

## **STUDENT PERCEPTIONS ON LANGUAGE LEARNING IN A TECHNOLOGICAL ENVIRONMENT: IMPLICATIONS FOR THE NEW MILLENNIUM**

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### **ABSTRACT**

This article presents survey data from beginning Spanish classes using a combination of technologies: Internet activities, CD-ROM, electronic pen pals, and threaded discussions. Goals of the study were to determine students' perceptions of (a) the role and importance of the instructor in technology-enhanced language learning (TELL), (b) the accessibility and relevance of the lab and the individual technological components in student learning, and (c) the effects of the technology on the foreign language learning experiences. Students attributed an important role to instructors and perceived that cultural knowledge, listening and reading skills, and independent learning skills were enhanced but were divided in their perceptions about the learning or interest values of the individual components. Implications are presented that may be useful to universities developing technology enhanced instruction.

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### **INTRODUCTION**

The use of technology, specifically multimedia, for foreign language instruction has expanded rapidly in the United States during the last two decades. Studies of the effect of technology-enhanced instruction on achievement and studies of student attitudes regarding learning with technology have also increasingly been reported (Salaberry, 2001). However, most of these studies have examined the use of only one element of technology, and those regarding student perceptions have been largely concerned with the use of computer-mediated communication via e-mail or networking. (Beauvois, 1994, 1996, 1998; Cononelos & Oliva, 1993; Kern, 1996; Sanaoui & Lapkin, 1992; Warschauer, 1996) This article reports on a descriptive study of student perceptions about the use of a variety of multimedia components within one course. More specifically, it reports the perceptions of university students enrolled in basic Spanish classes during the first year of implementation of technology-enhanced language learning. These classes incorporated task-based Internet activities, an interactive, publisher-produced CD-ROM, electronic pen pals, and threaded discussions. (Many of the components described in this article can be accessed and viewed at <http://www.fsu.edu/~modlang/divisions/spanish/spn1120.html>.)

A number of benefits for students related to the general use of technology in classrooms have been reported. These include increased motivation, improvement in self-concept and mastery of basic skills, more student-centered learning and engagement in the learning process, and more active processing, resulting in higher-order thinking skills and better recall (Brownlee-Conyers, 1996; Dwyer, 1996; McGrath, 1998; Weiss, 1994). Additionally, there seems to be a beneficial multimedia effect, especially for low achieving students, when it is used to illustrate concepts and organize factual information (Nowacznyk, 1998).

Students also appear to gain confidence directing their own learning. In a project at one of California's Model Technology Schools, students who engaged in self-paced learning-by-doing within an interactive environment became independent learners who were labeled "knowledge navigators" (Blackstock Junior High School, 1993).

## TECHNOLOGY-ENHANCED LANGUAGE LEARNING (TELL)

### Affective Issues

Positive affective benefits for students using technology are also reported in the foreign language classroom context. Sanaoui and Lapkin (1992) found that technology encouraged the development of independent learning characteristics in high school students of French. In an e-mail exchange project between these students and native French speakers, students assumed increased responsibility for their learning and broadened their cultural awareness.

Beauvois (1998) found that students participating in a Local Area Network (LAN) writing project showed positive attitudes about learning in that setting. She concluded that students felt positive because the LAN represented a low-anxiety situation and because they had more control than in a traditional classroom. These results support findings from an earlier study (Beauvois, 1994) in which the researcher concluded that the LAN is an effective motivating force.

Warschauer (1996) identified three common factors of student motivation provided by a technology-enhanced setting: communication, empowerment, and learning. "Communication" is represented by the finding that students liked the ability to communicate with others and to engage in real, as opposed to contrived, communicative acts. "Empowerment" describes the finding that students felt empowered in the technology environment since they felt less isolated and were less afraid to contact others. The "learning" factor describes the finding that students believed the computer gave them certain kinds of control over their learning by enabling them to learn faster and more independently and to write more creatively. Students in the computer-mediated communication project reported positive attitudes which could be attributed to these factors.

Another study on computer-mediated instruction for English writing skills by Hartman, Neuwirth, Kiesler, Sproull, Cochran, Palmquist, and Zabrow (1995) concluded that the use of technology redistributes teacher and classmate attentions so that less able students can become more active participants in the class. In this study, networked sections showed more student-teacher communication than traditional classes. Additionally, Beauvois (1998) found more student-to-student interaction in networked classes than in traditional classes.

### Language Skills

The use of technology in foreign language learning also appears to influence the development of linguistic skills. Several researchers have reported an improvement in student writing skills through the use of networked computers (Beauvois, 1998; Cononelos & Oliva, 1993; Warschauer, 1996). According to Beauvois, students in the networked writing project displayed more fluidity of conversation, more use of complex sentences, and more self-disclosure. She believes that the elimination of strong teacher dominance freed students to express themselves, resulting in a larger quantity and better quality of communication.

There have been reports of improvement in reading as well. In Beauvois' 1994 study, 43% of the students reported that reading skills had improved. Lunde (1990) also reported that students of Japanese enrolled in a computer mediated communication project showed improvement in reading comprehension.

