Incorporating interactive multimedia in an ESL classroom environment: Learners' interactions and learning strategies

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Incorporating interactive multimedia in an ESL classroom environment: Learners' interactions and learning strategies

Park, Yuh Soon Yun, Ph.D.

Iowa State University, 1994
Incorporating interactive multimedia in an ESL classroom environment: Learners' interactions and learning strategies

by

Yuh Soon Yun Park

A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of the Requirements for the Degree of DOCTOR OF PHILOSOPHY

Department: Curriculum and Instruction
Major: Education (Curriculum and Instructional Technology)

Approved:

Signature was redacted for privacy.

In Charge of Major Work

Signature was redacted for privacy.

For the Major Department

Signature was redacted for privacy.

For the Graduate College

Iowa State University
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1994
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INTRODUCTION

In the early to mid '80s, the use of the microcomputer became prevalent in schools and homes. Educators embraced the use of new technology such as the microcomputer and other forms of multimedia. The rapid technological innovations enabled educators to integrate computers with other types of media such as graphics, animation, audio and video. But even before the integration of multimedia, people pursued technological innovations to attempt to link information in nonlinear ways, which Nelson (1965) called "hypertext." The idea of hypertext and integration of multimedia were combined and became hypermedia, often more preferably called interactive multimedia, since it allows human interactions. This is the current stream in the world of educational computing.

Interactive multimedia excited many teachers and researchers because the integration of multimedia formats brought a motivating and authentic learning environment into the classroom. This notion of interactive multimedia excited teachers and researchers since it allowed students to navigate in a rich and large information space so that students could have the freedom to create their own independent and meaningful learning environment.

In ESL (English as a Second Language), for example, an interactive multimedia program, ELLIS (English Language Learning & Instruction System), provides role-playing scenarios students can watch, listen to, interact with and learn from in a large database beginning with a dialogue. Students can stop the dialogue and repeat it as many times as they want at any time, record their speech as part of the dialogue and play it back, and explore linguistic items such
as vocabulary, phrases, grammar, cultural background and pronunciation in each dialogue.

When we look at the other side of the freedom of navigation in this environment, we realize that it requires a high degree of responsibility or learner control in order to realize the learner's own independent and meaningful learning. Many researchers (e.g., Marchionini, 1988; Heller, 1990) emphasized the importance of learner responsibility and indicated some disadvantages of interactive multimedia. For example the learners might get lost in the huge and sophisticated space or might get distracted, not knowing on what to focus.

If an ESL teacher sends students to the computer lab to use an interactive multimedia program recommending that they can enjoy their learning, explore linguistic knowledge, and improve language skills in their own way, would the students really enjoy it and develop independent learning? Perhaps not! From a pedagogical perspective, we need to seek ways to link freedom and responsibility so that students can enjoy the freedom and take the responsibility.

In contrast to a large number of claims about the benefits of interactive multimedia, a small amount of research has supported such hopes. In addition to the paucity of current research about interactive multimedia, the results of such research have not identified or explained sufficiently the benefits of interactive multimedia. For example, there have been claims that the learners can have the freedom of navigation in an interactive multimedia environment, but little is known about how students actually navigate.

Many CALL (Computer Assisted Language Learning) researchers (e.g., Chapelle & Jamieson, 1991; Dunkel, 1991) have emphasized the importance of characterizing the interactions that occur between the computer and learner to
understand what and how particular students learn using CALL materials. Chapelle and Jamieson (1991) indicated that CALL activities must be described in terms of what students actually do, rather than what they can do, while they are working to answer questions about "whether, to what extent, under what circumstances, and with what results students - with what characteristics - actually do the things the technology makes possible" (Dunkel, 1991, p. xiv).

On the other hand, many researchers (e.g., Levine, 1990; Papert, 1987; Sheingold, et al., 1983) have also emphasized the importance of viewing the technology use in a whole context. Papert (1987) strongly argued that we have to center our attention on the culture and context of learning because "the context for human development is always a culture, never an isolated technology. In the presence of computers, cultures might change and with them people's ways of learning and thinking" (p. 23). In order to "understand any technological innovation [such as] the implementation and instructional use of microcomputers" it must be understood as a part in the whole context of "a complex system of social, political, and cultural values, priorities, and relations" (Levine, 1990, p. 462) because "the effects of microcomputers on education depend on the social and educational contexts within which they are embedded" (Sheingold et al., 1983, p. 431).

In this study, I focused on two senses which I believe are important to help create understanding and meaningful interpretation of how interactive multimedia can best be used. First, I focused on the use of interactive multimedia in a whole context to understand and interpret the effect of all the interacting variables surrounding the technology use. Second, I examined the process of interactions between the computer, for example, an interactive
multimedia program, and the students, who were characterized and described in terms of "what students actually do" (Chapelle & Jamieson, 1991, p. 52) in order to understand what and how particular students learn using computers. Thus, the actual students' interactions in a certain setting could be interpreted in a whole context, which, in turn, provides implications on how we can connect individual learning and classroom learning.

Specifically, in this study, I investigated how an ESL class incorporated an interactive multimedia environment into their traditional setting in terms of how an instructor accommodated to a new environment and how the students in that setting reacted to a new environment. From this big picture, I then narrowed down the question to investigate the interactional processes between an interactive multimedia language program, ELLIS, and the students in terms of the learning strategies the students used in the interactions. When I discussed the students' interactions, I focused on the students' interactional processes in relation to the whole context of the classroom culture in this environment, thereby providing insight into the role of interactive multimedia in an ESL classroom.

Theoretical Background

In this section, I will review the background and the theoretical frameworks for this study. Specifically, I will discuss interactive multimedia, interactive multimedia in ESL, theoretical frameworks for ESL interactive multimedia: interactional modifications and learning strategies, and a qualitative approach to research in CALL. First, I will review interactive
multimedia as a background for this study. Second, I will review how interactive multimedia is realized in second language learning. Third, I will present interactional modifications and learning strategies in ESL based on the need to employ appropriate frameworks to investigate interactive multimedia in terms of interactions and learner control, respectively. Lastly, I will review the importance of the qualitative approach to research in CALL.

Interactive multimedia

The term "hypermedia" originated from "hypertext," which was coined by Theodor Nelson (1965), who attempted to organize and link texts in a nonlinear way, just as humans absorb information. The idea of hypertext was combined with the use of multimedia such as graphics, animation, sound or video, and called hypermedia. The key features of hypermedia include nonlinearity and multimedia formats.

Many researchers (Jonassen & Grabinger, 1990; Marchionini, 1988; Tomek & Maurer, 1991) have recognized the essential characteristics of hypermedia as nodes, links and paths. Nodes are the basic units of information (Jonassen & Grabinger, 1990; Marchionini, 1988; Tomek & Maurer, 1991) and links are "the interconnections between the nodes" (Jonassen & Grabinger, 1990, p.6). Paths are "guided tours through a universe of information" (Tomek & Maurer, 1991, p.322).

Since the linked nodes allow users/learners to have nonlinear or random access to information, the users/learners can have various paths depending on either their decisions or possible navigation paths provided in the environment. This freedom of navigation was recognized by many researchers (Duffy & Knuth,
Interactive multimedia in second language learning

In ESL, interactive multimedia has been advocated by many more researchers and teachers than in any other disciplines. It was believed that the integration of multimedia, such as video, animation, graphics, sound with text, and its node and link structure brought a new dimension of language learning and teaching.

According to Coughlin (1989), one of the unique benefits of interactive multimedia for language learning is a large database with a variety of optional choices to access related information, oral and written feedback, control (stop, skip, back-up) of the audio-visual sequence, repetition of audio-visual passage at normal or slower speed, and authentic language of native speakers. The other
The distinctive benefit of interactive multimedia is to allow the learners to study language in a more comprehensive intercultural format, affording the opportunity to be confronted by cultural situations in which they make decisions on the use of language, the appropriate use of body language, and cultural interpretations of the situation presented (Gay & Mazur, 1989).

As in interactive multimedia in any discipline, it is also recognized that the unique benefits of interactive multimedia for language learning and teaching cannot be realized without the interactions by the learners.

**ELLIS**

Clearly, an appropriate ESL interactive multimedia program was needed to carry out this study. In this section, I will describe the distinctive characteristics and features of an interactive multimedia language program, ELLIS, that I used for this study.

The educational goals of ELLIS include individualizing and personalizing instruction, simulating experience not otherwise available, enabling students to work at their own pace, and gearing instruction to the mastery model, which included many language tasks and practices to check students' performances. ELLIS also can be used as a material for ESL classroom learning in which the teacher can be a facilitator to help, monitor and suggest for individual student's language learning.

ELLIS employs multimedia capabilities using videodisc and CD-ROM to present students with role-playing scenarios they can watch, listen to, interact with and learn from. Students can stop the action to review translation, vocabulary and pronunciation, and they can play back their speech as part of the
dialogues. It is intended primarily for young adults and adults who have had academic experiences and are literate in using conventional text materials. It requires very little computer literacy.

It consists of 12 conversations categorized as academic/non-academic survival skills, academic/non-academic communication skills, and long/short term financial management. The main activity menu is the first screen through which most ELLIS activities are accessible, and has six options: Conversations, Conversations with Choices, Practices, Games, Skills Check and Your Performance Status. After a learner chooses a lesson, the learner views a video segment, and then a script page appears. The learner can click on any line of the video script to play the video and audio of that line alone. Also, the learner can play a more enunciated, slower version of the selected line by clicking on the Slower Audio. The learner also can attempt to pronounce the line using the Record Voice.

In addition to the script, ELLIS provides many options to explore such as vocabulary, grammar, video, or phrases. When the learner clicks on the Vocabulary, Grammar, Phrases, or Culture, the words are highlighted and the system displays a definition and example. When the learner works on the Grammar, the Grammar Guide button appears. The Grammar Guide has 12 major grammar lessons taught in ELLIS. Each of the grammar lessons has easy, medium, and difficult levels. Students can scroll through the guide to access in-depth information about a particular grammar rule. The learner can also hear some of the example sentences by clicking the Hear button or viewing a sentence or segment from the video that demonstrates the grammar rule by clicking the View button. Clicking on the Video brings up a menu that asks the learner
how the video should be shown. The learner can watch video segments with the Script running below, the Keywords (verbs, adjectives, nouns, adverbs), the Without Words (no script), or in a Role Play format. When the learner clicks the Role Play, icons representing the characters from the current scene are displayed. The learner can click one of these icons to specify the character s/he wants to role play. The learner then watches the video and is prompted to speak when the specified character has a line. The learner can review the native speaker's voice, and record her or his own voice.

After going through all of the activities in the script page, the learner can access the Practice section of ELLIS. This section provides three activities: Practice Items, Pronunciation, and Minimal Pairs. From the Practice Items menu, the learner can choose from questions covering Vocabulary, Culture, Grammar, and Listening Comprehension on easy, medium or difficult levels. The Pronunciation menu provides male and female video profile models, as well as animated diagrams showing points of articulation available for each sound. Six words that exemplify the selected sound appear below the video window. Using the Record Voice, the learner can record her or his voice pronouncing a sound or a word. The learner can then compare that recording to that of a native speaker. The Minimal Pairs provides two words that have similar spelling (such as "pond" and "pound") or similar pronunciation (such as "boat" and "vote"). The Minimal Pairs are presented on the Which Do You Hear screen. The learner sees two words, but only hears one. ELLIS then prompts the learner to indicate which sound was played. The learner can record her or his voice, pronouncing each word for comparison.
The Games, Skills Check and Your Performance Status were not used for this study. (The screens of some features of the program are provided in Appendix A)

Interactional modifications

As shown in ELLIS, the ESL interactive multimedia program provides a number of interactional modifications, such as repetition of the dialogue, description of vocabulary, phrase or cultural background, explanation of grammar points, and confirmation of understanding by hearing or viewing again, for which the students can choose and control the degree of use.

The role of interactional modifications has been recognized by many researchers in second language acquisition (Larsen-Freeman & Long, 1991; Long, 1983; Long, in press). Long (1983) described the relationship between negotiated interactions, comprehensible input and language acquisition, emphasizing that the comprehensible input is enhanced by the negotiated modifications; then the enhanced comprehensible input promotes language acquisition.

The interactional modifications have been identified in a number of studies (Giaies, 1981; Long, 1980, 1981, 1983) in FTD (Foreigner Talk Discourse) between NS (Native Speakers) and NNS (Non-Native Speakers). The types of interactional modifications identified in FTD include self-and other-repetitions, expansions, confirmation checks, clarification requests and comprehension checks (Ellis, 1986).

As NS and NNS have interactional modifications in FTD, ESL learners can have interactional modifications in an ESL interactive multimedia program which provides many different types of modifications. However, there is a need
to develop specific types of interactional modifications, depending on the nature and the function of the ESL interactive multimedia program.

**Learning strategies and metacognition**

The learner control in interactive multimedia is realized as the decisions the learners make in the process of interacting with the interactive multimedia. When the learners make decisions for the interactions, they use learning strategies.

In ESL, learning strategies have been emphasized from the early '70s since there was a shift of focus from the methods of teaching to learners themselves their characteristics, styles, and strategies (Bialystok, 1979; O'Malley, Russo & Chamot, 1983; O'Malley et al., 1985; Wenden & Rubin, 1987). Acknowledging the importance of learning strategies, there have been attempts to identify the types of learning strategies and focus on what strategies are used by good language learners. After conducting four studies which attempted to identify and define strategies used in second language acquisition, Chamot and her colleagues (1988) developed a taxonomy of learning strategies in three categories: metacognitive, cognitive, and social and affective.

Metacognitive strategies involve thinking about the learning process, planning for learning, monitoring the learning task, and evaluating how well one has learned. Cognitive strategies involve interacting with the material to be learned, manipulating the material mentally or physically, or applying a specific technique to a learning task. Social and affective strategies involve interacting with another person to assist learning or using affective control to assist a learning task.
Among those strategies, the importance of metacognitive strategies have been emphasized by many researchers (Brown et al., 1982, 1983; Flavell, 1976; Gordon & Braun, 1985; O'Malley & Chamot, 1990) since metacognitive strategies help learners to review their progress, accomplishments, and future learning directions (Brown et al., 1983). Metacognitive strategies, especially, should be emphasized in an interactive multimedia environment since it requires learners to control their interactions by planning, monitoring and checking where they have been, where they are, where they can go, and what they can learn. Thus, there is a strong need to identify and develop learning strategies in an interactive multimedia environment depending on the nature and function of the program, and investigate how those strategies are used in this environment.

