TECHNOLOGY AND SECOND LANGUAGE READING AT THE UNIVERSITY LEVEL: INFORMED INSTRUCTORS' PERCEPTIONS

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Abstract

Lam (2000) contends that some teachers lack perceived legitimacy of technology as an effective educational tool and consequently they reject the technological changes in the curriculum. He argues that teachers are not technophobes, but rather, he attributes fault to the institutions and programs for a lack of dedication to teacher training. Egbert, et al. (2002) state that few investigations have been conducted on computer-using language teacher's development. The purpose of this study is to examine how informed instructors (practitioners who possess knowledge about L2 reading research and CALL) at the university level perceive the integration of technology-based materials in the L2 reading process. Participants in the study were 10 PhD students who were enrolled in a semester-long seminar on second language (L2) acquisition and CALL at a private, Midwestern university. All participants were currently teaching or had been teaching an undergraduate level course in either German, Spanish, French or Italian at the university. A questionnaire with both fixed-answer questions and open-ended questions was created to gather an authentic understanding of the instructor's perspectives on "CALL and second language acquisition (SLA)" and "CALL and L2 reading." Follow-up oral interviews were also conducted with select instructors. Results revealed that instructors proceed with caution when integrating CALL activities in the SLA curriculum mainly because of the time commitment, the rate of technological change, and technical/system difficulties. The informed instructors overcame their techno-related anxiety and consequently developed a more positive perception of the usefulness of technology for L2 reading instruction. Overall, the findings add a new perspective to research on teacher education as the informed instructors embrace the challenge of using new technologies to support curriculum rich activities that are grounded in L2 reading theories and research.

Introduction

A plethora of research has examined the role of technology in computer assisted language learning (CALL), and many studies focus on the attitudes, beliefs and outcomes from the student's point of view (Beauvois & Eledge,1996; Beauvois, 1999; Brantmeier, 2003a; Davis & Lyman-Hager, 1997; Lee, 2000; etc). Overall, even though the use of CALL does not always improve L2 acquisition, university level students enthusiastically embrace

the use of technology in second language instruction (Schcolnik et al, 1996). Consequently, the integration of technology in second language teaching and learning has developed rapidly and therefore has been unpredictable. Researchers across disciplines have also examined the instructor's perspective and their acceptance or rejection of technology in different classroom environments (Atkins & Vasu, 2000; Lee, 2000; Milbraithe & Kinzie, 2000). Some instructors who reject technology do so because institutions purchase and install technology equipment in the classrooms and do not provide the training of new technologies. Others find the rate of technological change to be impulsive. More specific to CALL, some L2 language professors have never formally studied the research that supports the effective use of technology based materials (Edbert, et al., 2002). The present study addresses technology and second language (L2) reading and examines the perspectives of *informed* instructors who are equipped with the technical and theoretical knowledge about CALL.

Brief History of CALL

In a commentary about former President Clinton's plan to connect every American classroom to the information highway, Cuban (1996) outlined the history of technology in American education dating back to the 1920s when telephones first appeared in the principal's office. He discusses the influence of technologies such as radio and film and how they brought the world to the classroom, and he emphasizes how teachers were ill-prepared to use the new technologies. Cuban demonstrates that throughout history politicians and policy makers have embraced the use of technology for learning, but unfortunately they have not understood the schools as a workplace where teachers focus on efficiency. Efficiency is

important to all instructors, that is, time and energy are significant factors across all instructional disciplines, including instructors of second languages.

The advent of using computers in L2 instruction began in the 1960's (Warschauer & Healey, 1998) with the hope that technology would serve as a capable and resourceful tool for more efficient L2 acquisition. Warschauer & Healey (1998) divide the history of CALL into three main phases: behavoristic CALL, communicative CALL, and integrative CALL. Each stage corresponds to levels of technology as well as research in the field of Educational Psychology and Applied Linguistics.