Furthermore, in follow-up interviews in the Beauvois study (1994), many students expressed an increased confidence in speaking. The researcher speculates that the increased language use promoted by the LAN environment promoted this self-confidence. She implies that the conversational aspect of writing via the network helped students to routinize a certain number of expressions, promoting the development of automatic structures that aid speaking. She concludes more boldly in the later study (1998) that LAN writing supports oral language development. Sanaoui and Lapkin (1992) also found that "considerable

growth occurred in French-speaking skills and possibly listening and reading comprehension as well, which implies that an explicit focus on one area can have an effect on the other skills" as well (p. 544).

### **Videoconferencing and Language Learning**

In a study of student perceptions about a videoconferencing project between students of German and native speakers in Germany (Coverdale-Jones, 2000), the students cited two advantages for the use of the technology. These were a) the immediacy of communication with a real person from their own age group and b) the interactivity of the videoconferencing. However, these students also viewed the videoconferencing as a reduced form of communication in comparison to face-to-face interaction. Coverdale-Jones concludes that this technology makes a powerful contribution to communication authenticity, but cautions that "we cannot simply transfer typical classroom activities, where it is easier for the tutor to intervene and to direct the flow of the interaction, to the videoconference where communication factors are subject to external influences of technology/medium" (p. 36).

In another study involving videoconferencing, Glisan, Dudt, and Howe (1998) found that this technology aided Spanish listening comprehension skills, but the variable *time on task* remained the key to achievement. They also found that students engaged in a more multi-modal approach to learning, noting that the role of teacher as facilitator is an important variable in the success of technology-mediated instruction. The implication was that a technological environment based on constructivist learning principals may be ideal for enhancing learner attitude and motivation.

### **Changing Roles in Technology-Enhanced Classrooms**

Kern (1996) notes that a shift from the use of the computer for drill and tutorial purposes to a medium for extending education beyond the classroom and reorganizing instruction has resulted in role changes for both learners and teachers. Learners now view the computer as a medium through which they must negotiate meaning through interaction, interpretation, and collaboration rather than as a finite, authoritative informational base for carrying out a stipulated language task. Instead of delegating language instruction to the computer, teachers participate in students' communication and learning and "provide a scaffold for their students' learning with their own knowledge and experience -- even when they are not immediately involved in a communicative exchange" (Kern, 1996, p. 108).

### **Context of the TELL Program**

Recently, the learning theory of constructivism has been proposed as a basis for the instructional design of technology (Lebow, 1993) and as a viable theory for language instruction (Blyth, 1997; Brooks & Brooks, 1993). This theory posits that students are not passive recipients of knowledge. Instead, they are active participants in the construction of new knowledge that is idiosyncratic and derived from the learner's prior experience and need to create equilibrium (i.e., find meaning or fill in an information gap) when faced with a new situation that creates cognitive dissonance. In this theory also, students assume responsibility for their learning, and the teacher is a facilitator rather than a purveyor of knowledge, fulfilling a role similar to that described by Kern (1996).

Furthermore, whole language philosophy has recently formed the basis for strategies in second language instruction (Shrum & Glisan, 2000). Inspired by practice in first language classrooms, whole language theorists maintain that language learning moves from the whole to the part (Crawford, 1993; Weaver, 1990) and comprehending, speaking, reading, and writing skills are interrelated, reinforcing each other in complex ways. They reject the traditional view that language acquisition is a set of hierarchically ordered sub-skills which build toward comprehension and speaking or writing (Fountas & Hannigan, 1989; Weaver, 1990). Whole language philosophy incorporates constructivism theory and proposes that, by experiencing whole written or oral discourse in meaningful units, students learn to analyze the parts and construct new knowledge by reordering or synthesizing relationships between the parts. Language

acquisition is, therefore, an active process in which the student focuses on cues and meaning and makes intelligent guesses.

Since instructional design of the TELL program incorporated a constructivist and whole language philosophy, certain principles guided its planning and implementation. It was decided that the program would

1. use its lab activities to enrich the curriculum in holistic ways, rather than to achieve mastery of individual skills;
2. use Spanish as the medium of instruction;
3. create opportunities, through authentic texts and task-based activities, for students to use language as a vehicle for sending and receiving information;
4. create individual lessons with appropriate sequencing of activities to help students deconstruct and reconstruct complex texts and tasks;
5. facilitate and encourage problem solving by providing links to online resources; and
6. evaluate students' performance in the computer lab by using the products of the TELL environment, rather than by testing the material covered in the lab.

## DESCRIPTION OF THE PROGRAM

Students participating in the present study were enrolled in first and second semester Spanish classes at Florida State University. TELL implementation for the first semester course occurred in the spring semester of 1998 and continued throughout the summer and fall semesters. TELL implementation for the second-semester course began in the fall of 1998. In all, 21 sections of technology-enhanced Spanish were offered, representing a little less than one-third of the basic courses. Both levels used the same text, completing either the first or second half of the text respectively. The particular computer instructional components were thus identical for both levels, although content varied to match level.