**Qualitative approach in CALL**

The qualitative research method has been advocated in many disciplines when the research questions ask "how" and "why," focusing on the "process," rather than "what" and "how many," focusing on "outcomes" or "products" (Bogdan & Biklen, 1982; Merriam, 1988; Yin, 1984). The key principles of qualitative research are holistic, process-oriented, and emic (Bogdan & Biklen, 1982; Chapelle, Jamieson & Park, in press; Marshall & Rossman, 1989; Merriam, 1988; Patton, 1990; Spindler & Spindler, 1987; Whitt, 1991). The holistic perspective can describe and explain any aspect of culture or interactional behaviors in relation to the whole system of which it is a part (Heath, 1982; Hymes, 1981; Erickson, 1981; Mehan, 1979; Patton, 1990). A process-oriented perspective can reveal why and how the phenomena occur rather than document only what occurred (Chapelle, Jamieson & Park, in press; Chaudron,

In order to understand the various impacts of the computer in second language contexts, the need for qualitative approaches in CALL has been emphasized. Qualitative research could play an important role addressing the complex issues surrounding computer use in L2 (Second Language) classrooms. On the other hand, many researchers have also suggested the need to combine qualitative approaches with other research methods to gain a broader perspective of L2 classrooms and CALL contexts. (Dunkel, 1991; Erickson, 1981; Larsen-Freeman & Long, 1991; Long, 1980; Markee, 1994; Van Lier, 1988). Chapelle & Jamieson (1991) strongly argued that in order to answer the question of "what relevance the findings concerning the influences of variables of one study have for other instructional contexts" (p. 49), the research report should describe the classroom context and the factors of the research settings, as clearly as possible. A CALL research report should describe (1) "the elements of the target language context, (2) the characteristics of the subjects, and (3) the CALL materials used" (Chapelle & Jamieson, 1991, p. 49). Thus, it can bring a deeper and richer understanding of the findings, which can contribute to the development and use of CALL materials.

Statement of Problems

As the application of technology to learning develops, interactive multimedia permits language learners to involve real language use in meaningful situations with a high level of interactivity and learner control.
Although the development and claims of the benefits of interactive multimedia have been rich, research which supports such development and claims has been sparse. In addition to the paucity of current research about interactive multimedia, the results of such research have not identified or explained sufficiently the benefits of interactive multimedia.

Many CALL researchers (e.g., Chapelle & Jamieson, 1989; Dunkel, 1991) realized that the traditional experimental comparison studies cannot give us a meaningful interpretation of how CALL can be used most effectively in the complicated language learning/teaching process. Thus, it has prompted many researchers to investigate whether interactive multimedia environments lead to successful language learning/teaching, and if so, why and how. In order to investigate those matters, understanding of the whole context in which the interacting variables surrounding technology use are interwoven, and understanding of the actual interactions students have while they are working with the program are strongly emphasized. There have been a few CALL studies which consider the importance of the actual interactions describing different working styles (Jamieson & Chapelle, 1987), different learning strategies (Chapelle & Mizuno, 1989; Hsu, Chapelle & Thompson, 1993), or student-student interaction during use (Abraham & Liou, 1991; Bueno & Nelson, 1993; Piper, 1986).

There is no strong research in interactive multimedia for language learning/teaching which investigates how a new environment is adopted to traditional settings in a whole context, and what and how students are doing in a rich navigation-free environment so that we can make connections between students' learning and the surrounding learning environment such as the
teacher, classroom or school. What we need, then, is further research which investigates those matters, so that the results of the study can provide a meaningful and powerful guide to researchers, teachers and designers to fully realize the real power of interactive multimedia for language learning/teaching.

Purpose of the Study

The overall purpose of this study is to investigate the role of interactive multimedia in classroom learning/teaching and individual learning, and to discuss whether the classroom learning and individual learning using an interactive multimedia program could be connected so that the teacher could facilitate students' independent and responsible learning.

I conducted this study to investigate how an ESL class incorporated an interactive multimedia environment into its language learning/teaching and how the students interacted with an interactive multimedia program using different interactional modification patterns and different learning strategies.

Research Questions

For this study, I began with two guiding questions as follows:
1. How is interactive multimedia incorporated into an ESL learning environment?
2. How do students use an interactive multimedia program?
Since I employed a qualitative approach for this study, I did not begin with a priori hypotheses, but I developed the following more specific questions throughout the research process from the emerging data:

1. What are the teacher and students' perceptions of an interactive multimedia environment?
2. What are the roles of the teacher in an interactive multimedia environment?
3. How do the students interact in an interactive multimedia environment?
4. To what extent do the students show interactional patterns to have nonlinear navigation in an interactive multimedia environment?
5. What learning strategies do students use and to what extent do these learning strategies enhance in-depth and independent learning in an interactive multimedia environment?

I could then focus on the connection of the classroom learning and individual learning. After focusing on this, I could develop a final question on the role of the teacher and the students, and their relationships in this environment:

6. What is the relationship between classroom learning and individual learning in terms of the freedom and responsibility provided in an interactive multimedia environment?

Overview of the Contents

In this study, I began with the Introduction, addressing the problems and the need for ESL interactive multimedia research as well as the theoretical background and research questions that I wanted to investigate. Second, I will
further review the literature relevant to interactive multimedia, interactive multimedia in ESL, interactional modifications and learning strategies as theoretical frameworks for ESL interactive multimedia, and a qualitative approach in CALL research. Third, I will present a case study of an ESL class using an interactive multimedia program to address the research question "How is interactive multimedia incorporated into an ESL learning environment?" I will also include the research process, data collection and analysis as well as the case report. Fourth, I will present a think-aloud/retrospective protocol of five selected ESL learners to address the research question "How do students use an interactive multimedia program?" I will include the research process, data collection and analysis as well as the report of five respondent cases. Finally, I will summarize my understanding and interpretation throughout this research process. I will provide the implications and recommendations for future study and ESL learning/teaching using technology from the pedagogical perspective.
LITERATURE REVIEW

Introduction

The purpose of this research was to investigate how an ESL class incorporated an interactive multimedia environment into its language learning/teaching and how the students interacted with an interactive multimedia program employing different interactional modifications and different learning strategies. I will review the theoretical frameworks for this study and the relevant research.

First, I will review interactive multimedia as a background theory for this study. Second, I will review how interactive multimedia is realized in second language learning. Third, I will present interactional modifications and learning strategies in ESL based on the need to employ appropriate frameworks to investigate interactive multimedia in terms of interactions and learner control, respectively. Fourth, I will review the problems of CALL research and the importance of a qualitative approach to research in CALL. Lastly, I will present the summary.

Interactive Multimedia

Hypermedia is a term coined from two words: "hyper," which means "nonlinear or random" and "media," which refers to "information represented in many formats (Thompson, Simonson & Hargrave, 1991, p. 57). Hypermedia is defined in many ways (Dede, 1987; Halasaz & Conklin, 1989; Jonassen &
Traditionally, people have a linear and sequential way of getting information since people put their ideas in written texts. However, many scholars and writers seek the way to get information nonlinearly as humans absorb information. The prefix "hyper" stems from "hypertext," which can be defined as "the use of computer to transcend the linear, bounded and fixed qualities of the traditional written text" (Landow & Delany, 1991). The term "hypertext" was coined by Theodor Nelson in 1965, but long before the idea of hypertext was first formulated by Bush in 1945 in his fictional environment Memex as "mechanically linked information-retrieval machines to help scholars and decision makers in the midst of an explosion of information" (Landow & Delany, 1991, p. 4) although he didn't anticipate the use of computers. Then, in the 1960's, Nelson and Engelbart began to realize Bush's idea as a computer system which implemented the notions of linked texts (Landow & Delany, 1991). Hypertext allowed a new way of reading and interacting with text by extensive cross referencing to the related information. The term "hypermedia" was justified by the MIT project in 1978, which used hypertext principles with information based on digitized photographs (Tomek & Maurer, 1991). In the 1980s, as more and more media such as graphics, animation, sound or video combined with the primarily linked text, "hypermedia" became a general term and we saw more of commercial products such as Notecards, Intermedia, Linkway and Hypercard.

Among many characteristics of hypermedia, nodes, links and paths are the most common and essential ones (Jonassen & Grabinger, 1990; Marchionini,
Nodes are the basic units of information and can be in the form of texts, paragraphs, digitized sounds, graphics, animation, stills or motion video (Jonassen & Grabinger, 1990; Marchionini, 1988; Tomek & Maurer, 1991). Links are "the interconnections between the nodes" (Jonassen & Grabinger, 1990, p.6), often realized as one-to-many or many-to-many links in computer-navigable systems (Tomek & Maurer, 1991, p. 322). Paths are "guided tours through a universe of information" (Tomek & Maurer, 1991) but can be "determined by the author, the user/learner, or by shared responsibility" (Jonassen & Grabinger, 1990, p. 7). Authors can predetermine the paths as guided tours but users or learners can create their own paths.

The notions of linked nodes allow users/learners to have nonlinear or random access to information. The users/learners can have various paths depending on either their decisions or possible navigation paths provided in the environment. Many researchers (Duffy & Knuth, 1990; Fischer & Mandl, 1990; Gay & Mazur, 1989; Hannafin, 1984; Jonassen & Grabinger, 1990; Marchionini, 1988; Milhelm & Azbell, 1988) recognized the importance of interactions and learner control in this environment; the nature of which allows users/learners to have a high level of interactivity to access information and to demand a high degree of user/learner control for the interactions. Interactivity can be increased if there are more of the following ingredients: immediacy of response, non-sequential access of information, adaptability, feedback, options, bi-directional communication, and interruptability (Borsook, 1988). It is not an exaggeration to say that the most important aspect of hypermedia is interactivity because hypermedia per se is "idealistic entities" but "they come into existence only if the users perceive them; they exist through the users' interpretative acts"
Thus, there are many researchers and practitioners who prefer to use the term "interactive multimedia" to "hypermedia" since the human involvement is clearly central to its use. I will use the term interactive multimedia in this paper from now on.

The interactive multimedia systems allow huge amounts of materials in a variety of formats to be stored in extremely compact form and accessed easily and rapidly, thus providing a breadth and depth of information seeking (Marchionini, 1988; Marchionini, 1990). The high level of incorporation with multimedia presentations brings a virtual reality which can enhance problem solving and simulated activities. The nature of interactive multimedia may bring a great many advantages for education, identified as one type of "cognition enhancer" (p. 195) by the educational technology futurist Dede (1987). Dede (1987) envisioned the relationship between the computer and the human as a partnership in which the complementary cognitive strengths of a person and an information technology can be used as partners so that they can "empower" human knowledge. In this environment, the learners can experience facilitative, integrated discovery learning through the dynamic interactions. The students can be self-directed learners who take the initiative for learning, changing the role of the teacher and the students in the classroom.

The nature of dynamic interactions which the interactive multimedia environment allows focused attention of teachers and researchers on the need for developing interactional skills. The learners need to develop their learning strategies for accessing and navigating information, integrating information, and restructuring knowledge, then transferring knowledge to possible situations (Jonassen & Grabinger, 1990).
However, there are some disadvantages such as disorientation or distraction that many researchers and designers (e.g., Marchionini, 1988, Heller, 1990) worry about. Disorientation has been noted as a phenomenon, in which users get lost in hyperspace due to the quantity, scope and arrangement of information (Marchionini, 1988; Heller, 1990). Distraction has been noted as another phenomenon, in which users lose track of where they have been due to the high level of learner control and freedom to learn in this environment (Marchionini, 1988). Although the interactive multimedia offers a rich and free learning environment, the learners may focus on information which is not the central goal of learning and task, and can be confused due to the high demand of self decision-making in a rich but too large and confusing environment (Marchionini, 1988, Thompson, Simonson & Hargrave, 1991). Thus, a rich hyperspace can be "hyperchaos" (Marchionini, 1988, p. 184).

These phenomena brought more attention on learner control and prompted researchers and teachers to realize that knowledge is linked to negotiated meaning and the negotiated meanings are on the level of learners reconsidering many issues such as more meaningful and effective learning, and the ways that can help the learners become dynamic and organized learners in this environment (Goldman-Segall, 1992). Can visiting or browsing be a meaningful and integrated learning in the sense that the learners take a full range of freedom and responsibility of learner control in this environment? In order to help the learners realize "Where am I? How did I get here? What can I do here? Where can I go to? How do I get there?" (Barbara Allen's five ET(H)IC commandments, cited in Fischer & Mandl, 1990), the need for organizational help such as a concept map, comprehensive index or navigational and
conceptual tools was emphasized (Heller, 1990; Marchionini, 1988; Morariu, 1988). These tools can help the learners monitor their interactions in this environment to develop their metacognitive strategies.

Learner control can be defined as "the degree to which a learner can direct his or her own learning process" (Milhelm & Azbell, 1988, p. 461). Hannafin (1984) described two types of control, external (program) control and internal (learner) control. External control is taken when "learners follow a predetermined path established by the designers" and internal control is taken when the "learners control the path, pace, and/or contingencies of instruction" (Milhelm & Azbell, 1988, p. 462). In addition to the issue of the locus of control, controlling the sequence and the pace of learning, and choosing the amount of materials the learners wish to learn are important issues in the research of learner control in an interactive multimedia environment (Milhelm & Azbell, 1988).

Although specific types of interactivity in a multimedia environment have been investigated by many researchers (e.g., Schaffer & Hannafin, 1986; Lee, 1989), no comprehensive theory specific to effective interactivity has emerged yet (Cronin & Cronin, 1992). Thus, the unique advantage of interactive multimedia providing more learner control and adaptability to learning style has not yet been identified (Cronin & Cronin, 1992).