Behavioristic CALL was grounded in Skinner's stimulus-response (S-R) theory and Pavlov's famous classical conditioning experiments. Basically, students completed repetition and drill type exercises on the computer. The computer was an at-home "mechanical tutor" (Warschauer & Healey, 1998), where students memorized word lists and completed fill-in-the-blank exercises over and over again, echoing the Audiolingual Methodology use in the classroom at this time. As the instructor was the drill leader in the classroom, the computer was the drill leader at home. Answers were either right or wrong, and reinforcement was given for 'correct' grammar. Because SLA theories in the 1960s were influenced by research in educational psychology, with heavy reliance on the first language (L1) of the student, translation tests were also facilitated via the computer. A significant contribution of behavioristic CALL was that students could progress at their own pace outside of the classroom.

In the late 1970s and 1980s behavioristic theories of SLA were rejected, and innatist theories (Krashen, 1982) became the foundation of L2 teaching methodologies, such as communicate language teaching, that were utilized in the classroom. These innatist theories

had a profound impact on CALL as they focused on "meaning" rather than "form." Grammar was taught explicitly through authentic communication. Students no longer memorized lists, rather, they were encouraged to use the target language in meaningful situations where the instructor asked questions and students answered them. The question were tailored to student interests and daily lives. Accordingly, students used the computer as a means to answer questions posed by the instructor.

The focus on language use in culturally authentic contexts led to the phase of "Integrative CALL" (Warschauer, 1996), where speaking, listening, reading and writing were integrated through the use of the computer across the stages of acquisition. Beforehand, under the influence of behavioristic and communicative CALL, the computer was utilized in isolated instances for limited phases of time. Integrative CALL is the foundation for current trends in technology-based language materials. The new interactive technologies include developments such as accessing video so that students see and hear "real" culture and language (Bush,1997) where students interact with each other (not just the instructor) at the computer in task-based contexts.

L2 Reading and Technology

In order to understand how instructor's perspectives relate to research and theory on L2 reading, a brief overview of variables involved in L2 reading and technology is offered. Research that focuses on L2 reading dates back to the 1960s and examines factors involved in bottom-up approaches (letter recognition, word recognition, etc.) and top-down approaches (prior knowledge, reader characteristics, etc.), and a combination of the two approaches (orthography, semantic knowledge, texts, content, organization, etc.). The combination of the two in L2 reading is often called the "interactive approach" which

includes the interaction between the text and the reader. When a third variable is added, technology, the L2 reading process becomes even more sophisticated. Multimedia environments may add both visual and auditory features to a text with the ultimate goal of improving comprehension (Chun & Plass, 1997). Chun & Plass offer a full summary of research on text comprehension and multimedia that emphasizes how learners integrate verbal and visual information to improve text comprehension. Two significant variables often considered when integrating multimedia into L2 reading are background knowledge, or schemata, and comprehension assessment.

Background Knowledge

Anderson (1984) defined schemata as organized knowledge structures in permanent memory that include chunks of related information and include plans for gathering additional information. Bruning et all (1995) includes more of the reader's behavior in his operational definition of schema: the mental framework that helps him/her organize knowledge, direct perception and attention, and guide recall. A common and simplified definition of schemata is "knowledge already stored in memory" (p. 255, Anderson, 1984). Many studies have examined the importance of relating background knowledge to the new information in the text, and therefore schema theory is an important consideration when integrating technology into L2 reading. The first studies on schema theory date back to the 1980's with Steffensen, Joag-dev, and Anderson (1979) and Johnson (1981) who found that members of a cultural group comprehended more of the content from the culturally familiar text than did non-members of a cultural group. Likewise, Carrell (1981) suggested that the cultural origin of the text affected the subject's recall of information from the texts. Further studies that examine the effects of schema on L2 reading comprehension across various languages and

various levels of acquisition have continued to support the initial findings of early

investigations (Brantmeier, 2002; 2003b; Bugel & Buunk, 1996; Carrell, 1984; Carrell,

1984b; Hudson, 1982; Johnson, 1981; Prichard, 1990; Schueller, 2000, etc.). Given the

consistent findings it can be said that content schemata influence second language reading

comprehension. With the use of technology, prior knowledge can be activated before

reading via visuals, graphics, and even streamlined videos. Hyperlinks can be created to

connect the reader to online information about authors, historical periods, geography, and

more before the text is read. Inspiration, concept mapping software, can serve as a valuable

brainstorming tool to activate relevant schemata.