Each week, students received face-to-face instruction three times. They also met 1 day in a traditional audio-video language lab and 1 day in a computer lab for a total of 5 days of instruction. Computer-assisted instructional (CAI) components were as follows:

1. An interactive audio-visual CD-ROM with a high-interest mystery story format.
2. Internet activities that required students to visit Spanish-speaking sites and perform simulated real-life tasks, such as filling out a university schedule, ordering clothing, creating an itinerary, buying a house, and writing a job resumé.
3. Threaded discussions among the classes in which students posted opinions and responses relating to a chapter theme.
4. Electronic pen pal communication with individuals from Hispanic cultures.
5. Online resources such as vocabulary lists, dictionaries, and grammar explanations.
6. An optional drill and tutorial program that corresponded to the text's grammar instruction.

Threaded discussion assignments were posted every 2 weeks, and students posted their opinions and responses either inside or outside of the lab, whereas Internet and CD-ROM activities were generally completed in the lab. Furthermore, students alternated between activity types, with a component from the CD-ROM being assigned during a particular chapter's first week of study and an Internet activity during the second. CD-ROM activities were prescribed for the students, but students were allowed to select which Internet activities to complete, choosing one of three possibilities for each chapter. Pen pal letters were intended to be an out-of-lab activity, although some students used extra lab time for these assignments. Students used their own time to complete drill and tutorial activities and were awarded extra credit for them.

The syllabus for the technology-enhanced classes contained a category under "grade" for Internet activities. If students completed the activity, they e-mailed it to their instructor and received credit, which was included as a percentage of their grade in the course. This practice corresponded with the pre-established principle that the products of the technology-enhanced instruction would serve as the evaluation of the students' lab performances, as opposed to formal testing of the material covered in lab. The other categories for grading were the same for the TELL classes as for the regular classes. These included oral evaluations, quizzes and tests, participation and homework, and writing assignments. Writing evaluation for the TELL classes was for the two pen pal letters rather than for traditional writing assignments. Completed CD-ROM activities were counted as part of the participation grade.

The substantive nature of the TELL classes' exams was identical to those in the regular classes, except that they often covered two chapters at a time rather than one. Fewer assessments created extra time for accommodating the lab work and also allowed maximum face-to-face instruction during class. The standardized assessments measured listening comprehension, grammar, reading comprehension, and creative writing.

## THE STUDY

At the ends of the spring, summer, and fall semesters of 1998, a questionnaire on student perceptions about technology use for language instruction was administered to students enrolled in the first-semester Spanish TELL classes. TELL was implemented in the second-semester classes for the first time in the fall, so students in the second-semester classes also completed the questionnaire in the fall. Twenty out of 21 sections completed the questionnaire. This included 16 sections of first-semester Spanish students and 4 sections of second semester Spanish students. The total of 358 students completed the questionnaire in the CAI classes out of an enrollment of 449 students.

The study was designed to elicit answers to the following questions:

1. What role did the instructor play in TELL, and how important was the instructor's presence?
2. Were the lab and the online resources accessible and useful to students?
3. What was the technology's perceived effect on the learning of subject matter and language skills?
4. Did students enjoy the TELL activities and experience, and were the activities relevant to either their present or future use of Spanish?
5. Did students perceive that they gained confidence as a learner, gained technical skills, or improved their performance on class assessments as a result of the TELL experience?

The questionnaire contained 45 statements with which students were asked to indicate whether they strongly agreed, agreed, disagreed, or strongly disagreed. These statements elicited information about students' perceptions in five categories: a) teachers' usefulness and facilitative behavior in the TELL environment, b) the usefulness and/or accessibility of the online resources or the lab environment itself, c) the effect of TELL on learning subject matter and skills, d) the effect of TELL on student interest and enjoyment of Spanish or the relevance of the activities to their present or future study of Spanish, e) the effect of TELL on students' confidence as learners, technical skills, and performance on class assessments.

Two additional questions asked for information regarding students' perceptions about time commitment. Another question concerning the use of an online tutor was eliminated, since this feature was discontinued due to staffing problems.

## RESULTS AND DISCUSSION

For the purposes of this article, data are reported in numbers and percentages of student responses for each statement, as shown in the [Appendix](#). The statements are ordered from those receiving the highest number to the lowest number of responses expressing agreement.

### Teacher Usefulness or Facilitation

More than 89% of the students agreed or strongly agreed that the instructor interacted with the students to facilitate difficulties with the Spanish activities. Students also believed that the instructor provided other kinds of language assistance, with 88% agreeing (34% of the total respondents agreeing strongly) that the instructor provided vocabulary help. Over 85% agreed that the instructor interacted with them to facilitate difficulties in the computer use. Over 85% also agreed that having an instructor present during the lab increased learning potential in the class. Moreover, for a small majority of students, the need for instructor facilitation did not seem to decrease after initial learning curve demands were met. Over half (54.2%) disagreed with the statement, "Once I learned how to do the activities, the presence of the instructor was not necessary."

Students strongly perceived that their instructors facilitated instruction and that they were important to the TELL environment. This perception corresponds to conclusions by other researchers (Becker, 1994; Glisan et al., 1998; Kern, 1996; McGrath, 1998) that the teacher's role is significant in technology-mediated instruction. Glisan et al. conclude that teacher behaviors such as conducting review lessons, stimulating students to respond during lessons, and offering praise are important in the learning process. McGrath concludes that introducing technology resources alone into students' learning experience does not automatically result in improvement. He found that both the preparation and the knowledge of teachers about technology, as well as how to integrate and refine the lesson with technology, were the key to whether it was effective or not. Kern states that "the degree to which computer-mediated communication promotes language and content learning, cultural awareness, and critical reflection depends fundamentally on the teachers who coordinate its use" (p. 118).