Interactive Multimedia in Second Language Learning

Interactive multimedia has been applied to many different disciplines including ESL. CALL has evolved over a period of time through realizing the
"computer's potential for linguistic purposes and of the ways in which the computer has combined with other resources to create a viable learning environment" (Ahmad, 1985, p. 27). In the 1960s, the early development work in CALL began involving the use of mainframe terminals such as PLATO at the University of Illinois. In the early 1980s, the use of microcomputers for schools and individuals became prevalent and many CALL programs were produced by commercial programmers or teachers and used by learners for their own purposes. Generally, each CALL program has a different style to deal with different language skills. Many researchers have tried to classify different types of CALL programs with different standards.

Among many different types of classification, Kenning and Kenning (1990) focused on the communicative function of a language and identified three types of computer activities: pre-communicative activities, communicative activities and other types of activities. Pre-communicative activities are drill, vocabulary practice, text reconstruction and concordance packages. Drill type activities usually focus on automation of substitution and transformation for grammar or vocabulary practice. Communicative activities are simulating conversation, adventure games and problem solving. Simulation type software such as "Eliza," adventure game type software such as "Zork," "Spion," "The Dark Castle," and problem solving type software such as "Mugger" provide learners with the opportunity for problem solving and decision making within a simulated environment. However, the interactions in these communicative activity type software were in written forms and more receptive than productive with learners, mostly answering the questions given by the computer (Kenning & Kenning, 1990). Other types of activities are using tool application such as
word processing or database. The use of word processing for writing has shifted
the focus from product to process of writing.

Underwood (1989) pointed out the problems of CALL activities in two
ways. First, language tended to be chopped into bite-sized chunks for easy
digestion and then presented in a mostly "wrong-try-again" fashion. Second,
CALL, like CAI (Computer Assisted Instruction) of the time, tended to treat the
computer as a one-way system, a purveyor of information, a drillmaster, a tutor
telling students what they should know rather than encouraging them to
discover things for themselves.

Interactive multimedia is distinguished from CALL software by its
integrated use of multimedia such as video, animation, graphics, sound with
text, and its node and link structure. The audio-video capabilities with linked
texts excited many researchers and teachers and were believed to open a new
dimension for language learning.

A passage in a piece of literature, Joyce’s *Ulysses*, for example, can be
linked to three or four notes on different points of explication, to a parallel
passage elsewhere in the novel or to a visual image (Landow & Delany, 1991). In
this structure, each passage can be a node to be linked bi-directionally to any
other node or a cluster of supplementary files, where consideration of a
particular phrase typically sets off a chain of connections through a space made
up of both the text of the novel and a large body of commentary (Landow &

Coughlin (1989) included the unique benefits of interactive multimedia
for language learning as a large database with a variety of optional choices to
access related information, oral and written feedback, control (stop, skip, back-up)
of the audio-visual sequence, repetition of audio-visual passage at normal or slower speed, and authentic language of native speakers. Interactive multimedia allows the learners to study language in a more comprehensive intercultural format, affording the opportunity to be confronted by cultural situations in which they make decisions on the use of language, the appropriate use of body language, and cultural interpretations of the situation presented (Gay & Mazur, 1989). According to Underwood (1988), culturally authentic images are more strongly associated with language learning than words as well as being motivating, and make linguistic input more comprehensible.

Jamieson (1994) summarized the contributions of interactive multimedia to language learning as improving the authenticity and contextualization of CALL materials. Jamieson (1994) also described the development made by interactive multimedia in terms of language focus, as language in context, culture, and listening comprehension.

As Bösser (1992) described, the representations of the domain of language learning and knowledge are usually of two types: a dynamic model of reality or a simulator, and a large linked and structured database. "A La Rencontre de Philippe," a French videodisc program developed by the MIT Athena Project, provides a simulated environment in Paris. Users need to locate an apartment for the main character through newspaper ads, telephone messages, and help from friends. The program provides numerous comprehensible tools such as video and text review, context-sensitive help, full and partial French subtitles, an electronic glossary, and a second (clearer) French audio soundtrack (Watkins, 1992). "No Recuerdo," a Spanish videodisc program also developed by the MIT Athena Project, was designed as an interactive adventure game. The student
becomes involved in a political intrigue in Colombia and has to interview an amnesiac scientist. Conversations are conducted by typing in Spanish sentences, and responses are in the form of video segments or still frames with audio or text superimposed (Underwood, 1989). "ELLIS," an ESL videodisc/CD-ROM program, provides role-playing scenarios which students can watch, listen to, interact with and learn from in a large database beginning with a dialogue. Students can stop the action to play back their speech as part of the dialogues and explore vocabulary, phrases, grammar, cultural background and pronunciation in each dialogue.

Although the positive capabilities of these interactive multimedia programs seem obvious, they will not be realized unless the learners use and interact with these capabilities in a full range. As in interactive multimedia research, the extent of interactions, the degree of learner control, and the adaptability of learning strategies are left as questions to be identified and interpreted meaningfully. In order to identify and interpret these variables, there is a strong need to employ appropriate underlying principles and research methods, depending on the nature of the applied area, such as ESL.

Interactional Modifications

The ESL interactive multimedia program such as ELLIS provides options for students to produce interactional modifications such as repetition of the dialogue, description of vocabulary, phrase or cultural background, explanation of grammar points, confirmation of understanding by hearing or viewing again, and so on, which the students can choose and control the degree of use of. The
interactions students have with the interactive multimedia program can be described from an ESL viewpoint. The information and the functions provided by the ESL interactive multimedia program can be an input to ESL learners. The modifiable manipulation selected by the learners through the options provided in the ESL interactive multimedia program can be interactional modifications that the students can have control.

In order to investigate the interactions in ESL interactive multimedia, interactional modifications claimed by Long (1983) are considered as appropriate underlying principles. The role of interactional modifications in language acquisition is often emphasized because the role it plays in negotiation for meaning helps to make input comprehensible and is a better candidate having potential intake for acquisition than comprehensible input (Larsen-Freeman & Long, 1991).

Long (in press) proposed the interaction hypothesis that "negotiation for meaning and negotiation work that triggers interactional adjustments by the NS (Native Speakers) or more competent interlocutor facilitates acquisition because it connects input, internal learner capacities, particularly selective attention, and output in productive ways" (p. 37). The interactional adjustments are often realized as input modifications in second language comprehension. The role of interactional modification is described by Larsen-Freeman and Long (1991) as follows:

Modification of the interactional structure of conversation or of written discourse during reading . . . is a better candidate for a necessary (not sufficient) condition for acquisition. The role it plays in negotiation for meaning helps to make input comprehensible while still containing unknown linguistic elements, and, hence, potential intake for acquisition. (p. 144)
Larson-Freeman and Long (1991) also argued that learners should not be viewed as passive recipients of input made comprehensible for them by others, focusing more on the role of interactional modifications than on the role of comprehensible input claimed by Krashen.

Krashen (1985) emphasized the role of comprehensible input while he was claiming the input hypothesis, as follows:

humans acquire language in only one way - by understanding messages, or by receiving 'comprehensible input' . . . . We move from $i$, our current level, to $i+1$, the next level along the natural order, by understanding input containing $i+1$. (p.2)

Thus, Krashen (1982) believed that "comprehensible input is responsible for progress in language acquisition" (p. 61) defining that input is comprehensible when it is meaningful to and understood by the hearer.

Krashen (1985) supported his hypothesis with evidence of caretaker speech and FT (Foreigner Talk), and the silent period in child L1 (First Language) and SL (Second Language) acquisition, claiming that caretaker or NS speech in FT played a facilitating role and children in the silent period were listening to and comprehending prior to beginning to produce (Larsen-Freeman & Long, 1991).

Although Krashen supported his hypothesis with much evidence, it is hard to believe that all input is comprehensible and to know when it is comprehensible and when it is not (McLaughlin, 1987). Larsen-Freeman and Long (1991) used as an example of Ochs' (1982) study with Samoan mothers' simplified speech with their children as strong evidence of the importance of the modifications made in interactional structure, not the input per se.

It is emphasized that comprehensible input alone is insufficient, and that interactional adjustments and modifications make input comprehensible and
may take a more important role in language learning (Larsen-Freeman & Long, 1991; Long, in press). Long (1983) developed a model of the relationship of negotiated interactions, comprehensible input and language acquisition, emphasizing that the comprehensible input is enhanced by the negotiated modifications; then the enhanced comprehensible promotes language acquisition (see Figure 1).

![Diagram](image)

Figure 1. Model of the relationship between type of conversational task and language acquisition (Long, 1983, p. 24)
In FTD (Foreigner Talk Discourse), it was found that there was a difference between NS-NS and NS-NNS conversation, and native speakers and non-native speakers used various conversational adjustments to make the understanding easier (Long, 1983).

**NS-NS conversation**
- NS1 (Input): Do you like California?
- NS2 (Response): I love it.

**NS-NNS conversation**
- NS (Input): Do you like California?
- NNS (Response): Huh?
- NS (Input): Do you like Los Angeles?
- NNS (Response): Um.
- NS (Input): Do you like California?
- NNS (Response): Oh! Yeah I like.

Through the process of interactional modifications, the non-native speakers can negotiate meaning to enhance the input. The input is comprehended; then the comprehensible input becomes intake (Larsen-Freeman & Long, 1991; Long, in press).

The principal features of interactional modifications have been identified in a number of studies (Gaies, 1981; Long, 1980, 1981, 1983) which included self and other-repetitions, expansions, confirmation checks, clarification requests and comprehension checks. The detailed descriptions are shown in Figure 2.

The interactional modifications between NS and NNS can be applied to the relationship between the ESL interactive multimedia program and the students since the nature of the relationship is similar. The ESL interactive multimedia program provides a number of interactional modifications such as repetition of the dialogue, description of vocabulary, phrase or cultural background, explanation of grammar points, confirmation of understanding by
1. Confirmation checks
When the native speaker repeats part or whole of learner's immediately preceding utterance and employs a rising intonation or when the native speaker repeats the utterance and adds a question tag. They are designed to elicit confirmation that the utterance has been correctly heard or understood. An example is as follow:

NNS: I went to cinema.
NA: The cinema?

2. Comprehension checks
Attempts by the native speaker to establish that the learner is following what s/he is saying. Typical realizations are "Right?" "OK?" "Do you follow?" An example is as follow:

NS: It was raining cats and dogs. Do you follow?

3. Clarification requests
These differences from confirmation checks in that there is no presupposition that the native speaker has understood or heard the learner's previous utterance. They can take the form of questions (e.g., "Sorry?"), statements ("I can't hear."), or imperatives ("Say it again."). They are designed to get the learner to clarify an utterance which has not been heard or understood. An example is as follow:

NNS: She very high
NS: Sorry?

4. Self-repetition
When the native speaker repeats part or the whole of his preceding utterance and also when the teacher paraphrases part or whole of his/her preceding utterance. An example is as follow:

NS: He got stuck in the window trying to get in. He got stuck.

5. Other-repetitions
When the native speaker repeats (but doesn't paraphrase) part or the whole of the learner's preceding utterance without seeking confirmation. An example is as follow:

NNS: I went to cinema.
NS: Yeah. You went to cinema.

Figure 2. An example and description of interactional modifications in the foreigner talk (Ellis, 1986, p. 136)
6. Expansions
   When the native speaker expands a previous learner utterance whether by supplying missing
   formatives or by adding new semantic information. An example is as follow:
   
   NNS: I wear a sweater.
   NS: Yes, you're wearing a red sweater.

7. Here-and-now topics
   The native speaker refers to objects/events which are contiguous. An example is as follow:
   
   NS: What's that you are wearing?

8. Topic-initiating moves
   The native speaker starts a conversation topic by asking a question or making a comment.

Figure 2. (continued)

hearing or viewing again, and so on, which the students can choose and control
the degree of use of. However, there is a need to identify and investigate specific
types of interactional modifications depending on the nature and the function of
a program.

Learning Strategies and Metacognition

Learning strategies
   In order to investigate the learner control in interactive multimedia, there
is a need to focus on learning strategies that the learners use to make decisions.
In ESL, learning strategies have been emphasized since the early '70s when
"research concerns in second language teaching and learning shifted from the
methods of teaching to learner characteristics and their influence on the process
of acquiring a second language" (Wenden & Rubin, 1987, p. 3). Wong-Fillmore
(1985) emphasized the role of learning strategies in second language acquisition
in which learning strategies are the principal influence on the rate and level of SLA, whereas inherent developmental and experiential factors are primarily responsible for first language acquisition. Learning strategies have been defined in a number of different ways. Learning strategies are "mental steps or operations that learners use to learn a new language (information) and to regulate their efforts to do so" (Wenden, 1991, p.18). In other words, learning strategies are "specific actions taken by the learner to make learning easier, faster, more enjoyable, more self-directed, more effective, and more transferrable to a new situation" (Oxford, 1990, p.8). Wenden (1987) defined learning strategies in second language as "the language learning behaviors that learners actually engage in to learn and regulate the learning of a second language" (p. 6).

Many researchers claimed that learning strategies have considerable potential for enhancing language skills, are applicable to a variety of language tasks (Bialystok, 1979; O'Malley, Russo, & Chamot, 1983; O'Malley et al., 1985), and can be adapted to different language proficiencies of individual learners (Cohen and Aptek, 1980, 1981). However, it was acknowledged that there is little consensus in the literature on the definition or identification of learning strategies (Naiman, Frohlich, & Todesco, 1975; Bialystok, 1983). Many researchers have tried to identify the types of learning strategies and focus on what strategies are used by good language learners. Rubin (1981) identified strategies which contribute to successful language learning either directly, e.g., inductive inferencing, practice, memorization, or indirectly, e.g., creating practice opportunities, using production tricks. Naiman, Fröhlich and Todesco (1975) identified six strategies of good language learners: selecting language situations that allow one's preference to be used; actively being involved in language
learning; seeing language as both a rule system and a communication tool; extending and revising one's understanding of the language; learning to think in the language; and addressing the affective demands of language learning (cited in Oxford, 1989). Oxford (1990) synthesized the strategy system of good language learners into two broad groups: direct (memory, cognitive, and compensation strategies), and indirect (social, affective, and metacognitive strategies). The direct class is composed of memory strategies for remembering and retrieving new information, cognitive strategies for understanding and producing the language, and compensation strategies for using the language despite knowledge gaps. The indirect class is made up of metacognitive strategies for coordinating the learning process, affective strategies for regulating emotions, and social strategies for learning with others.

