their understanding in their own words in the language of instruction, they may find it difficult to display their newly acquired

knowledge. Therefore, the instructor must encourage learners with less language experience and help them to overcome their difficulties in expressing their opinion and actively participate in the learning procedure.

- Learners have different strategies, approaches, and capabilities for learning that are a function of prior experience and heredity. Individuals are born with and develop their own capabilities and talents (Ford 2000). Instructors need to help students examine their learning preferences and expand or modify them, if necessary. They also need to attend to learner perceptions as long as these differences are adapted to by varying instructional methods and materials.

Conclusions and Future research

As several studies have observed (Watson et al., 1993; Adler, 1997), diversity within teams is a reality for educators, and organizations. It is also an important social value for synchronous society. For these reasons, it is important that research clearly and accurately elucidate the true impact of diversity in learning-teams. This requires moving beyond studies of simple demographic effects and broad generalizations about the effects of diversity on teams to understanding how these differences arise and are experienced in specific contexts. Only then, both learners and instructors will be able to manage differences effectively and understand in detail how diversity really affects individuals in different types of educational organizations.

In the current chapter, diversity issues that arise from both social and cultural differences are analyzed. Social differences focus mainly on race, gender, class and age. While cultural differences focus on how individuals’ cognition, values, beliefs, communication styles and study behaviors are influenced by their culture. The impact of these factors on the learner-learner interactions are being summarized in Tables 1-2.

On line learning and virtual learning environments demand that the role of the instructor will be the one of the facilitator in the learning process rather than that a of knowledge dispenser. Conclusively, in order for the instructor to attain successful collaboration, diversity and all its factors that affect learners' interactions must be adequately analyzed and studied. A number of constructive suggestions to be used by the instructor in both the design and the implementation of learning activities are presented in the bulleted paragraphs throughout the 'The Impact of Gender and Diversity in Learner-Learner Interactions' section.

A teaching and learning environment located within a technological context, can be used to support instructor-learner and learner-learner communication and to aid collaborative learning across different cultures. An individual's learning process, combined with synchronous or even asynchronous interactivity with other learners, can be enhanced with the proliferation of communication technologies. Such technologies can strengthen and increase additional communication cues during group activities (Aviv, 2000). Due to their unique features, CSCLEs provide strong support for the collaborative learning process. They help in teaming up groups of people who are unable to meet face-to-face and facilitate group interactions.

By using CSCLEs, learners from an individualistic cultural context might emphasize more on group achievement or relationship than before and learners from a collectivistic context might become more independent and insistent on their own opinion during the reasoning process. Future research should work toward greater understanding of this aspect. In addition, problems of cross-cultural learning might be due to differences in language, cultural values, and the types of learning strategies preferred.

Recent technological developments have opened new perspectives for the cooperation between human learners, virtual humans and anthropomorphic robots, especially in an augmented virtual reality environment. This kind of learning environments can be defined as DigiMech Learning Environments (DMLE) (La Russa & Faggiano 2004; Nijholt 2005). The richness and variety of users' possible interactions in such environments go far beyond the simple sensorial use of the virtual realities. The existing research, literature, experiences, practices and academic know-how support that DMLEs have extensive educative and cognitive potentials, especially in distant education context, and need further explorations. In addition, the associated social awareness mechanisms and diversity factors need to be explored further, including the issue of how robots and virtual humans perceive and interpret the social situations in the community they are a part of.

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