### Access to Lab and Resources

Most students (81.3%) agreed that they had adequate access to a computer. Additionally, they seemed to prefer a lab environment, with over 73% reporting that they liked the learning environment of a regularly scheduled lab. Less than half (46.1%) expressed a desire to do all the activities at their own computer without any lab access. Less than 35% expressed a preference for having access to the lab at any time, without any scheduled lab. These findings seem to lend support to the statements by students that indicated the importance of an instructor's facilitative presence.

### Perceptions Concerning the Effect on Learning

**Time Invested** Almost 71% of the students felt that they invested more time on the technology-enhanced course than they would have in a regular Spanish class. Slightly over 36% "strongly agreed" with this response. Time on task may be considered to be a learning benefit, since it is frequently cited as a factor in achievement, and was found to be important in this respect in Glisan, Dudt, and Howe's study (1998).

**Learning of Culture** Approximately two-thirds of the students perceived that they had learned more about Hispanic culture in the TELL environment than they would have in a regular class (67.6%) and that the information from the lab activities contributed greatly to their knowledge of Hispanic culture (65.4%). These findings corroborate Sanaoui and Lapkin's (1992) finding that the use of technology enhances cultural awareness. In spite of this increased cultural knowledge, in the present study, few students developed enough interest in culture to pursue it on their own. The statement that elicited the lowest agreement (17.0%) was, "I returned to Hispanic-related sites that I used or found on the Web to explore

further on my own." This was a disappointing finding, as the course designers had hoped to influence students toward sustained learning goals involving Hispanic culture.

**Communication Skills** Students seemed to believe that the lab activities were beneficial to their communicative skills, although the majority expressed only moderate agreement with these statements. Almost two-thirds agreed that their listening and reading skills had improved in Spanish as a result of the lab activities (65.9% and 63.4%, respectively). These perceptions of improved listening and reading skills with technology lend support to findings of improved listening skills reported by Glisan et al. (1998) and students' perceptions of improved reading skills reported by Beauvois (1994) and Lunde (1990).

**Value of Specific Components** In response to questions about the learning benefits of specific components, a slight majority of students (52.2%) believed that they had learned a significant amount from the interactive CD-ROM. This finding seems to contradict students' reported perceptions about improved listening skills, since the CD-ROM was the only component with any degree of listening activity. Moreover, the CD-ROM also had a function that allowed audio texts to be visually displayed, permitting students to read texts to aid comprehension. Markham (1999) found that students showed increased listening comprehension of target language videos when there was target language captioning. If listening skills had improved, as students reported in the general questions, the increase would have to be attributed to the CD-ROM, in spite of the lukewarm beliefs about its learning value.

Only 43% of the students reported that they had learned a significant amount from the Internet task-based activities, and, in spite of the real life nature of the tasks, only a small majority (54.2%) perceived them to be relevant to real-life needs in Spanish. The first finding seems to contradict student perceptions that reading skills had improved. In addition to written application tasks, the Internet activities required the students to read large amounts of authentic texts and complete reading comprehension activities. If reading skills had improved, it was likely that the increase was due largely to the Internet activities. Although it seems that students would have attributed their reported gains in cultural knowledge to the Internet activities, they did not seem to see a relationship between the Internet activities' authentic cultural and linguistic material and their improvement in cultural knowledge or reading skills. This linking failure is an area for further investigation.

**Writing Skills** Only 50% of the students believed that their writing skills had improved when evaluating the general effect of technology-enhanced instruction on writing skills. Fewer felt that they had learned a considerable amount from the threaded discussion or pen pal activities (30.2% and 27.9%, respectively). Furthermore, since less than half of the students (43%) attributed learning value to the Internet activities, it appears that they did not believe that any of the writing activities (Internet, pen pal letters, or threaded discussion) contributed significantly to the development of writing skills. Conrad (1999) found that when compared to fourth semester students, first semester language students gave low priority value to writing skills. Therefore, since the large majority of students in this study were first semester students, this may explain our findings. Additionally, no explicit writing instruction took place in this study, nor was there any formal error correction, as in the study reported by Beauvois (1998). Instead, the experiential nature of the activities in this course more closely matched the activities suggested by Sanaoui and Lapkin (1992). In this e-mail project, "communication of meaning prevailed over error avoidance and accuracy in speaking and some components of writing practice" (p. 535). While students in this study improved aspects of their language use, researchers found that there was a "...need to emphasize the procedural aspects of writing through an explicit process-centered approach" (p. 544). They warned instructors that "...second language writing instruction directed mostly to the ... use of the second language will not necessarily improve learners' writing abilities" (p. 545).

Moreover, in follow-up focus groups at Florida State University, the graduate teaching assistants (TAs) working in classes in the current study said that students often hurriedly put together their writing assignments in order to "get the job done." It appears that students rushed to complete their Internet

activity before the end of lab, which probably resulted in lower quality work and, consequently, lower value attributed to the work. This represented a very different situation from the networking project reported by Beauvois (1994), where students reported feeling less time pressure and had plenty of time to carefully compose a response. In that project, students stated that the lab was not stressful and that they could take their time to monitor grammar and express ideas, responding at their own pace.