Chamot and her colleagues (1988) conducted four studies that attempted to define and classify strategies used in second language acquisition and identify these strategies with different types of learners and language tasks. After their longitudinal study (four semesters) of learning strategies used by foreign language students (Spanish and Russian) from three different levels (beginning, intermediate, and advanced levels) for different language tasks (vocabulary, reading, listening, speaking, etc.) using a think-aloud method, they developed a taxonomy of learning strategies in three categories: metacognitive, cognitive, and social and affective (see Figure 3). Metacognitive strategies involve thinking about the learning process, planning for learning, monitoring the learning task, and evaluating how well one has learned, and include planning, directed attention, selective attention, self-management, self-monitoring, problem identification, and self-evaluation. Cognitive strategies involve interacting with
Metacognitive Strategies

Planning
Previewing the organizing concept or principle of an anticipated learning task (advance organization); proposing strategies for handling an upcoming task; generating a plan for the parts, sequence, main ideas, or language functions to be used in handling a task (organizational planning)

Directed attention
Deciding in advance to attend in general to a learning task and to ignore irrelevant distracters; maintaining attention during task execution

Selective attention
Deciding in advance to attend to specific aspects of language input or situational details that assist in performance of a task; attending to specific aspects of language input during task execution

Self-management
Understanding the conditions that help one successfully accomplish language tasks and arranging for the presence of those conditions; controlling one's language performance to maximize use of what is already known

Self-monitoring
Checking, verifying, or correcting one's comprehension or performance in the course of a language task

Problem identification
Explicitly identifying the central point needing resolution in a task or identifying an aspect of the task that hinders its successful completion

Self-evaluation
Checking the outcomes of one's own language performance against an internal measure of completeness and accuracy; checking one's language repertoire, strategy use, or ability to perform the task at hand

Cognitive Strategies

Repetition
Repeating a chunk of language (a word or phrase) in the course of performing a language task

Resourcing
Using available reference sources of information about the target language, including dictionaries, textbooks, and prior work

Figure 3. Foreign language longitudinal study: Learning strategies and their definitions (Cited in O'Malley and Chamot, 1990, p. 137-139)
<table>
<thead>
<tr>
<th>Grouping</th>
<th>Ordering, classifying, or labeling material used in a language task based on common attributes; recalling information based on grouping previously done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note taking</td>
<td>Writing down key words and concepts in abbreviated verbal, graphic, or numerical form to assist performance of a language task</td>
</tr>
<tr>
<td>Substitution</td>
<td>Selecting alternative approaches, revised plans, or different words or phrases to accomplish a language task</td>
</tr>
<tr>
<td>Elaboration</td>
<td>Relating new information to prior knowledge; relating different parts of new information to each other; making meaningful personal associations to information presented</td>
</tr>
<tr>
<td>Summarization</td>
<td>Making a mental or written summary of language and information presented in a task</td>
</tr>
<tr>
<td>Translation</td>
<td>Rendering ideas from one language to another in a relatively verbatim manner</td>
</tr>
<tr>
<td>Transfer</td>
<td>Using previously acquired linguistic knowledge to facilitate a language task</td>
</tr>
<tr>
<td>Inferencing</td>
<td>Using available information to guess the meanings or usage of unfamiliar language items associated with a language task, to predict outcomes, or to fill in missing information</td>
</tr>
</tbody>
</table>

**Social and Affective Strategies**

<table>
<thead>
<tr>
<th>Questioning for clarification</th>
<th>Asking for explanation, verification, rephrasing, or examples about the material; asking for clarification or verification about the task; posing questions to the self</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperation</td>
<td>Working together with peers to solve a problem, pool information, check a learning task, model a language activity, or get feedback on oral or written performance</td>
</tr>
<tr>
<td>Self-talk</td>
<td>Reducing anxiety by using mental techniques that make one feel competent to do the learning task</td>
</tr>
<tr>
<td>Self-reinforcement</td>
<td>Providing personal motivation by arranging rewards for oneself when a language learning activity has been successfully completed</td>
</tr>
</tbody>
</table>

Figure 3. (continued)
the material to be learned, manipulating the material mentally or physically, or applying a specific technique to a learning task, and include repetition, resourcing, grouping, note taking, deduction/induction, substitution, elaboration, summarization, translation, transfer, and inferencing. Social and affective strategies involve interacting with another person to assist learning or using affective control to assist a learning task, and include questioning for clarification, cooperation, self-talk, and self-reinforcement.

Although there is the criticism, as Oxford (1990) pointed out, that learning strategy research is still in its infancy with conflicting methods and results, there have been major contributions to an understanding of learning strategy. During the time when many researchers tried to identify different type of strategies and, especially, successful strategies, the research concerns for successful strategies focused on the awareness and control of learning processes. The successful learners are not necessarily the ones who discover and master the correct procedure for each situation (Nisbet & Schucksmith, 1986). The essential difference between successful and unsuccessful learners is that the successful learners are the ones who have "learned how to learn" (p. 7). Managing the learning process should involve "being aware of what one is doing, or being able to bring one's mental processes under conscious scrutiny and thus more effectively under control" (p. 7).

Metacognition

The awareness of one's mental processes is termed metacognition. Metacognition refers to "an awareness of our cognitive processes (thinking and learning activities) or knowing about what we know" (Gordon & Braun, 1985, p.
2). The term "metacognition" was coined by Flavell (1976) and described as follows:

Metacognition refers to one's knowledge concerning one's own cognitive processes or anything related to them, e.g. the learning-relevant properties of information or data. For example, I am engaging in metacognition (metamemory, metalearning, metaattention, metalanguage, or whatever) if I notice that I am having more trouble learning A than B; if it strikes me that I should double check C before accepting it as fact; if it occurs to me that I had better scrutinize each and every alternative in any multiple-choice type task situation before deciding which is the best one; if I sense that I had better make a note of D because I may forget it; ... Metacognition refers among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal of objective. (p. 232)

Brown and her colleagues (1983) indicated that much of the reported failure of learning strategies to transfer to new tasks is due to the failure to combine metacognitive strategies with cognitive strategies during learning. O'Malley and Chamot (1990) noted that "students without metacognitive approaches are essentially learners without direction and ability to review their progress, accomplishments, and future learning directions" (p. 99). Brown and her colleagues (1983) provided a comprehensive overview of metacognitive strategies, and descriptions of those strategies as follows:

These processes include planning activities prior to undertaking a problem (predicting outcomes, scheduling strategies, various forms of vicarious trial and error, etc.), monitoring activities during learning (testing, revising, rescheduling one's strategies for learning), and checking outcomes (evaluating the outcome of any strategic actions against criteria of efficiency and effectiveness). It has been assumed that these activities are not necessarily storable,
somewhat unstable, and relatively age independent, that is, task and situation dependent. (p. 107)

Metacognitive strategies usually involve both knowledge about learning (metacognitive knowledge) and control or regulation over learning (metacognitive strategies) (O'Malley & Chamot, 1990). Brown and her colleagues (1983) pointed out interesting characteristics of metacognitive knowledge which is "stable, statable, often fallible" (p. 107). Metacognitive knowledge is stable, thus it is retrievable for use with learning tasks; statable, thus it can be reflected upon and used as the topic of discussion with others; fallible, so that what one believes about one's cognitive processes may be inaccurate (O'Malley & Chamot, 1990).

Research on learning strategies

There have been a number of problems in the research of learning strategies in second language learning. There is no consensus on what constitutes learning strategies in second language learning and how these differ from other types of learner activities or other types of learners, or how appropriate they are. As O'Malley and Chamot (1990) indicated, the type of strategy used by the learner depends on the type of knowledge required for a given task and what the learner knows.

While a number of studies supported the assumption that particular learning strategies lead to successful language learning and acquisition (Brown & Perry, 1991; Carrell, Pharis & Liberto, 1989; O'Malley, Chamot & Küpper, 1989), there have been some studies which show conflicting findings (Vann & Abraham, 1990). Brown and Perry (1991) compared three learning strategies of keyword, semantics, and keyword-semantics for ESL vocabulary with six intact
ESL classes at two levels of proficiency. They found that the keyword strategy facilitated vocabulary acquisition for lower proficiency students and the combined keyword-semantic strategy increased retention. Carrell, Pharis and Liberto (1989) provided metacognitive strategy training for reading in ESL, proposing three questions: 1) Does metacognitive strategy training enhance L2 reading?; 2) If so, does one type of strategy training facilitate L2 reading better than another?; and 3) How is the effectiveness of metacognitive strategy training related to the learning styles of the students? Results showed that metacognitive strategy training is effective in enhancing second language reading, and that the effectiveness of one type of training versus another may depend upon the way reading is measured. Further, the results showed that the effectiveness of the training is related to differences in the learning styles of the students. O'Malley and his colleagues (1989) conducted a study of comprehension processing of ESL students while listening to academic texts to see whether there were differences in the strategies reported by effective and ineffective listeners. The results showed that there were significant differences between effective and ineffective listeners on self-monitoring, or checking one's comprehension while it is taking place; elaboration, or relating new information to prior knowledge or to other ideas in the text; and inferencing, or using information in the text to guess at meaning or complete missing ideas.

However, Vann and Abraham (1990) conducted a study to probe the strategies of two unsuccessful learners, both Saudi Arabian women enrolled in an intensive English program, as they completed four activities (an interview, a verb exercise, a cloze passage, and a composition). Although they were unsuccessful learners, they used a variety of learning strategies. The combined
analyses of think-aloud protocols and task products offered a detailed and insightful picture of learner strategies, providing counterevidence for the claim that unsuccessful learners are inactive.

Vann and Abraham (1990) indicated that the conflicting findings may be rooted in inadequate knowledge of the actual strategies used by learners in contrast to what they report doing. In other words, the conflicting findings may be rooted in the methods of data collection. The issue of the data collection method becomes more critical when we attempt to tap the mental processes which are directly involved to metacognitive strategies.

Problems of CALL Research

As teachers and practitioners of CALL used and tested many CALL programs in classrooms, researchers examined the effectiveness of CALL. Chapelle and Jamieson (1989) analyzed two kinds of research design: a) CALL vs. a traditional instruction design for research assessing effects of CALL on achievement; and b) descriptive research for studying students' attitudes toward CALL and describing students' learning processes while they work with CALL programs.

The typical research design assessing CALL effectiveness selected a particular CALL program focusing on a certain language skill and a group of learners, and then divided the group of learners into an experimental group, which was provided with a CALL program, and a control group, which was provided with traditional instruction. However, the early studies of the effectiveness of computer use in language learning/teaching produced
contradictory or irreconcilable findings because of the lack of agreement as to appropriate research questions and research methodologies (Dunkel, 1991).

In CBL (Computer Based Learning), Clark (1985) suggested that the research question in media comparison studies, "Which medium most effects learning?", is invalid, leading to uninterpretable results. Methodologically any study which compares two different media requires an experiment in which all other variables, except the media variable, should be held constant. Otherwise, any significant differences can be attributed to the presentation devices, such as the instructional methods to use the software, the way teachers teach using the software, or the way the software presents the instruction, and so on. Clark indicated that there have been several confounding variables in media comparison studies. First, there were novelty effects. When the computer was introduced in the classrooms, there was obvious excitement and interest in the change. He stated that longer studies, where the novelty wears off, did not show significant differences. The effects were attributed to students' "beliefs" or "enthusiasm" rather than the "computer." Second, there was a teacher variable. When the teacher's effects were taken out, the average effect size dropped. The teacher variable, teacher's use of particular media, is large. Third, there were obvious failures of control over the amount of instruction received by the computer and the traditional instruction. Papert (1987) termed this phenomenon as technocentrism, "the tendency to give (a similar) centrality to a technical object" (p. 23). Similarly, this technocentrism permeates CALL effectiveness research, ignoring the fact that factors such as the context of instruction, learner attitudes or characteristics, or teaching strategies can affect the performance of the subjects' acquired L2 proficiency (Dunkel, 1991).
As a consequence, the analyses of traditional laboratory-like experiments, in which students are divided into an experimental group receiving computer based instruction and a control group receiving traditional instruction, and then tested to see the effectiveness of two modes of instruction, have prompted researchers (1) to construct designs other than the traditional experimental-control group design to assess the cognitive and social impact of computers on content and language learning, and (2) to examine a host of variables which may interact with the computer treatment to affect the learning outcomes (Dunkel, 1991).

In descriptive research which allows CALL researchers to examine various phenomena related to CALL use, CALL researchers attempted to consider numerous variables which affect CALL use. There have been a few studies which describe different working styles (Jamieson & Chapelle, 1987), different learning strategies (Chapelle & Mizuno, 1989; Hsu, Chapelle & Thompson, 1993), or student-student interaction during use (Abraham & Liou, 1991; Bueno & Nelson, 1993; Piper, 1986) to show different characteristics of learners or different learning strategies in CALL use.

In order to understand what and how particular students learn using CALL materials, CALL researchers are also prompted to characterize the interactions that occur between the computer and learner. Chapelle and Jamieson (1991) indicated that CALL activities must be described in terms of what students actually do, rather than what they can do while they are working, to answer questions about "whether, to what extent, under what circumstances, and with what results students - with what characteristics - actually do the things the technology makes possible" (Dunkel, 1991, p. xiv).
Since second language acquisition is a complex process involving socio-cultural, psychological, affective and personal variables, a qualitative research method has been advocated as providing a unique and important perspective on the second language classroom (Breen, 1985; Chaudron, 1988; Larsen-Freeman & Long, 1991; Long, 1980; Nunan, 1991; Van Lier, 1988). In attempting to understand the various impacts of the computer in second language contexts, a qualitative research method could play an important role. Computer use in L2 learning has raised controversial issues concerning the value of various computer activities. Can the technology be used to improve language learning or does the technology actually isolate students from meaningful learning (Johnson, 1991)? Can CALL help to create an empowering environment for language learning, as many CALL developers and teachers have suggested, or does the computer act as another foreign element in an already foreign environment? To address the complex issues surrounding computer use in L2 classrooms, a qualitative research method would help by discovering and investigating the many interrelated variables holistically and with sensitivity toward the perspectives of the learners.