Comprehension Tasks

Reading is an outward manifestation of an inward process, and therefore

assessing L2 reading comprehension is a difficult task. In a normal situation readers do not

produce oral output data while reading (Alderson, 2000), and therefore instructors do not

know what is happening in the mind. To gain a picture of readers' understanding of a text

researchers and instructors measure comprehension after the reading is complete, and some

of the most widely used comprehension assessment measures are multiple choice questions,

written recalls, close tests, sentence completion, and open ended questions. The most

common comprehension test is multiple choice, perhaps because it is easy to grade.

However, creating multiple choice questions for L2 reading passages is not an easy task.

Research in L2 reading has shown that multiple-choice questions should meet the following

two criterion (Bernhardt, 1991; Wolf, 1993): (a) all items are passage dependent, and (b)

some of the items require the reader to make inferences. In addition, a third condition should

be added: the test-takers were not able to determine correct responses by looking at the other

questions on the page (Brantmeier, 2003b). For each multiple choice question four possible responses should be created: one correct response and three plausible distracters (Alderson, 2000). All multiple-choice questions should not be answered correctly without having read and understood relevant parts of the passages. The advantage to completing multiple choice comprehension tasks on the computer is that readers will get immediate feedback on incorrect/correct answers. In using the computer to deconstruct the plot via multiple choice questions, classroom instructors can spend more class time critically analyzing the texts. Furthermore, students can answer open-ended questions posed by the instructor and can send answers electronically before the class session.

Participants

The need for change in second language teacher development is not a recent issue. In a synthesis of research on L2 instructor development, Bernhardt and Hammadou (1987) revealed that we know little about the preparation of L2 instructors because of the dearth in the research database. To date, no studies have specifically addressed language instructor development, technology and reading. The purpose of the present study is to examine how informed university-level language instructors perceive the integration of technology in the L2 reading process. Lee (1989) offers a detailed model for providing professional development for teaching assistants that includes a blending of theory and practice in the formation of informed instructors. Parot (1993) emphasizes the involvement of instructors in introspecting and comparing experience. For the present study, all participants were enrolled in a graduate seminar entitled "Second Language Acquisition and Pedagogy: Integrating Technology into Language Instruction."[i] All the students in the course were pursuing PhDs

in literature of the following languages: German, Spanish, and French. Participants were currently teaching a language or had been teaching a language at a private university in the Midwest.[1] The goal of the seminar was to transform knowledge about second language acquisition (SLA) and pedagogy into practice while focusing on the impact of technology. The course fostered professional development as participants formulated critical skills for assessing, creating and integrating technology into the classroom. Topics included web page design, interactive and non-interactive hypermedia technologies such as web use and chat sessions, software selection, and more. Course formats included readings, discussion, demonstrations and hands-on sessions with technologies. An important emphasis of the course was second language literacy and CALL because the graduate students in the course were primarily studying literature for their PhDs and therefore had a keen interest in this topic.

The course consisted of three parts that were interwoven throughout the semester. The course began with a review of SLA theories and research, and focused on how CALL fits within these frameworks. Topics included: language learning contexts, language and culture, acquisition processes, etc. The second part of the course examined how CALL has been used in university level teaching environments throughout the nation. Different computer based materials were showcased from different universities. After this, students compiled a checklist to evaluate published CALL materials. The last part of the class focused on the design and implementation of computer based materials. Each student created pedagogically effective CALL materials that were grounded in SLA theory.