Lastly, the grading procedure for the Internet and threaded discussion assignments did not discriminate for the quality of work done. No formal feedback took place, and students were automatically given credit if assignments were completed. Furthermore, although pen pal letters were graded, TAs felt that the habit of quickly writing responses to complete Internet and threaded discussion assignments was generalized to the pen pal activities.

To summarize, in spite of the fact that two-thirds or more of the students reported that their listening and reading skills, as well as their cultural knowledge, had improved, none of the individual technology components were rated highly for their learning value. Less than half (45%) felt that they had learned more Spanish language skills than they would have learned in a regular Spanish course. The perceptions about the learning value of the individual components and the TELL experience in general may have been influenced by students' feelings of lack of control over time pressures, since they conveyed strongly that the technology-enhanced class required a significant amount of time investment. Although the majority said they completed their Internet activities in an hour or less, almost 37% disagreed. Many, therefore, felt pressured to finish during their lab time. Nowaczyk (1998) found that time pressures played a negative role in students' perceptions of the effectiveness of multimedia, particularly among low-achieving students.

**Enjoyment and Interest** In spite of divided perceptions about the instructional value of the TELL, two-thirds (66%) of the students agreed that the computer lab made the course more interesting, and slightly more than half (52%) said that they would take another technology-enhanced class in Spanish. Slightly less than half of the respondents (48%) said that, if given a choice between a regular Spanish class and a computer-assisted class, they would take the latter. Therefore, despite the fact that approximately two-thirds of the students expressed a high interest level in the computer-assisted classes, almost half preferred traditional face-to-face instruction. This discrepancy may be due to the high time commitment required for the computer-assisted classes, or it may represent a need among certain groups of students for more personalized interaction with an instructor.

Approximately two-thirds of the students (64%) found the CD-ROM to be enjoyable, not a surprising finding since it contained a highly engaging mystery story. Students also attributed more learning value to the CD-ROM than to the other components. It appears that they perceived that they had learned the most from that which they enjoyed the most, attributing both learning and interest value to one component. This observation differs from Nowaczyk's study (1998) in which college students differentiated between the effect of the multimedia instruction on their interest level and its effect on their understanding of the content.

The students did not especially enjoy the TELL writing activities. Furthermore, less than half (41.3%) said they enjoyed the Internet activities, although slightly more (50%) found them interesting. Fewer (38%) reported that they enjoyed the pen pal or the threaded discussion activities (33%). These were surprising responses, since much of the work in the TELL classes involved authentic assignments that were expected to stimulate student interest and enjoyment. These divided responses may represent personality type preferences, for which there was no control in the study. In one study of personality types and TELL (Beauvois, 1996), it was shown that introverts perceived computer-mediated communication less positively, both linguistically and affectively, than did extroverts.



## **Perceptions Concerning Effect on Learner Confidence, Technical Skills, and Class Assessments**

***Learner Confidence and Technical Skills*** For a clear majority of students, however, the CAI instruction appeared to have had certain benefits. In spite of the fact that 57.8% of the students reported that they were initially frustrated by activities in the Spanish language, almost 72% agreed they had gained confidence in their ability to complete the complex, task-based activities. A majority (54%) also believed that they had gained confidence in their ability to use technology successfully. These reports corroborate research showing that CAI students gain confidence in language use as well as in the use of the computer (Beauvois, 1994; Cononelos & Oliva, 1993; Lunde, 1990; Sanaoui & Lapkin, 1992).

Slightly more than 79% of students believed they had learned how to be resourceful in finding the meaning of difficult words or phrases on their own, and almost two-thirds (65%) expressed a gain in confidence as independent learners. These findings also relate to other studies in which learner control in a technology enhanced environment is cited as a motivating factor in increased language use. (Beauvois, 1994, 1998; Warschauer, 1996). Additionally, these perceptions support results from the Blackstock study (1993) which concluded that students engaged in technological interactive learning environments became independent "knowledge navigators." These beginning students successfully and independently negotiated the linguistically complex Internet and interactive CD-ROM environments.

Findings of this study do not support Paul's (1990) contention that technology discourages the development of independent learners. Paul contends that prepackaged materials carry an intrinsic authority which is unquestioned by students, and that the use of prescribed online reference materials does not encourage research skills. It appears that a more open, complex learning environment, as opposed to the prepackaged, content-driven technology courses described by Paul, does provide students with the opportunity to become independent learners.

***Class Assessments*** Only 41% of the students stated that their general experiences in the computer lab helped them improve their scores. The tests and quizzes given in class did not contain questions to evaluate their lab work. Nowaczyk (1998) found that students attributed learning value primarily to those multimedia components that directly related to course examinations, regardless of the intrinsic learning value of the material. Warschauer (1996) also found that the degree to which computer-based projects were integrated into general course goals and structure correlated to differences in student motivation. The less than enthusiastic perceptions concerning the general experiences in the TELL classes may be due to the fact that there was no direct link between individual electronic components and classroom assessments and structure.