Despite the variety of theoretical perspectives that have shaped current views of a qualitative research method, all qualitative approaches to research are, as noted earlier, ideally holistic, process-oriented, and emic (Bogdan & Biklen, 1982; Chapelle, Jamieson & Park, in press; Marshall & Rossman, 1989; Merriam, 1988; Patton, 1990; Spindler & Spindler, 1987; Whitt, 1991). The holism refers to the principle that any aspect of culture or interactional behaviors—among
students, students and teachers, or students and materials—should be described and explained in relation to the whole system of which it is a part (Heath, 1982; Hymes, 1981; Erickson, 1981; Mehan, 1979; Van Lier, 1988, Watson-Gegeo, 1988). By examining the process dimension of events, the researcher can explore "the intersubjective and context-dependent nature of (interactional) events as they occur, noting the regularities and idiosyncracies in the events" (Chaudron, 1988, p. 48). The emic nature of a qualitative research requires the researcher to consult the viewpoint of a "native" to the situation under investigation in order to refine and sharpen research questions using the native's perceptions and cultural knowledge (Spindler & Spindler, 1987). The researcher should not be restricted by "pre-established views, standards of measurement, models, schemes and typologies" (Van Lier, 1988, p. 55).

While the need of pure qualitative approaches in second language and CALL research has been emphasized, many researchers have suggested the need to combine qualitative approaches with other research methods to gain a broader perspective of L2 classrooms and CALL contexts. (Dunkel, 1991; Erickson, 1981; Larsen-Freeman & Long, 1991; Long, 1980; Markee, 1994; Van Lier, 1988). This need seems particularly relevant to CALL research, which has been conducted primarily within the tradition of experimental studies, despite the fact that any observed learning gain cannot be unambiguously attributed to the computer (Clark, 1985). Papert (1987) strongly argued that we have to center our attention on the culture and context of learning because "the context for human development is always a culture, never an isolated technology. In the presence of computers, cultures might change and with them people's ways of learning and thinking (p. 23)." "To understand any technological innovation [such as] the
implementation and instructional use of microcomputers," it must be understood as a part in the whole context of "a complex system of social, political, and cultural values, priorities, and relations" (Levine, 1990, p. 462) because "the effects of microcomputers on education depend on the social and educational contexts within which they are embedded" (Sheingold et al., 1983, p. 431).

A qualitative research perspective can enhance the generalizability of CALL research based in another tradition. In order to generalize the results of a research study, in other words, to answer the question of "what relevance do the findings concerning the influences of variables of one study have for other instructional contexts?" (Chapelle & Jamieson, 1991, p. 49), the research report should describe the classroom context, the factors of the research setting as clearly as possible. A CALL research report should describe "(1) the elements of the target language context, (2) the characteristics of the subjects, and (3) the CALL materials used" (Chapelle & Jamieson, 1991, p. 49) in addition to the empirically based or linguistically grounded findings using experimental studies, interaction analysis or discourse analysis. It can therefore bring a more thorough understanding of the generalizability of findings, which can contribute to the development and use of CALL materials.

Summary

As the application of technology to learning develops, interactive multimedia permits language learners to involve real language use in meaningful situations with a high level of interactivity and learner control.
However, there have been few studies about whether interactive multimedia environments lead to successful language learning/teaching, and if so, what, why and how. In order to investigate what, why and how, there was a strong need to employ appropriate underlying principles and methods.

While the importance of investigating what and how the students are working with computers was emphasized, the importance of viewing the technology in a whole context was recognized. The students' interactions with interactive multimedia in a new environment which was created using the technology are not separable from the whole context and should be viewed as a part of the whole environment.

In order to investigate the whole context of a setting, a qualitative approach is suggested in CALL research. To investigate the different degree of interactions, it is suggested that a framework of interactional modifications in ESL had the potential of being applied to an ESL interactive multimedia environment. To investigate how the students make decisions to manipulate the degree of learner control, it is suggested that learning strategies in ESL had the potential to be applied to an ESL interactive multimedia environment. However, the specific types of interactional modifications and learning strategies should be identified and investigated for the ESL interactive multimedia environment.

In this study, I focused on two senses which have not been sufficiently examined yet, but should be pursued to have a meaningful understanding and interpretation of how interactive multimedia can best be used. First, the use of interactive multimedia should be discussed in a whole context to understand and interpret the effect of all the interacting variables surrounding the
technology use. Second, the process of interactions between the computer, for example, an interactive multimedia program, and the students should be characterized and described in terms of "what students actually do" (Chapelle & Jamieson, 1991, p. 52) to understand what and how particular students learn using computers. Thus, the actual students' interactions in a certain setting could be interpreted in a whole context, which, in turn, suggest how we can connect individual learning and classroom learning.

Notes

1. The term "generalizability" is used in CALL research. However, in qualitative research, the term is shifted to 'transferability.' Lincoln and Guba (1985) defined "transferability" as asking "How can one tell whether a working hypothesis developed in Context A might be applicable in Context B?" and answering the question as:

   The degree of transferability is a direct function of the similarity between the two contexts, what we shall call "fittingness."
   Fittingness is defined as the degree of congruence between sending and receiving contexts. If Context A and Context B are "sufficiently" congruent, then working hypotheses from the sending originating context may be applicable in the receiving context. (p. 124)

However, Donmoyer (1990) argued that Lincoln and Guba's view is too moderate, assuming that findings from one setting are only generalizable to another if both settings are very similar, which is an alternative view to the traditional view. Donmoyer described his own experience about how a paper, "Instruction and Affect in Hopi Cultural Continuity," containing a rich narrative description of Hopi education provided tremendous insight into schooling in his own culture, which is radically different from Hopi culture. I want to interpret the notion of "generalizability" in terms of Donmoyer's claim for generalizability.

What is important, however, is that Donmoyer took responsibility for making the connections between disparate cultures. The reader and the qualitative text must be an active participant in making connections. In quantitative
research, the researcher is supposed to guarantee generalizability; in qualitative research, the researcher actually constructs it.

The research text should be rich enough so that the reader can vicariously gain insight into the experience and setting described and analyzed. That vicarious experience allows the reader—encourages the reader—to make transference to her/his own settings.
SITUATING THE TECHNOLOGY

Introduction

Interactive multimedia has excited many teachers and researchers because the integration of multimedia formats brought a motivating and authentic learning environment into the classroom. Interactive multimedia has excited language teachers and researchers even more because it provides many aspects of language which traditional teaching material couldn't provide in a classroom situation. The aspects of language the interactive multimedia can provide are among others, authentic language, recording capability, and real life situations in a full motion video which brings a socio-cultural aspect of the target language. When the teacher or the school decides to incorporate a new technology into a classroom or school, it becomes a whole new environment in which the students, teachers, and administrators interact together with the surrounding variables.

Many researchers (e.g., Levine, 1990; Papert, 1987; Sheingold, et al., 1983) emphasized the importance of viewing the technology use in a whole context. As Papert (1987) strongly argued, the presence of computers changes the culture and people's ways of learning and thinking, and "the context for human development is always a culture, never an isolated technology" (p. 23). Levine (1990) and Sheingold and others (1983) also emphasized the importance of understanding the technological innovation in a whole context of "a complex system of social, political, and cultural values, priorities, and relations" (Levine,
1990, p.462) because the effects of using technology depend on the social and educational contexts.

As an instructional technology major graduate student with an ESL background, I became interested in investigating what would happen if we bring technology, an ESL interactive multimedia program, to a language classroom setting as one type of teaching material. How would the students react to a new environment which was created with a new type of learning material? How would the teacher use it for her/his teaching? What kinds of role would s/he take? How would the school react to adopting technology into its classrooms? These questions led me to conduct a study to investigate how an ESL class incorporated an interactive multimedia environment to its traditional setting in terms of how an instructor incorporates a new environment and how the students in that setting react to a new environment.

In this chapter, I will first discuss the rationale for employing qualitative research to investigate the question "How was ELLIS incorporated into an Intensive English Program learning environment?" I will then, present the research process using a qualitative method. Finally, I will present the narratives of how an Intensive English Program, the class, the teacher, and the students reacted to this new environment.

Qualitative Research Method

In order to investigate the questions for my study, I sought the appropriate research method to answer how an interactive multimedia language program is incorporated into an Intensive English Program learning environment. I
became more and more involved in reading the literature about qualitative research. In order to view the technological use in a whole context, I decided to use qualitative methodology, specifically, a case study.

The decision about which research design is appropriate depends on the considerations of the nature of the research questions, the amount of control, and the desired end product (Merriam, 1988). The qualitative study is an appropriate design when the research questions ask "how" and "why" rather than "what" and "how many" (Merriam, 1988; Yin, 1984). In other words, the investigators of a qualitative study are concerned with "process" rather than simply with "outcomes" or "products" (Bogdan & Biklen, 1982). Based on the nature of the research questions, the end product of a qualitative study is descriptive "in the form of words or pictures rather than numbers" (Bogdan & Biklen, 1982, p. 28). In terms of amount of control, a qualitative study employs a flexible design (Marshall & Rossman, 1989) so that research can "unfold, cascade, roll, and emerge" (Lincoln & Guba, 1985, p. 210). A qualitative study doesn't start with a priori hypothesis and rely on inductive reasoning (Merriam, 1988). The investigators may have tentative working hypotheses, but these are subject to reformulations as the study proceeds by the discovery of new relationships, concepts, and understanding (Merriam, 1988). The investigators "construct a picture which takes shape as [they] collect and examine the parts" (Bogdan & Biklen, 1982, p. 29).

In addition to these factors, the paramount objective of a qualitative study is to understand meaning (Merriam, 1988; Bogdan & Biklen, 1982). In order to understand the meaning of phenomena, the investigators should go out to the people, setting, site, institution ("the field") and observe the behaviors in its
natural setting (Merriam, 1988). Observing the phenomena in natural settings enables the investigators to understand the process of phenomena in context as the parts of a whole from the insiders' viewpoints. Referred to as an emic perspective, holistic perspective, and process-oriented perspective, these are the key principles of a qualitative study (Bogdan & Biklen, 1982; Chapelle, Jamieson & Park, in press; Marshall & Rossman, 1989; Merriam, 1988; Patton, 1990; Spindler & Spindler, 1987; Whitt, 1991). The information obtained from emic perspectives, "discovering insiders' perspectives" (Whitt, 1991, p. 407), brings in-depth understanding of phenomena by consulting the viewpoint of a native about the situation under investigation in order to refine and sharpen research questions using the native's perceptions and cultural knowledge (Spindler & Spindler, 1987). A holistic perspective enables the investigators to see and understand the phenomena as constituting a whole and complex system (Patton, 1990). Any aspect of culture or interactonal behaviors should be described and explained in relation to the whole system of which it is a part (Hymes, 1981; Erickson, 1981; Mehan, 1979). A process-oriented perspective reveals why and how social events occur rather than documenting only what occurred (Chapelle, Jamieson & Park, in press; Chaudron, 1988).

When the qualitative study approach is employed "to gain an in-depth understanding of the situation and its meaning for those involved" (Merriam, 1988, p. xii), it is called a case study and defined as "the in-depth study of a particular case" (Hamel et al., 1993, p. 34) with the three key characteristics of "describing, understanding, and explaining" (p. 39). Using the principles for the qualitative study approach, a case study method has been identified to be useful for "an intensive, holistic description and analysis of a single entity,
phenomenon, or social unit" (Merriam, 1988, p.16), especially when "the focus is on a contemporary phenomenon within a real-life context" (Yin, 1984, p. 13).

For my study, the use of CALL was a "phenomena," more specifically, the use of an ESL interactive multimedia program was a "contemporary phenomenon." The "social unit" I focused on was an ESL class of an Intensive English program. I selected an ESL class in an Intensive English program (IEP) in a major university in the mid-western area of the United States as a typical ESL class which is not very open to technology yet. I want to have a deep and rich understanding and interpretation of this single case, which can have a powerful applicability to other settings. Therefore, a case study is suitable for the purpose of my study.

Consistent with those principles, the research methods used in a case study typically consist of combinations including interviews, observations, and examination of relevant documents (Yin, 1984). Data are usually collected over a long period of time with a few respondents in order to perform an in-depth investigation and analysis.

The sources of data from humans are interviews and observations, and from non-humans are documents and records (Lincoln & Guba, 1985). Yin (1984) provided three principles to maximize the benefits of the evidence from these sources: using multiple sources of evidence, creating a case study base, and maintaining a chain of evidence. Using multiple sources of evidence, usually called a process of triangulation, allows an investigator to address a broader range of inquiry and any findings or conclusion of a case study are therefore more convincing and accurate (Lincoln & Guba, 1985; Yin, 1984). It is very important that a case study should develop a formal and retrieval database so that other
investigators can review the evidence directly and not be limited to the written reports (Yin, 1984). The types of database are notes from interviews, observations or documents analysis, documents relevant to a case study which were collected during the course of a study, tabular materials which were collected from the site being studied or created by the research team, or narratives from open-ended answers, etc. (Yin, 1984). A case study should develop explicit links, a chain of evidence, between the questions asked, the data collected, and the conclusions drawn (Yin, 1984).

Research Process

In order to investigate how an interactive multimedia environment is incorporated into an ESL learning environment, I conducted this study in the first session (Week 1-Week 8) of Spring of 1994 using the Advanced Level of a Reading/Writing class in an intensive English program in a major university with an ESL interactive multimedia program, ELLIS (English Language Learning & Instruction System). In Spring semester, the intensive English program has two sessions: first session for the first half of the semester (Week 1-Week 8) and second session for the second half of the semester (Week 9-Week 16). (The procedures and schedule are presented in Appendix C)

Data collection

In this study, I used observations, interviews, and documents as multiple sources of data. The types of database are transcriptions and notes from interviews, field notes from observations, and documents from IEP. All the
transcriptions, notes, and documents were used for reconstructing the ideas for the research questions and research processes, and analyzing the data to provide precise, thick, and rich descriptions and explanations for the focus of the study.