Data Collection and Analysis

A paper-based questionnaire was developed that allowed for both a fixed answer as well as an individualized answer in a single question. The fixed choice questions ('yes' or 'no') lent themselves to simple tabulation. The open-ended questions were created to gather an "authentic" understanding of the instructor's perspectives as there was more freedom of response. Most of the open-ended questions were contingency questions: they were contingent upon how the respondent answered the yes/no question. Furthermore, the open-ended questions permitted follow-up interviews. A pretest of the questionnaire helped reveal ambiguities in the questions. The questions were about the instructor's general attitudes toward the integration of CALL materials in SLA as well as questions specific to CALL and L2 reading.

In the end, the 3-page questionnaire was completed during class time during regular class hours. Participants were told that the researcher (professor of the class) would not read the questionnaires until the semester was over and course grades were handed in. This allowed participants the freedom to answer the questions in a more autonomous way that would not affect responses. All of the participants answered every question on the questionnaire.

Results

Table One presents the frequency data for the fixed choice questions, and Table Two lists the patterns of responses given by participants in the open-ended parts of questions about general use of CALL in SLA. Table Three lists the responses given to the questions about CALL and L2 Reading.

Table One

Frequency and Percentage of Total Responses to Questionnaire

Question #	Frequency		Percentage of Total	
	Yes	No	Yes	No
1. CALL use	10	0	100%	0%
2. Reservations CALL use	10	0	100%	0%
3. CALL in L2 Rding before this course	4	6	40%	60%
4. CALL use in L2 reading	10	0	100%	0%
5. Reservations CALL use L2 Rding	10	0	100%	0%

Note: n = 10

Key to Questions:
Question #1: Generally speaking, do you think technology-based materials should be integrated in the L2 acquisition process? Why or why not? How?
Question #2: Do you have reservations about integrating technology in the L2 acquisition process? If so, what are they?
Question #3: Have you ever integrated technology-based materials in the L2 reading process? Explain.
Question #4: Do you think technology-based materials should be integrated in the L2 reading process? Why or why not? How?
Question #5: Do you have reservations about integrating technology in the L2 reading process? If so, what are they?

Table Two

Patterns of Responses to Open-ended Questions about General CALL Use

* Signifies that more than half of respondents wrote this answer
**Signifies that all of respondents stated this answer

Question: *Generally speaking, do you think technology-based materials should be integrated in the L2 acquisition process? Why or why not? How?*
Answers:
- The technology should not replace the teacher.**
- Only if they are driven by research and theory.*
- Only if they are used outside the classroom.*
- Only if used during their own time.*
- You can reach more students by giving individuals the experience before coming to class.*
- They are a great source of authentic materials.
- They have interactive potential that can add value to the course.
- Anything that will increase student motivation.

Question: *Do you have reservations about integrating technology in the L2 acquisition process? Why or why not?*
Answers:
- I want to be sure that it is motivated by theory and that students truly learn**
- I am concerned about the amount of time I will spend creating materials**
- I am concerned about colleagues in my department supporting my use of technology in the L2 classroom*
- I am concerned about technical difficulties (including student's operating systems and compatibility issues)*
- I am concerned about technical support (i.e. computer software specialists and programmers)
- I lack experience with technology
- I am concerned about financial resources

Table Three

Patterns of Responses to Open-ended Questions about CALL and L2 Reading

* Signifies that more than half of respondents wrote this answer
**Signifies that all of respondents stated this answer

Question: *Have you ever integrated technology in the L2 reading process?*
Answers:
- As a post-reading activity to check for comprehension.
- I had students look up information about the author on the internet.

Question: *Do you that technology based materials should be integrated in the L2 reading process? Why or why not?*
Answers:
- Because it saves class time (class time can be used for text analysis rather than plot deconstruction)**
- Students will get immediate feedback about their comprehension of the text*
- Students individual plot questions could be answered before coming to class*
- Students may enjoy reading more... reading is something the students generally do not like to do because the emphasis in early courses is on speaking.