On a more positive note, students generally did not feel that the TELL hurt their performance on class tests and quizzes. In fact, over 72% disagreed with the statement that the TELL was detrimental to their performance on class assessments. This may indirectly imply that the TELL contributed to the acquisition of the skills measured on the tests and quizzes, since these students had one day per week less of face to face instruction than students in the regular classes. This represents an area for further study, as there seems to be a dearth of data concerning the effect of technology enhanced instruction on regular class assessments in foreign language.

## **Divided Perceptions**

The students' divided perceptions about both the learning as well as the enjoyment value of the individual lab components may be a reflection of the discomfort caused by a holistic learning environment. Here, the student must confront a certain level of ambiguity, engage in a wide array of learning choices, and make meaning out of material presented in a nonlinear fashion. Moreover, it may also be difficult for students in a whole language environment to realistically evaluate their own learning. In this study, holistic learning consisted of authentic texts, large amounts of linguistic material, and student engagement in the construction of complex knowledge evaluated through performance-based measures, as opposed to

traditional testing. These students, however, did not appear to value the performance-based measures, as evidenced by both their responses and the TA comments. This was a real problem, since traditionally students regard tests as the measure of their achievement, and there was no other yardstick by which they could self assess their lab learning.

Furthermore, the Internet activities were inherently more holistic and authentic than the CD-ROM, although the latter provided many internal supports, resources, and traditional building block reinforcement activities with its structured story line. The students preferred the CD-ROM, despite the fact that the Internet activities led them through a planned sequence of whole language exercises, including such features as advance organizers and recognition activities as well as exploration activities, to enable them to deconstruct texts, see relationships, and complete task-based activities. The preference for more traditional structure among these beginning students is consonant with a study by Conrad (1999) who found that first semester students in regular foreign language classes favored repetition and structured activities over more creative linguistic activities.

Moreover, the majority of the students in this study were students who had little or no or no prior experience in the subject matter. In a 1986 study of university students, Young (1986) found that for those courses in which students have little background, specific sequencing contributes more to learner motivation, positive attitudes, and student success than in courses where students have a knowledge base. The lack of structure in the threaded discussions and Internet activities may have negatively affected student attitudes toward the learning as well as the interest value of these activities.

Glisan et al. (1998) found that the capability of the delivery system itself to facilitate learner interaction is important in determining the effectiveness of the technology. Therefore, the lack of a strong endorsement for the learning and interest value of the CAI components may also be a reflection of insufficient facilitation within a complex learning environment.

Additionally, in spite of the reported high level of teacher facilitation, the computer lab was primarily an independent learning environment. Videotaped observations demonstrated that there was generally less student-to-student interaction, and less teacher-to-student interaction in the lab than in the regular classroom, unlike the computer-mediated projects cited earlier (Beauvois, 1994, 1998; Hartman et al., 1995). Nowaczyk (1998) also found that the use of technology resulted in a reduction in the amount of person-to-person interaction in the class and in less willingness on the part of students to ask questions. Even in regular classrooms, Lee (1993) found that low achieving students greatly valued teacher interaction and that all students perceived consistent teacher interaction as a mark of caring behavior. Lee also found that the degree of perception of teacher caring behaviors correlated positively to students' sense of efficacy. In a technological environment, where interactions are reduced, this may be reduced, and some students may experience increased difficulties and blame the learning activities themselves.

### **Pedagogical Implications and Conclusions**

This study implies that instructors have an important role in technology enhanced learning environments, especially those that incorporate complex learning paradigms involving constructivist or whole language principles. It corroborates other reports (Glisan, et al., 1998; Kern, 1996; McGrath, 1998; Weiss, 1994), which indicate that the role of an instructor as facilitator is important and complex in technology-enhanced environments and involves well-developed instructional skills.

The issue of teacher facilitation must also be addressed in such environments. Although students in this study rated teacher interaction favorably, negative perceptions about the learning value of the instructional components may imply that instructor facilitation was still insufficient. This may be especially true for low ability students, who have needs for increased assistance, (Lee, 1993) and for students with little prior background (Young, 1986).

Instructors working in learning environments mediated by technology need support and preparation to adopt new roles. Paul (1990) states that there is frequently role confusion and ambivalence among instructors working with students using technology, noting that there is internal conflict between the notion of creating an independent learner and natural instructor feelings of responsibility. Professional development must include those skills necessary for the instructor to function appropriately as a facilitator and co-learner, rather than as an information purveyor.

The development of professional skills must also include new pedagogical as well as technical and routine management skills. In addition to the facilitative teaching skills by Glisan et al. (1998) which were cited earlier, instructors must learn to negotiate meaning with students in an unpredictable environment in which any question may be asked at any moment. Such unpredictability precludes the extensive preparation and resulting customary security of a structured lesson in a regular classroom. Instructors must learn to encourage students (and themselves) to engage in a holistic, rather than linear, learning process, thus allowing students to ask grammar questions "out of order," and answering such questions in a way that encourages elaboration. They must also learn to create opportunities for increased person-to-person interaction within a lab environment, and at the same time, manage these interactions and keep them task-focused.