I selected an Intensive English program in a major university as an ESL language program in which there was a mix of various cultures and in which the students and teachers were not much exposed to the technology yet; thus, it had the potential to reveal a variety of interactional processes in a new environment. I selected an Advanced Level of Reading/Writing class as a focus of the study. The program ELLIS is designed for a high intermediate to advanced level of ESL students. ELLIS deals with many different language tasks such as vocabulary, grammar, and culture, which are taught variously in the Reading/Writing class, which is a core class.

The key respondents were all students and the instructor of the Reading/Writing class of Spring semester of 1994 in an Intensive English program in a major university, and the director of the program. The instructor and all of the students were parts of a whole class, and the classroom activity with ELLIS dealt with all students. In order to obtain information about the context, of how an ESL program was perceived and accepted in a new environment, I included the director as one of the key respondents.

Gaining access On week 1, I introduced the purpose and procedures of the study in oral and written form (see Appendix F). I asked the students' cooperation after I got approval from the University Human Subjects Approval Committee to use students as respondents of the study (see Appendix D). The students received a respondent consent form (see Appendix E) which
emphasized the voluntary nature of participation in the study and described the confidentiality of the participation and the anonymity of respondents in the final written report of the study. The students were informed that if they did not agree to the voluntary participation, they would not be observed for the study. I asked the students to submit the respondent consent form to the instructor at the end of week 1, and all the students agreed to participate in this study.

**Interviews** I interviewed the instructor two times, in the beginning (Week 1) and at the end (Week 8) of the research period. The first interview, which lasted for about an hour, focused on the instructor's teaching experiences, teaching philosophy, the relationship with this class, opinions of teaching strategies and techniques for ESL, perspectives of an interactive multimedia environment, and plan of using interactive multimedia environment in this class. The second interview, also about an hour, focused on the instructor's opinions, feelings, experiences, and future recommendations for using an interactive multimedia environment in the ESL classes.

I interviewed the director of the program two times, on Week 1 and Week 8, for about an hour each. The first interview focused on the director's experiences, philosophies, opinions, and feelings of being an administrator of a language program, opinions of teaching strategies and techniques for ESL, and perspectives of an interactive multimedia environment. The second interview, after the observations of the class using ELLIS and personal contacts with the instructor, focused on the director's opinions, feelings, and future recommendations of incorporating interactive multimedia environment into the ESL program.
All the interviews were audio taped and transcribed. I also took notes during the interviews. I began with primary key questions (see Appendix G) in a semi-structured interview, which allowed the flexibility of adding new questions from the interviewees' perspective. In the semi-structured interview, the researcher begins with a list of questions or issues to be explored, but is allowed to respond to the situation at hand, to the emerging world view of the respondent, and to new ideas on the topic (Merriam, 1988). When I asked the instructor about the role of word processing in writing, she expanded her view of technology in teaching to her world wide view of technology, relating it to language learning, "And also you've joined the 20th century, you know. And they have a chance here to get a lot of supervised practice and when they are out on a job someplace, they are going to have to know how to do all this stuff . . . And they are going to be in English. Ninety percent of the world's technology, all that information, is in English. You can't get it any other way . . . The computer is their access to it."

Immediately following the interviews, I reviewed the transcriptions and notes, and reconstructed the ideas for the research questions and processes, which were summarized on Interview Summary Forms (see Appendices H and I). For example, the instructor's worldwide view of technology related to language made me reconstruct the idea about technology. I viewed the technology as an efficient tool for language learning and teaching, but I could view technology as an indispensable tool for access for English learning. This view helped me to have a deeper and broader interpretation of the students, instructor, and director's perceptions of technology throughout my study.
Observations

In order to investigate the culture of the class and the process of the incorporation of the interactive multimedia environment in the context, I observed the regular class one time per week (Week 1-Week 8). The flexibility of the decision of observation was maintained. For example, if there were a continuing activity in the following class, I observed the following class too. I made the field notes while I was observing the class and added my opinion or feeling in the bracket. Immediately after the observation, the field notes were summarized on the Observation Summary Form (see Appendices J and K).

In order to investigate the particular contexts in which a new technology was used, the instructor used ELLIS as one type of teaching/learning material by adopting it to the regular needs and circumstances of the class. For example, when the topic of the class was on vocabulary use for introductions, the lesson "Casual Introductions and Small Talk" of ELLIS was selected. The instructor taught the class with ELLIS using the lesson and had a follow-up activity of writing down the vocabulary from the lesson and role-playing using the vocabulary.

The classroom activity with ELLIS was conducted once a week for 5 weeks from Week 3 to Week 7. The teaching topics for each week were: registering for class (2 times), introducing, summarizing literary discussion, job hunting and interviewing. The lessons of ELLIS used were: Registering for a class (2 times), Making Introduction and Casual Introductions and Small Talk, Literary Discussion, and Job Hunting and Job Interview for each week. The follow up activities were a role play for registering for class, a small group discussion for introducing, group discussion for summarizing a literary discussion, and a group
discussion and writing activity for job hunting and interviewing. The classroom activity with ELLIS was videotaped.

In order to introduce ELLIS and let students have a chance to be acquainted with it, the instructor demonstrated ELLIS to the class on the first day on Week 2 and distributed the flow chart of ELLIS (see Appendix B) to the students. The instructor explained the purpose of the program, and demonstrated the structure of the program and how to use it. On the second day of Week 2, the class was divided into two groups; half of the class did hands-on practice with the program in pairs, while the remaining half of the class did a library research activity outside the classroom. On the third day of Week 2, the students changed places with the other half of the class now having hands-on practice with the program. I helped with the demonstration and hands-on practice whenever there was a need to supplement or there were questions. The instructor's demonstration and the pair groups interactions were videotaped.

For the regular classroom observations, I was a non-participant observer, but for the classroom activity with ELLIS, I was a participant observer to a certain degree. I was in charge of the computer for the demonstration of ELLIS and helped the students for the hands-on practice session. In the classroom activity with ELLIS, the instructor often involved me in the activities, for example, asking my opinion or confirming the correctness of information. This involvement made the students and me closer and many of them treated me like their technology consultant. I was often asked about software and computer purchasing. One student asked me to help his keyboarding skill, so I arranged for him to work with keyboarding software in our department computer lab. I had many informal talks about the students' perceptions about technology and their
feelings about the classroom activities with ELLIS. Finally, I was invited to give a
lecture about how to use the word processor (Microsoft Word) for a writing class.
As a participant observer, I could have insightful findings about different
reactions between the students, instructor and myself. All these experiences as a
participant observer helped me have interactions with the students and
instructor, the "natives" of my study, which can be referred to emic perspectives.

Immediately following the observations of the ELLIS activities, including
the demonstration and hands-on practice, I reviewed the videotape and
transcribed it. When I transcribed the videotape, I added my opinions and
feelings in brackets. Immediately after transcribing, the transcriptions were
summarized on an Observation Summary Form.

Documents In order to understand the culture of the program
which influenced the policies of the program and culture of the classes,
including the instructor's teaching and students' learning, I used documents
which provided information about the program's history, policies, or activities
as background information. The Student Handbook, which is written as a guide
for the students, provides information about the purpose and policies of the
program, courses, and rules and advice. The Annual Report of the program
provides information about instructors, students' enrollment, and activities.
The information from documents was summarized on Document Summary
Forms (see Appendices L and M).

Additional data collection In order to investigate the computer
experiences of the students, I conducted the Pre Survey and Post Survey (see
Appendices N and O). Both the Pre Survey and Post Survey were mainly open-ended questions to know students' opinions. Post Survey included 5 scale rank system.

In the Pre Survey, I asked about students' computer experiences, computer-related terms and perceptions of interactive multimedia to understand the students' general status with computers in the beginning period of the research. In the Post Survey, I asked about students' feelings, opinions and suggestions for the different features of ELLIS and the classroom activities with ELLIS. I asked the students to mark using 5 scale rank system and to describe the reasons in detail after the research was finished.

Data analysis

Data analysis is defined as a process of "examining, categorizing, tabulating, or otherwise recombining the evidence to address the initial propositions of a study" (Yin, 1984, p. 105). Data analysis for a case study is inductive. Inductive analysis begins not with theories or hypotheses, but with the data themselves, from which theoretical categories and relational propositions may be arrived at by inductive reasoning processes (Goetz & LeComte, 1984).

The processes involved with inductive analysis are unitization and categorization (Lincoln & Guba, 1985). The units of information are used as the basis for defining categories. There are two characteristics of units: 1) units should be heuristic, aimed at some understanding or some action that the inquirer needs, and 2) units are the smallest pieces of information which can stand by themselves so that they are interpretable in the absence of any
additional information (Lincoln & Guba, 1985). Categorizing is a process in which previously unitized data are organized into categories that provide descriptive or inferential information about the context or setting from which the units were derived (Lincoln & Guba, 1985).

I analyzed all of the transcriptions of interviews and ELLIS activity, and the field notes of classroom activity, using Lincoln and Guba's (1985) principles. First, I unitized all those data as a unit which had a stand-alone meaning, then, categorized all the units and indicated the source of data (i.e. I1 is the pre-interview with the instructor, D2 is the post-interview with the director, C1 is the first classroom observation, or E1 is the first ELLIS activity). The categories were added from emerging data. After the unitization and categorization, I could reorganize the categories under themes. For example, under the theme of "teaching," I could sort out categories, such as "teaching experience," "teaching material," "teaching material (IEP)," "teaching material (technology)," "teaching method," "teaching philosophy," "teaching strategy," and "teaching style" (see Appendix Q). Based on the themes and categories developed through the analysis of data with the information from the summaries of interviews, observations and documents, pre/post survey results, and daily log, I could begin to organize the structure to write the case report. With the reconstructed concepts (categories and themes) and raw data (transcriptions and additional sources), organizing the thoughts and interpretations and writing the narrative was an on-going process in order to have precise, rich and thorough descriptions.

Trustworthiness For the trustworthiness of this study, I used Lincoln and Guba's (1985) principles of trustworthiness. Lincoln and Guba (1985) provide
the basic issue in relation to trustworthiness, asking "How can an inquirer persuade his or her audiences (including self) that the findings of an inquiry are worth paying attention to, worth taking account of?" (p. 290). The criteria for trustworthiness are credibility, transferability, dependability, and confirmability. The underlying questions for each criteria are whether "the constructions arrived at are credible to the respondents" (Whitt, 1988, p. 61), whether the findings are applicable to other contexts or with other respondents, whether the findings are dependable based on stable and consistent process (Lincoln & Guba, 1985), and whether "the data can be confirmed by someone other than the inquirer" (Whitt, 1988, p. 61). The detailed descriptions of the criteria of the trustworthiness are described as follows.

**Credibility**

I employed three of the mechanisms described by Lincoln and Guba (1985) for establishing credibility (triangulation, debriefing, and member checks). Triangulation is used for judging the accuracy of data items, and uses multiple and different sources and methods of data collection. In this study, I used three different types of data sources (interviews, observations, and documents), and three different types of respondents (students, instructor, and director) to provide the information about the interactions in a multimedia environment in an ESL classroom.

Peer debriefing is a process of exposing oneself to a "disinterested" peer to be sure that the investigator is as fully aware of her/his posture and process as possible, to test working hypotheses that may be emerging from the data, to test the next steps in the emerging methodological design, and to vent frustration. For this study, a graduate student in the College of Education served as a
debriefer. Debriefing was held several times, and was used to test ideas, obtain ideas on methods, and for catharsis.

During this study, Kay, the peer debriefer, and I shared the understanding of the process of exposing the investigator's view and the role of peer debriefer in this process. I asked her how I could set up a task for the think-aloud verbalization to see the relationship with a given task when the respondents work on ELLIS. Kay's suggestion was to make a direct connection with the task and the content of ELLIS; otherwise, the respondents might be distracted. After I observed how the respondents worked with a writing task (described in Looking Inside the Learners), I realized the task was fairly complicated to the respondents. I discussed this with Kay, and she regretted that she had been too shy to express her earlier opinion that the task could be too complicated for the respondents. After this experience, Kay and I could be more open and direct in discussing the issues of my study. When I analyzed the data about the director's view of technology, I was not sure how I could interpret and write about the director's negative view toward technology, although I understood that her opinion was from an administrator's viewpoint. After much discussion with Kay, I decided to interpret the director's negative view of technology as barriers that we encounter when we attempt to situate technology to traditional settings. During the interactions with the peer debriefer, I could expand the viewpoints as an investigator. Kay, who had a new experience as a peer debriefer, could also expand her viewpoints to the issues that emerged from my study and understand the role of peer debriefer.

Member checking is for judging credibility of findings in respect to constructions (Lincoln & Guba, 1985). Member checking is both informal and
formal, and it occurs continuously. In this study, member checks occurred throughout the study in both a formal and informal manner. After each interview, I reviewed the summary notes and discussed the interview with the respondents to affirm their perceptions and feelings. After each observation, I reviewed the summary notes and discussed the observation with the instructor and some of the students to affirm the perceptions and feelings of one another.

Phillipe, who was one of the five selected respondents for think-aloud, enjoyed working with ELLIS, but didn't attend the classroom activity with ELLIS. I contacted him and had an informal interview with him. I found that he had a strong opinion that the computer should be used individually in a lab situation rather than as a classroom activity. Through this kind of member checking, I could get students' various reactions toward technology. It also prompted me to consider the issue of how a teacher would handle many different types of students' reactions in a classroom setting.