Question: How would you integrate technology based materials in the L2 reading process?
- I would use it for pre-reading activities to activate relevant schemata**
- I would use it for pre-reading exercises to create relevant schemata for those students who do not know anything about the passage content at all*
- I would use it for follow-up activities to check comprehension**
- I would use it to check understanding of basic plot through questions that have immediate answers
- I would use it to ask students to recall what they just read at home and send it to my email address*
- I would use it for creative writing in an interactive way
- I would have native speakers read the authentic passages so that students can hear what they are reading
- I would utilize a discussion board where students write answers to different questions that I pose
- I would use it to help guide my student with good reading strategies
- I would use it to gloss texts (if I am teaching at the lower levels of language instruction)

Question: *Do you have reservations about integrating technology in the L2 reading process? Why or why not?*
- I want to be sure that it is motivated by theory and that students truly learn**
- I am concerned about the amount of time I will spend creating materials**
- I am concerned about colleagues in my department supporting my use of technology

> in the L2 classroom*
> - I am concerned about technical difficulties (including student's operating systems and compatibility issues)*
> - I am concerned about issues of plagiarism.
> - I am concerned about the legalities behind borrowing information from the web.

In sum, the data of this study attest to favorable instructor attitudes toward the use of technology in L2 reading contexts. The three most widely sited ways to integrate technology were the following: pre-reading materials, word glossing of the text, and follow-up comprehension questions (See Figure One).

Figure One

<u>Three Ways to Integrate Technology in L2 Reading Process</u>
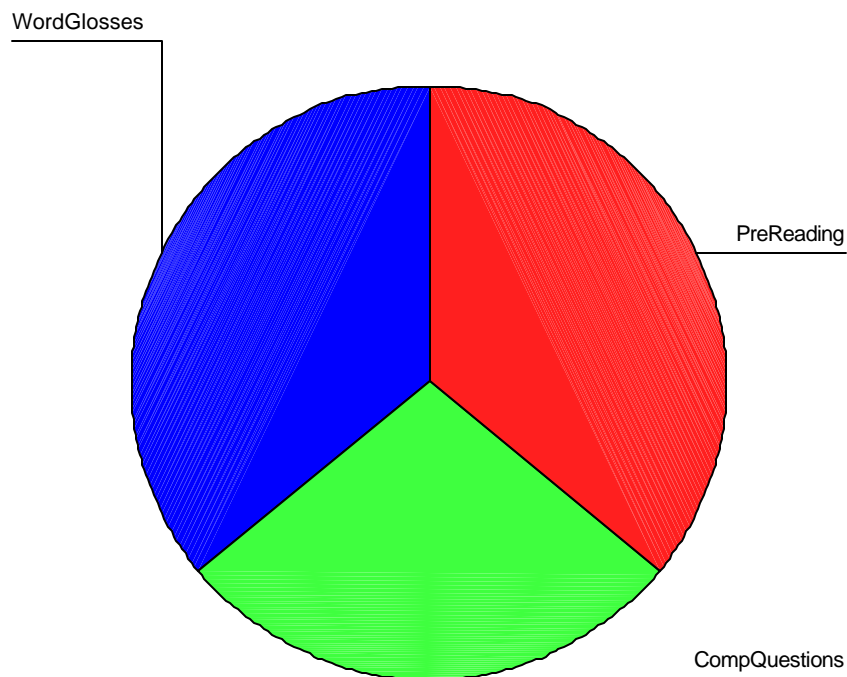
This graphic illustration demonstrates that the instructors view L2 reading as a process that includes three stages: pre, during and post, and that the computer can be effectively integrated into the process during all three stages. Martinez-Lage (1997) provides details on how to develop instructional materials for all three stages, and these guidelines can be easily adapted to CALL and L2 reading.