Issues dealing with the design of the curriculum must also be addressed. Some structured activities and scaffolding activities that activate background knowledge or provide advance organizers should be carefully sequenced within a holistic curriculum to enable every learner to negotiate the environment in a positive manner. Less able learners appear to learn more from drill and tutorial programs than more able learners (Rockman, in Weiss, 1994) and beginning students, in general, appear to value a certain amount of repetition and structure (Conrad, 1999). Paul (1990) draws attention to the conflict that exists between structured, mastery-based learning that dissuades the development of the independent learner and the challenging environments that enable students to take responsibility for their own learning. This tension must be considered in making curricular instructional design decisions for TELL. Additionally, the pace of the curriculum must be addressed to accommodate time constraints and feelings of student control, especially for low achieving students.

The issue of writing skills within the TELL curriculum must also be addressed. Simply writing for real needs did not increase the motivation and performance of the majority of the students in this study. The basic level of the students' grammar and vocabulary knowledge may have played a role in both their motivation and performance; however, time pressures and non-graded performance-based assignments appeared to be the inhibiting factors. To encourage quality work, the number of writing assignments must be manageable, freedom from overly limiting time constraints must be given within the lab period, and explicit procedural aspects must be emphasized. A system of evaluation that differentiates quality in lab assignments and threaded discussions must also be implemented. The development of a writing mentoring program with foreign language experts similar to that described by Mather (1997) might be considered as a means to improve students' writing as well.

Lastly, accountability for lab work must extend beyond performance-based measures. In spite of reported gains in listening and reading skills, students did not seem to link these achievements to the performance-based activities of the TELL components, nor did they highly value these activities. Since students appear to value multimedia components that directly relate to exams (Nowaczyk, 1998), measures must be implemented that link TELL activities to regular assessments, so that students attribute relevancy and educational benefits to technology-enhanced instruction.

## **CONCLUSION**

This descriptive study has illustrated the perceptions of one group of university students about language learning in a technology environment. These were beginning language learners who perhaps had limited

Spanish skills as well as limited motivation and performance. The students' perceptions regarding the effect of technology-enhanced instruction on their learning of Spanish requires follow-up study.

Reports in the research note that teachers' jobs are harder in the early stages of a technology's implementation, that positive changes from technology are more evolutionary than revolutionary, and that these changes occur as teachers become more experienced with the technology (Weiss, 1994). Data has been collected for the year following this study and is currently being compiled to determine whether the staff's increased experience, as well as the absence of routine initial problems, such as computer glitches, planning issues, and scheduling and reporting problems, positively affect student perceptions. The TELL classes described in this article have continued to the present, with some modifications indicated by the feedback provided by the students in this study.

This study has several limitations. The information is self-reported, and factors that may influence student perceptions such as student ability, prior experience with technology, prior background in Spanish, and personality type, were not considered. Also, due to the descriptive, rather than statistical, nature of the data, results may not be generalized to other TELL programs. Nevertheless, since little research is available on student perceptions about language learning using a variety of multimedia, this study may provide insights to universities currently implementing or contemplating the implementation of technology enhanced instruction.

More empirical studies should be conducted concerning the effect of multimedia instruction on student perceptions and the relationship between such perceptions and the actual achievement of specific skills. In addition, studies should be conducted to compare second language learning in a holistic, constructivist TELL environment as opposed to more structured TELL environments. Studies should be conducted concerning the role of the instructor in the TELL environment, in order to identify those teacher behaviors and interactions most favorable to students' second language acquisition. Such studies may contribute to a future knowledge base that will shape and improve curriculum and instruction mediated by technology.

## APPENDIX

### Category 1 -- Perceptions Concerning Teacher Role and Facilitation

	Strongly Disagree		Disagree		Agree		Strongly Agree		No Response	
	N	%	N	%	N	%	N	%	N	%
29. The instructor interacted with me to facilitate difficulties with Spanish in the activities.	9	2.5	27	7.5	203	56.7	116	32.4	3	0.8
30. During the lab activities, the instructor provided vocabulary help.	5	1.4	36	10.1	194	54.2	121	33.8	2	0.6
28. The instructor interacted with me to facilitate difficulties in the use of the computer.	8	2.2	40	11.2	194	54.2	112	31.3	4	1.1
33. Having an instructor present during the lab increased the learning potential in the class.	9	2.5	42	11.7	186	52.0	119	33.2	2	0.6
31. The instructions on the board for each lab day were helpful.	22	6.1	64	17.9	170	47.5	96	26.8	6	1.7
42. The instructions for the Web activities were easy to understand.	52	14.5	91	25.4	173	48.3	40	11.2	2	0.6
34. Once I learned how to do the activities, the presence of the instructor was not necessary.	53	14.8	141	39.4	118	33.0	44	12.3	2	0.6

### Category 2 -- Perceptions Concerning Access to Lab and Computers

	Strongly Disagree		Disagree		Agree		Strongly Agree		No Response	
	N	%	N	%	N	%	N	%	N	%
32. Access to the lab or to a computer was adequate.	20	5.6	47	13.1	189	52.8	102	28.5	0	0.0
35. I liked the learning environment of having a regular scheduled lab period.	31	8.7	63	17.6	186	52.0	76	21.2	2	0.6
37. I would prefer the flexibility of being able to do all the activities at my own computer without any sessions in the lab.	90	25.1	90	25.1	85	23.7	80	22.3	13	3.6
36. I would prefer the flexibility of not having a regular lab period, but of being able to go to lab at any time to do the required activities.	100	27.9	129	36.0	79	22.1	45	12.6	5	1.4