Transferability The establishment of transferability depends upon the degree of similarity between the sending and receiving contexts (Lincoln & Guba, 1985). Thus, I had to provide the thorough description which would enable someone interested in making a transfer to reach a conclusion about whether transfer could be contemplated as a possibility (Lincoln & Guba, 1985). For reporting the findings and interpretations for this study, I provided a thorough and accurate description and explanation of the interactional processes of the setting and respondents. I wanted to describe this research as problem-setting in which the readers could have quasi access, which could lead to insightful findings rather than problem-solving in which the answers were
provided. However, I hope I "can create a virtual reality" (Langer, 1953, cited in Donmoyer, 1990) in which the readers can have "vicarious experiences" (Stake, 1980, cited in Donmoyer, 1990) getting insightful knowledge and understanding through the narratives of this story, so that the readers can apply those to their teaching and learning more powerfully.

Dependability and confirmability To address the issue of dependability, I must provide evidence as to whether the findings are dependable based on stable and consistent processes (Lincoln & Guba, 1985). Confirmability is established by showing whether the findings are grounded in the data and the inferences from data are consistent with available data (Lincoln & Guba, 1985). The technique for establishing dependability and confirmability is an audit trail as a principal means of establishing whether the criteria of dependability and confirmability have been achieved (Lincoln & Guba, 1985). Halpern (Lincoln & Guba, 1985; see also, Halpern & Schwandt, 1988) first detailed the specific audit trail.

For this study, I followed Halpern’s framework of the audit trail. There are two types of inquiry documentation: representing phenomena and representing inquiry procedures. For representing phenomena, raw data files, data reduction files, and data reconstruction files are used. For representing inquiry procedures, process notes, notes about intentions and motivations, and instruments, tools and resources are used. Lincoln and Guba (1985) provided the examples for each category. The raw data files include electronically recorded materials such as videotapes and recordings; written field notes, unobtrusive measures such as documents and records and physical traces; and survey results.
The data reduction files include field notes, summaries such as condensed notes, unitized information, and quantitative summaries. The data reconstruction files include structure of categories (themes, definitions, and relationships); findings and conclusions (interpretations and inferences); and a final report, with connections to the existing literature and an integration of concepts, relationships, and interpretations. The process notes include methodological notes (procedures, designs, strategies, rationale); trustworthiness notes (relating to credibility, dependability, and confirmability); and audit trail notes. The materials relating to intentions and dispositions include the inquiry proposal; personal notes; and expectations. The instrument development information includes pilot forms and preliminary schedules; observation formats; and surveys.

For this study, I used transcriptions from audio/video tapes, interviews summary notes, observations summary notes and documents summary notes, and pre/post survey results as raw data. I used the unitized data as data reduction. I used categorization of the transcriptions and field notes as data reconstruction (see Appendix Q). I also used a daily log (see Appendix P) as process notes, and pre/post survey and interview/observation/document summary forms as instruments.

Case Report

Beginnings of the work

My journey to look for a good ESL interactive multimedia program for my research was long and hard. Excited after reading the literature for interactive
multimedia, I got many demonstration programs and tested them but it was hard to get an ESL interactive multimedia program which was well organized and functioned as claimed in the literature. I was not very satisfied. I contacted many ESL researchers and graduate students who were developing their own programs, but most of those programs were not proper for my purpose or still in the process of being developed. Finally, I found ELLIS, which made me excited to use for my research since it covered many language skills which were provided with authentic language and well organized. But there was no way to get the program and a computer which could afford the high technology ELLIS required just for my research. With my major professor's help, which I greatly appreciate, I got a grant to use ELLIS for a year and arm a computer in our department to run ELLIS. This long journey to get a good program made me reconsider how hard it could be for a technology-motivated teacher to get a good program suited for her/his expectation, as a matter of fact, for her/his students' expectation and bring it into a classroom. In reality, it is not very easy to get a program which fulfills all the claims made in the literature. Even if a technology-motivated teacher finds a good program, s/he might have to confront a financial barrier to afford the high-technology, which might be turned into a political barrier, making it difficult to convince administrators, teachers and parents.

After much excitement to get the program, I cautiously knocked on the door of the director, Dr. Nelson[^1], of the Intensive English Program in our university to ask whether I could use one class for my research using this ESL interactive multimedia Program. Her answer was mixed with openness and curiosity, "I and our program are very open to any graduate students' research, but what's that and what are you going to do with that?" Glad to hear her
answer Yes, I described at length interactive multimedia, the program and my research design although there was a short break in the conversation because I wanted to work with the whole class for several weeks, not just sending some students to a lab. At that point Dr. Nelson suggested that I needed to talk with the instructor of the Advanced level class for the next semester since ELLIS is proper for high-intermediate to advanced level and the amount of time I could work with the whole class would depend on the negotiation with the instructor, who would be Alice. I was glad because I worked with her in my TESL (Teaching English as a Second Language) masters program and I knew Alice was very open to new ideas.

I met with Alice and explained what I wanted to do for my research. She was very open to using a different type of material for her teaching and excited about trying the technology: "I'm willing to give it a try. Part of it is I just want to expand my horizons a little bit. I mean, it's a selfish reason. I want to be able to say 'I've done this' and feel comfortable doing it. And the only way to do that is to just jump in and do it. It is a little scary for me." I said, "The computer is scary for anybody for the first time. But you'll find out you can do it."

The first reaction when Alice saw ELLIS was "Overwhelmed!" Alice just wanted to look at my demonstration instead of trying by herself, thinking she might be lost because ELLIS looked very complicated. We continued to meet several times to let Alice became acquainted with ELLIS. At the second meeting, Alice grabbed the mouse and began to explore the program. She watched and listened to some of the dialogues and wondered whether the dialogues would be proper for her IEP students. She thought the dialogues about business discussion or literary discussion of *Grapes of Wrath* would not be proper for the students.
She wondered how many students read *Grapes of Wrath* and it might be hard to work with the dialogue if students did not know the story. After Alice felt comfortable in understanding the whole structure of ELLIS, she began to navigate each section such as vocabulary, phrase, culture, grammar, or video in each lesson. Interestingly enough, Alice spent most of the time in the grammar section, reading the descriptions and examples very carefully and identifying some confusing or unclear points for students. Alice said in the pre-interview, "I'd rather deal with a substance just like grammar. I'm interested in those kinds of things, reading, grammar and writing, more than I am in speaking." Among many options, Alice selected her favorite subject and looked through it.

After Alice felt comfortable enough with ELLIS, we began to discuss how often to use ELLIS for classroom activity and set up a framework for the activity with ELLIS. In the beginning, we agreed to have an ELLIS activity once a week for three weeks. Later, I asked for more and it was negotiated to have an ELLIS activity once a week for five weeks if the students' reactions were positive and the class ran smoothly. Alice and I agreed to explore the information in a lesson first and then have a follow-up activity focusing on different language skills. Alice picked out the lesson about Registering and planned to have a role-play of being an advisor and a student who has problems focusing on utilizing the vocabulary and the expressions in the dialogue for students' role-play. We agreed to have the same framework for each activity, but employ various types of activity such as group discussion, or small group discussion depending on the topic being discussed at the time, following the context of the class. The discussion ended at this level before the semester began since the textbooks were not decided; thus, the topics could not be decided yet.
The technical set up was overwhelming. Since ELLIS was a very sophisticated program, I could get only one computer which could run ELLIS in our department. I used a Zenith 433 model which had an audio and video card in the computer for having audio and video on the computer monitor and SCSI board to run a CD-ROM. The computer was connected with a CD-ROM drive and a videodisc player. To use in the classroom, the computer set was connected with a LCD Panel and an overhead projector to project to a large screen. The whole process of setting up to run the program for the classroom use was overwhelming to both the instructor and the director. Their question concerned who could do such work to use technology in a class. This observation discouraged Alice from using technology for her teaching, "I wouldn't want to be responsible for all that technology. It takes somebody like you to set the thing up and run it. [We could use it] if you had a big enough department where somebody, a TA or somebody, knew how to do this stuff."

Although we did finally set up classroom activities incorporating technology as naturally as possible, I had to admit that it was a contrived situation, because I made the initial attempt of incorporating a new technology, not the staff of IEP.

In the meantime, I conducted a pilot study with three Advanced level students of Fall semester, 1993. I explained the whole structure of ELLIS with a chart which showed the substructures of each part of ELLIS. As a matter of fact, ELLIS is a huge program in terms of magnitude and complicated in terms of structure, even though it is well organized. Two students worked three hours and one student worked two hours with ELLIS. All three students spent half of their working hours solely exploring ELLIS and the other half on think-aloud
verbalization. In spite of the explanation and the help of the chart, two students lost track of what they had done and where to go many times. They couldn't understand the whole structure of ELLIS thoroughly. This phenomenon made them a little bit bored and they just stuck to a couple of features of ELLIS that they could control. One student could understand the whole structure fairly well the last time and enjoyed many other features of ELLIS that she had not tried before with many "Ah Ha"s. This experience suggested that disorientation and distraction would happen many times in my research. I also realized the importance of a more structured explanation and a concept map.

Opening the door of IEP

On a snowy evening, bringing my five year old daughter, I visited Alice's house to observe an IEP Welcoming Party because this year the party was in Alice's house. I could see a variety of nationalities and some nervous faces, being in a new country, new culture and using a new language. The instructors mingled with the students and led the conversation. When the meal time was over, the students were more relaxed and some South American students turned the Latin music on. A brave student asked the assistant director to dance the Samba with her. Everybody whistled. After a while, everybody stood up and it became a Samba party; of course, my daughter enjoyed Samba very much. By that time, I didn't see nervous faces anymore.

Later that week, I visited the IEP, located in one of the oldest buildings on the campus. The building appeared somewhat empty and quiet. But after I entered that old building, I found the building was full of energy. It was break time and the small lounge was full of students chatting, laughing, drinking
coffee and sharing pictures. The walls were full of the pictures taken from various activities of the previous semester. The assistant director's office door was wide open and two students were waiting to talk with him. I could overhear discussions about how to solve their visa problems and housing problems, and I saw them leaving with smiling faces while I was waiting to get some IEP documents.

The students could be relaxed and comfortable using a new language even at the Welcoming Party. The warm and open atmosphere of the IEP allowed the students to be comfortable being in a new culture, and using a new language. The students felt free to discuss their problems with the instructors and students of the IEP. The language learning became integral part of their life rather than only an academic activity.

According to the IEP Student Handbook, IEP has two purposes. The first purpose is to improve English proficiency. The second purpose is to introduce students to American life and culture and to acquaint them with academic life in the United States. The two purposes are very closely related. The philosophy of these goals is that you cannot use a language well if you do not understand its society and culture, and you cannot study and work in the U.S. if you cannot use its language well.

To meet these goals, the program provides a Cross-Cultural Studies class and many weekend activities as well as regular classes for language skills. The weekend activities are various, such as the welcome party described above, hockey/roller skating/bowling, trips to Minneapolis, theater events, food and folk dancing, movie and pizza, farewell party and so on. The weekend activities provide students a relaxed atmosphere to practice their English sharing their
concern, needs and fun. The topics of Cross-Cultural Studies are also various such as classroom courtesy, cultural adjustment, managing stress, how others see Americans, stereotypes and prejudices, personal safety, customs: dining, parties and so on (Annual Report, 1992). The Cross-Cultural Studies is one of the most popular classes for students because it provides students a new experience to learn how to view different cultures and how their culture is viewed by Americans, which students had probably not realized before. One of the students of the Advanced level class, Jang Hyun from Korea, once asked me (I, too, am from Korea) "Have you ever noticed we Koreans put one hand on the stomach when we shake hands?" I said, "I don't know. Do we?" He said, "Phil [assistant director and the instructor of the Cross-Cultural Studies class] talked about different manners and he said he wondered why all Koreans have stomachache when they shake hands. When Phil was acting it, it was so funny. Yes we do! I never noticed that." The openness and understanding of different cultures, which was a stated goal of IEP, was enjoyed and being fulfilled by many students.

A typical roster of IEP includes students from at least twenty countries and nearly a dozen language backgrounds. They include undergraduate and graduate students. The students are a heterogeneous group in terms of nationality and culture, and a homogeneous group in terms of their goal. The students come from many parts of the world such as Asia, Central/South America, Mideast, Europe, and Africa. Therefore, they have been taught in different ways and have many different educational backgrounds. Most of the students want to be admitted to undergraduate or graduate studies in the United States. Therefore, increasing their TOEFL (Test of English as a Foreign language) score is the biggest and the most urgent task to many of the students since TOEFL is the test required
for international students to study in the U.S. However, IEP leads students to focus on learning to communicate better in English, considering the students' different cultural and educational backgrounds as well as preparing for TOEFL.

As shown by many of IEP instructors and stated in Annual Report, members of the faculty have advanced degrees in Teaching English as a Second Language (TESL) or closely related fields, and most have extensive overseas experience and fluency in at least one foreign language. In addition to the qualification, all the instructors enjoy ESL teaching, which is a part of their lives. They are very open to cultural diversity. One IEP instructor, Jane, adopted an Indian girl and has become absorbed with Indian culture. She enjoys wearing Indian costumes at IEP parties and presenting information about Indian culture.

For Alice, the instructor of Advanced level Reading/Writing class, ESL is her life, but not only because she has 26 years of ESL teaching experience. Alice teaches both ESL classes and native speaker classes. She enjoys teaching ESL classes more than native speakers classes because she thinks she "learns a lot" from ESL classes in which all students are from different backgrounds. In native speaker classes, Alice feels "I've been pretty much bored silly when I taught Americans. They all had blonde hair and blue eyes and look alike." However, Alice values teaching native speakers; otherwise there is a "tendency to lose sight of what native speakers are doing." She believes ESL instructors "need some judge against which to, or some gauging as which to judge, particularly the writing of these (ESL) people."

Alice especially values learning about different cultures from her students. She believes that learning about different cultures give her a deeper understanding of people, society and the world. This understanding enriches
her life as being a whole person as well as her career as being an ESL teacher. She doesn't want to merely get information about different cultures, but wants to be a part of it. When there was a big exodus from Cambodia and Laos, she volunteered, working in churches to help these people so that they could order a hamburger and read a bus schedule. I believe her attitude toward different people and cultures, and the experiences with them, in return, make her understand and teach her ESL students as whole persons not just as English learners.