General Discussion

Overall, all of the instructors agreed that the use of technology in general SLA contexts and in the L2 reading process should be driven by theoretical rich motivations. All of the instructors expressed that pedagogy and research should drive technology, and not the reverse. Doughty (1987) asserts that second language pedagogy must be connected to theory and empirical research, and 10 years later Bush (1997) stated that there is little evidence that technology has had a significant impact on the way most students acquire languages in the USA. Since 1997, many researchers have conducted studies that connect SLA theory and research to CALL (see *Language Learning and Technologies: A Refereed Journal for Second and Foreign Language Education*) and therefore educators may be more enthusiastic about the use of technology for language learning. Furthermore, all instructors reported that technology should not replace the instructor, that is, student should use technology outside of the classroom. Because technology is often viewed as a source of instructional efficiency, some instructors fear that students may not be required to come to class as often and therefore fewer instructors will be needed. Almost all of the participants in the present study stated that they do not feel that any type of technology should replace valuable class time with an instructor.

In various ways and multiple times throughout the questionnaire, all of the instructors stated that the computer can help account for individual learner differences (IDs) in general SLA situations as well as in the L2 reading process. Although a lot of research has been conducted on IDs in SLA (Skehan, 1991), there is still no all-embracing or comprehensive theory of IDs in SLA (Ellis, 1997). Nonetheless, books about SLA include chapters on individual differences, and Figure 2 (Brantmeier, 2003c) summarizes the IDs included in some books that review IDV research.

Figure 2. <u>SLA Books That Include Chapters on Individual Learner Differences</u>, taken from Brantmeier, 2003c

Author	Title	Individual Variables Reviewed
Ellis, Rod (1997)	<u>The Study of Second Language Acquisition</u>	Learner's Beliefs Affective States Age Aptitude Learning Style Motivation Personality
Cook, Vivian (1991)	<u>Second Language Learning and Teaching</u>	Motivation Aptitude Learning Strategies Age Others: Sex Differences, Intelligence, Level of L1, Empathy
Larson, Freeman and Long (1991)	<u>An Introduction To Second Language Acquisition Research</u>	Age Language Aptitude Social-psychological Personality Cognitive Style Hemisphere Learning Strategies Others: Gender,

Ramirez, Arnulfo (1995)	Creating Contexts for Second Language Acquisition: Theory and Methods	Learning Strategies Learning Styles Attitudes Motivation Anxiety
Lightbown, Patsy Spada, Nina (1999)	How Languages are Learned	Intelligence Aptitude Personality Motivation and Attitudes Learner Preferences Learner Beliefs Age of Acquisition

It is important to note that little research examines IDVs in L2 reading, but a close look at the list reveals that all of these variables could be examined in the L2 reading process. In a discussion about new directions in L2 reading research, Bernhardt (2003) shows that L1 literacy is a significant contribution to L2 reading and that more research needs to be conducted on individual performance. Outside of the studies that have been conducted on motivation and CALL, at this point it is difficult to make predictions about the topic of IDVs, CALL and L2 reading.

All instructors in the present study stated that they think computers motivate students, in both general SLA contexts as well as in the L2 reading process. A plethora of research indicates that students are generally in favor of CALL (Beauvois & Eledge,1996; Beauvois, 1999; Brantmeier, 2003a; Davis & Lyman-Hager, 1997; Lee, 2000 etc.). Lee (2000) states that students are made to feel more independent with the computer and consequently motivation is high. He also mentions that students often view technology as "fashionable." In a discussion about interactive technologies, Bush (1997) states the computer energizes the minds of learners, and he demonstrates this through an example with learners studying at the

United States Air Force Academy. These students overwhelming stated they were in favor of using the interactive technologies outside of the language classroom. Beauvois (1999) echoes this assertion with students from various levels of French. Her students overwhelmingly stated that they felt less stress when they could individually use the computer outside of the classroom. Lee (1999) commented on how empirical research that connects language anxiety to L2 reading is beginning to emerge, and he continues to discuss the importance of this type of research. Davis & Lyman-Hager (1997) report that technology lowers anxiety and has a positive effect on L2 reading. Again, at this point there is no uniform conclusion to be drawn about the topic of "Anxiety, CALL, and L2 reading" because of the dearth of research in this area.