### Category 3 -- Perceptions Concerning Effect on Learning

	Strongly Disagree		Disagree		Agree		Strongly Agree		No Response	
	N	%	N	%	N	%	N	%	N	%
8. I put more time into this class than I would have invested in a regular Spanish class.	23	6.4	74	20.7	124	34.6	130	36.3	7	0.0
18. My listening skills in Spanish improved as a result of the lab activities.	35	9.8	87	24.3	193	53.9	43	12.0	0	0.0
7. The information from the lab activities contributed greatly to my knowledge about Hispanic culture.	21	5.9	100	27.9	189	52.8	45	12.6	3	0.8
38. Generally, I completed the Internet activity in an hour or less.	60	16.8	70	19.6	161	45.0	66	18.4	1	0.3
6. I learned more about Spanish culture in this class than I would have learned in a regular Spanish class.	26	7.3	82	22.9	176	49.2	66	18.4	8	2.2
16. My reading skills in Spanish improved as a result of the lab activities.	40	11.2	89	24.9	183	51.1	44	12.3	2	0.6
22. I learned a lot from the interactive CD ROM.	58	16.2	112	31.3	143	39.9	44	12.3	1	0.3
17. My writing skills in Spanish improved as a result of the lab activities.	48	13.4	128	35.8	144	40.2	35	9.8	3	0.8
4. I learned more Spanish language skills than I would have learned in a regular Spanish course.	54	15.1	134	37.4	123	34.4	37	10.3	10	2.8
5. The information from the lab activities contributed greatly to my knowledge of Spanish grammar and vocabulary.	48	13.4	150	41.9	129	36.0	31	8.7	0	0.0
20. I learned a lot from the Internet activities.	68	19.0	135	37.7	130	36.3	24	6.7	1	0.3
24. I learned a lot from the threaded discussion activities.	85	23.7	160	44.7	92	25.7	16	4.5	5	1.4
26. I learned a lot from the penpal activities.	96	26.8	152	42.5	78	21.8	22	6.1	10	2.8
39. I returned to Hispanic-related sites that I used or found on the Web to explore further on my own.	167	46.6	129	36.0	45	12.6	16	4.5	1	0.3

### Category 4 -- Perceptions on Interest and Relevance

	Strongly Disagree		Disagree		Agree		Strongly Agree		No Response	
	N	%	N	%	N	%	N	%	N	%
1. The learning experiences in the computer lab made this a more interesting course.	38	10.6	84	23.5	180	50.3	56	15.6	0	0.0
21. I enjoyed the interactive CD ROM.	62	17.3	67	18.7	170	47.5	59	16.5	0	0.0
41. The tasks I performed on the Web were relevant to real-life need in the Spanish language.	66	18.4	97	27.1	176	49.2	18	5.0	1	0.3
43. I enjoyed doing the computer-based writing assignments better than traditional writing assignments.	72	20.1	87	24.3	142	39.7	49	13.7	8	2.2
2. I would take another course in Spanish that had a computer-assisted component.	83	23.2	89	24.9	115	32.1	70	19.6	1	0.3
40. The tasks I performed on the Web were interesting.	79	22.1	97	27.1	157	43.9	24	6.7	1	0.3
3. If given a choice between a regular Spanish class and a computer-assisted Spanish class, I would take a computer-assisted class.	78	21.8	105	29.3	102	28.5	69	19.3	4	1.1
19. I enjoyed the Internet activities.	101	28.2	108	30.2	115	32.1	33	9.2	1	0.3
25. I enjoyed the penpal activities.	84	23.5	128	35.8	113	31.6	23	6.4	10	2.8
23. I enjoyed the threaded discussion activities.	79	22.1	157	43.9	103	28.8	15	4.2	4	1.1

### Category 5 -- Perceptions Concerning Effect on Confidence as a Learner, Technical Skills, and Class Assessments

	Strongly Disagree		Disagree		Agree		Strongly Agree		No Response	
	N	%	N	%	N	%	N	%	N	%
15. I learned how to be resourceful in finding the meanings of words or phrases that were difficult.	16	4.5	59	16.5	227	63.4	56	15.6	0	0.0
13. I gained confidence in my ability to do the Spanish language activities.	20	5.6	79	22.1	215	60.1	42	11.7	2	0.6
14. I gained confidence in my abilities as an independent learner.	22	6.1	101	28.2	189	52.8	43	12.0	3	0.8
12. I was initially frustrated by the various activities in the Spanish language.	41	11.5	110	30.7	120	33.5	87	24.3	0	0.0
11. I gained confidence in my ability to use technology successfully.	53	14.8	106	29.6	158	44.1	37	10.3	4	1.1
9. I gained technical skills on the computer as a result of this course.	62	17.3	127	35.5	126	35.2	43	12.0	0	0.0
44. The experiences in the computer-assisted class helped me perform better on the regular chapter quizzes or tests.	79	22.1	123	34.4	117	32.7	29	8.1	10	2.8

10. I was initially frustrated by having to learn how to use the computer components.	115	32.1	128	35.8	60	16.8	55	15.4	0	0.0
45. Taking the computer-assisted class was detrimental to my performance on quizzes or tests.	99	27.7	159	44.4	54	15.1	30	8.4	16	4.5

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