With regard to instructor's perceptions of CALL and L2 reading, they all agreed that the use of technology would allow class time to be used in more collaborative ways where text analysis is central to discussion instead of plot deconstruction. Students may come to class better prepared after individually answering comprehension questions and receiving immediate feedback. Currently in most advanced language courses, students typically read authentic texts silently at home and then answer a series of comprehension questions. The next day class time is spent correcting and talking about answers. The instructors' perspective repeats Martinez-Lage's (1997) claim that technology can help both students and instructors in the L2 reading process as it makes students better prepared and class time can be spent with literary theory and analysis. Martinez-Lage gives a very detailed description of ways to use an authoring system to develop annotations and word glosses that students may use during the reading process. The use of word-glossing and annotations in CALL is an area

that has been researched heavily, and computerized reading with glosses may enhance deep levels of text comprehension (Lomicka, 1998).

An overriding issue about the use of CALL was the time commitment needed to create and use materials. Reservations about time pressures were expressed by instructors in prior investigations (Lam, 2000; Levy, 1997). In follow-up interviews with 2 different participants in the present study they indicated that some of the authorware packages were not easy to learn and use (i.e. Macromedia Flash) and that the authorware they learned to use for the class (HotPotatoes, produced by Half-Baked Software, Inc.,) was user-friendly but that it did not comply with current SLA theories and research as there was no room for student creativity. Winke & MacGregor (2001) offer a thorough review of HotPotatoes authorware, and they too note that it can "more easily be used to create form-focused activities in which the interaction is limited to interaction between the user and the pre-scripted feedback provided by the creator of the activity" (p. 30). The instructors in the present study expressed that they were afraid of spending too much time on creating CALL materials because if the system failed, then the students may give them poor teaching evaluations. Along this vein, they thought using technology may be a big risk with regard to their time as well as their teaching successes.

Instructors may profit from training that is designed to teach them theories and research on L2 reading so that they can make informed decisions about the integration of technology in the curriculum.[2] Chappelle (1998) developed a guide with design features and evaluation criteria for multimedia CALL that addresses idea conditions for SLA, and this guide can be easily adapted to CALL and L2 reading. Chun & Plass (1997) provide a

thorough review of text comprehension in multimedia environments, and they include

practical guidelines about effective multimedia instruction in L2 reading.

Limitation of the Present Study

From a methodological point of view, it should be held in mind that that the

participant sample in the present study did not include and compare instructors who were not

informed about theories and research on L2 reading and CALL. A future study may include

a sample population of instructors who are not enrolled in the seminar.

Conclusion

There is no overriding empirical evidence to support the statement that university

level instructors do not feel adequately prepared for the challenge of using CALL, however,

this assertion can be based on the fact that CALL is not a consistent part of the L2 curriculum

at the university level. This article demonstrates that the advent of CALL into the L2 reading

process changes the environment in which instruction takes place, and that CALL can be an

exciting way in which to create theoretically-rich L2 reading pedagogy. As new directions

and opportunities emerge with CALL and L2 reading instruction, instructors are faced with

the challenge of making significant decisions. The present study explores the perceptions of

informed university level L2 instructors and reveals that they utilize theoretical knowledge to

make decisions about the inclusion or exclusion of computer-based L2 reading activities.

Furthermore, informed instructor's formulate positive attitudes toward the integration of

technology in the L2 reading process. Not long ago Kamil & Lane (1998) stated that issues

involved in technology and literacy need to become part of mainstream L1 literacy research.

The need to examine literacy "through the lens of technology" is an area that deserves much

attention in L2 reading as well, especially given the enthusiastic support of informed

instructors.

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[1] Go to the following website to view the course syllabus: http://artsci.wustl.edu/~cbrantme/CBwebsite. The syllabus was designed after consultation with Dr. X who teaches a similar course at the University of Texas at Austin.

[2] The University X offers a bi-annual symposium for professors and graduate students across disciplines where a collection of resources around the topic of teaching with technology is offered.