From time to time, Alice thinks ESL instructors are not properly paid and treated prestigiously on the campus, but always ends up saying ESL teaching is the best job for her: "There's never been a time where I didn't like what I was doing in the classroom, like my students. I don't want to do anything else." Since Alice's life is mostly involved with ESL teaching and ESL people, it is recognized that ESL is her life by the people around her. Alice once brought her American friend to her farm and Alice's neighbor said, assuming he was a foreign student, "He has really good English. Where is he from?"

IEP has good and appropriate purposes for this particular group of ESL learners, and fulfills the goals as one community with students and instructors. It provides various teaching strategies by qualified and experienced instructors in classrooms, and various activities outside the classrooms. The balanced combination of in-class teaching and outside activities enhances students' language learning, considering students' current needs, but never losing the ultimate goal of language learning.
Opening the door of the class

The Reading/Writing class met Monday through Friday from 9:00 to 11:00. The classroom was on the second floor of the IEP building, one of the oldest buildings on the campus. The classroom was just like any other typical classroom having a blackboard in the center of front wall and many chairs. But the arrangement of the chairs was different. It was arranged as a big circle so that everybody could see each other, including the instructor. This arrangement must be quite different to some students who are used to sitting row by row, facing the teacher in the center, in a typical teacher-centered classroom.

Sixteen students, eleven males and five females, in the Advanced level class were from all over the world, so that the class was mixed, with many different nationalities and cultures as well as different educational backgrounds. Even though the majority was eleven Asian students, they were from six different countries, sharing five different languages and cultural backgrounds. There were two Europeans, two Middle Easterners, and one South American. Although a few students came to IEP to improve their English for their careers, most of them had one purpose—to study either undergraduate or graduate courses in the U.S.

The Reading/Writing class had a schedule set up on Mondays for Writing in a Mac Lab, Tuesdays and Wednesdays for Reading with the textbooks, Thursdays for Reading with Newsweek, and Fridays for ELLIS activity. They also had Listening/Speaking class which met 1:00-2:00 on Monday through Friday. I tried to observe each of these to see the kinds of activities in the class.

On the day I first visited the class, the students were discussing diet from an article of a current issue of Newsweek. Students did not speak out much and
looked a little bit shy yet. Alice, the instructor of this Advanced level Reading/Writing class, took vocabulary first and then asked for the main idea. When Alice asked for the main idea, Han Chen from Taiwan was mumbling with his head down, looking at the article. Then Alice encouraged him to speak out "You read it. Just tell me about it." Alice constantly checked students' comprehension, asking questions, "How many people did they study?" "How long did they study?" "What are the problems?" and sometimes indicating where to read "Read column two, eighth line. It's there." Alice was often making connections to the students' situation, such as asking about their experiences with dormitory meals. Alice taught as if she was acting and kept talking in many different ways. Alice's habit of making gestures and rephrasing could be built up from her long experiences of ESL teaching and could be easier to understand for any level of ESL learners. Although Alice made students very comfortable, participating was still up to the students. Finally one student asked the meaning of a French word in the article. Instead of answering right away, Alice quickly turned to Phillipe, the French student, and let him answer it. By this time, many students could relax their stiff necks from looking down to the article and look around at each other and the teacher. Since it was the first week, students could not be relaxed but at least they could have a sense of a student-centered class, which Alice was trying to create.

Alice enjoys teaching ESL with much gesturing, acting, and laughing. Alice's teaching style is very flexible, making students comfortable and making language fun. When she explained the meaning of "sprawling," she almost lay down on the floor, slipping from the chair. When she explained the meaning of "peripheral," her gestures with hands and fast eye movements were so funny
that nobody could forget the meaning of the word. Alice always tried to pull up many relevant topics and rephrase an expression in many different ways. She showed good examples of using the language which was being discussed right at that moment. Alice believed that everything could be a lesson for ESL learners as long as they are communicating, "You can turn anything into a lesson because you're using the language to communicate, so I'm sitting here looking at the furniture and I can have a lesson about that." Based on this philosophy, Alice was very verbal as well as active in the class.

She was also very open to see her teaching style from the students' viewpoint, "Maybe I dominate too much, which is a possibility," she reflected. Maybe there were some students who thought Alice always talked about everything. But she had a strategy of leading students to think in an organized way, developing their thoughts step by step, and have them take responsibility for their learning by posing questions rather than saying "This is what you should do." Once Alice asked students to find the topic sentence. When many students were trying to guess haphazardly, she tried to make them think structurally, "I don't want you to guess. Read. It's there!" After students found out the topic sentence, she moved on to find the controlling idea. Then she asked students to find the connectors. In the end, students could find the supporting idea much more easily than before.

Alice considers the students' needs, but never wants to be restricted by their current needs such as for TOEFL preparation. Almost all of the students in IEP want to improve their TOEFL score in order to be admitted to a university in the U.S. However, IEP's primary goal is to improve English proficiency rather than prepare for a test. Alice also tries to teach them "to be able to think of the
language without translating and say what they need to say no matter what the students' current needs are." Certainly, the students in IEP do not need to adopt the culture because they are not immigrants who will have their life and living in the culture. But Alice believes that if they understand the culture, then the language makes more sense. Therefore, her teaching philosophy is "to get them thinking in the language."

Three or four weeks after the semester began, most of the students became much more relaxed and comfortable with each other and with the classroom activities. By this time, I observed the Reading class with the textbooks. It was a warm day and Phil was half dozing. Alice called him "Phil" and Suri sitting next to Phil yelled at him "Wake up!" Everybody laughed. The atmosphere of the class was changed. The class ran smoothly. Alice was still a captain, but not very obviously. Almost everybody participated asking questions and answering freely, except Mitsuko and Hae Sun. Mitsuko from Japan and Hae Sun from Korea were still quiet. I still could hardly hear their voices in the class. Other female students, like Suri from Indonesia or Wong from Hong Kong, became very active in the class and outside of the class too. When I talked with Mitsuko in the lounge, I found that she was a slow speaker, but spoke without any grammar errors. Alice told me Hae Sun was the best writer in the class.

However, I could notice that some students reacted very differently in some activities, like Mitsuko and Hae Sun. One day there was a Fluency Workshop activity in the Listening/Speaking class. In this activity, students were divided into two groups as speakers and listeners. One speaker and one listener became a pair group. The topic was given about registering for class, which was very relevant to all of the students. The speakers had three chances to
talk about this topic in four minutes with listener A, three minutes with listener B, and finally two minutes with listener C. Then the students changed the role of speakers and listeners. In this activity, I found that both Mitsuko and Hae Sun burst into speaking and were the most active participants. This small group activity, one-to-one communication with an interesting task, made them act so differently, which showed me the necessity of matching different learning styles with different learning activities.

Students were so different. Their attitude and reactions were all very different. Jose from Nicaragua and Kulad from Palestine were the most active participants in the class at any time. Widjak and Dju from Indonesia always wanted to focus on grammar, which they thought their weakest area. Jang Hyun from Korea was very good at making definitions for vocabulary. Phillipe from France, Uni a Basque from Spain and Jang Hyun were especially active in discussing political and economic affairs in the world.

However, cultural topics were the most popular one for everybody. Everybody had something to say about them, which made the class come alive. Alice was an active participant too. In addition to that, she was alert to make a cultural connection with any topic such as diet, registering for class, jobs, immigration and so on. As a matter of fact, she already knew the cultural differences, so that she could lead students to make comparisons and raise their consciousness about cultural differences. When the topic was on registering for class, Alice explained about deciding on classes, working out schedules, and meeting with the advisor. She mentioned that in some cultures students could just sit and ask what their classes are, but here in this culture the advisor would say "Go home and come back." Everybody laughed, but they could notice the
cultural differences and adjust themselves with this simple episode. The connection to cultural points with any topic made language real to the students.

Even though it was a Reading/Writing class, Alice's concern did not stay on only reading or writing. Alice always picked up the relevant topics and tried to make the language in the textbook authentic to students. Once students were practicing reading a graph on immigration to the U.S. The focus of that activity in the textbook was on reading big and complicated numbers in English. After Alice finished checking questions in the book, she asked students "Which country surprised you?" Kulad said "Iran." Alice asked "Why?" Kulad said "Iran and U.S. don't talk . . . " Uni became involved this discussion, saying "Because Homeini . . . " Then Phillipe talked about immigration to France from Middle Eastern or African countries and expanded his information to talk about employment and political matters. It began with reading numbers but became like presentations about immigration relevant to political, economical and cultural matters. But it was so natural and spontaneous. Alice tried a similar method for the language skills. Her concern did not stay on only vocabulary, grammar or reading comprehension. Many times she picked up pronunciation, stress or better expression. Alice tried to teach English holistically rather than discretely, focusing on specific language items in a traditional lecture style.

The class was the main place for all of the students to study and practice the language. Many were nervous about adjusting to a new way of life, including school life. But they could overcome the difficulties fast and easily because Alice made the atmosphere of the class so relaxed and comfortable. The students became like a family; they participated more actively, and the class ran smoothly. Alice made the class fun, exposing students to many different ways of
topics and learning experiences so that they could make the language more real and authentic.

However, the students were still all different. They had different needs, different interests, and different strengths and weaknesses. They had different learning styles. They reacted differently. This observation made me wonder if there was a way that we could expand students' learning to their individual needs and interests so that they could take responsibility for their learning. There must be a tool with which we could closely connect the role of classroom teaching and individual learning.

Incorporating the technology into the class

Situating the technology to the class began with the introduction of my research to the students. Thanks to all students, everybody signed the consent form. Some of them showed a lot of interest in using a computer program in language class. Alice and I were a bit nervous because Alice had never used a computer as a main medium for her classroom activity and I didn't know how all would react to this new environment. After the introduction of my research, we had a demonstration of ELLIS and hands-on practices in a small group to let students be acquainted with ELLIS before we began classroom activities with the program. While the students had classroom activities with ELLIS on Fridays, they could voluntarily work individually in the lab.

First, I want to look at how technology was being used in IEP and how technology was perceived by the students, instructor and director; then I will unravel the story of how all reacted to this new environment.
Current status of technology use in IEP

Although some supplementary materials are being used, all of the required courses such as Reading and Vocabulary, Writing, and Grammar, Listening and Speaking classes rely primarily on textbooks.

The language lab, Language Learning Center, provides materials coordinated with the Listening/Speaking classes. Some of the materials were developed by the IEP instructors, while others are commercial audio tapes, videotapes, software, and realia (Annual Report 1992). The hardware in the Language Learning Center includes cassette recorders, a video cassette player, and three Apple IIe computers. The software in the Language Learning Center are Print Power, The Newsroom, Famous Scientists, Speed Reading II, Word Attack, Word Scrambler, ESL Computer Grammar and Grammar Mastery II. In general, the technology being used in IEP is on the audio/video tape level. The types of software are very old Apple programs. Among those software, only Grammar Mastery II is often used and the others are seldom used.

Above all, the use of those materials is not closely integrated to classroom learning. One instructor admitted that "I don't know if they know about that [the programs in the language lab] yet, but we'll talk to them about it. But none of it is assigned. All of it is in the lab and they can just go in and work on their own." The use of those materials depends on students' perception of their needs, "We also have TOEFL prep courses on computers. As you get closer to TOEFL, it is more heavily used."

No matter what kinds of software we have, it is more important to use those most efficiently rather than to store them as assets. In order to use any teaching materials properly and effectively, a strong connection between the
students, class, and school is needed. Informing students of the availability of any learning tools is not sufficient, especially, for the new type of materials such as computer programs. The students need to be guided in not only the availability of learning materials but also the possibility of efficient use of those materials. When the students use learning materials depending on their own perceptions and needs, there might be a danger that the materials would not be used appropriately. The correct guide for the students should be made by the teachers and the school.

In summary, IEP is not a very open society to technology yet. The technology use in IEP classrooms or language labs is fairly limited. The types of hardware and software are old and not varied. The use of those materials is not fully integrated into classroom teaching and learning. CALL is not yet integrated into IEP.

The students, instructor and director's perceptions on technology
Several students had previous experiences using the computer for word processing (Word Star, Microsoft Word, Word Perfect) and spreadsheet (QPro, Lotus 123). Most of the students had used word processing for their papers or resumes and spreadsheets for their computer applications class assignments. Only one student had various experiences of using many different types of computer application such as word processing, spreadsheet, database, graphics and desktop publishing. However, none of the students had been exposed to an interactive multimedia type program yet.

In an open-ended pre-survey of the perceptions on technology, all the students showed positive opinions except one who showed mixed feelings. Most
of them believed that the technology was powerful so that it could be helpful for language learning. Specifically, the students expected that the use of technology for language learning could be "interesting," "new," "faster and more efficient," and "a sophisticated tool in language learning." Many believed in the possibility for individual learning, "to improve myself as an individual," "to allow me to practice it any time that I want," "to repeat as much as I want." One student believed that "computers can make us be more interested and attracted" but "the problems are they are impersonal and sometimes tedious."

Several of the students thought they knew the term "hypermedia" or "interactive multimedia" and attempted to define it. Many tried to define it in terms of the combination of different media and one student touched the meaning of interaction as "relationing people with many kinds of media."

Alice's experience with the computer has been with word processing. She has been teaching four or five semesters using word processing in her class. This experience made her more familiar with the computer so that she did not have anxiety about the computer. She strongly believed in the power of word processing for the writing process. She recognized the possibility for the revision process for the content of writing as well as the mechanical revision, "I think it (word processing) helps a great deal . . . all the mechanical stuff, but basically you can ask them to revise a lot. I think that's important."

Alice also believed, as most of the students did, that the role of computer for learners would be for individual learning. She was "not convinced the computer can do much in the classroom; it's more of a lab situation." However, she was very open to see what would happen in this research, "I could be proven wrong and I would be glad to be." She wanted to try to make classroom activity
and individual work cohesive, even though she guessed "I could have the same lessons without the computer and the results will probably be the same." From the teaching point of view, Alice wanted to expand her teaching experience so that she could have more confidence and self-esteem for a new type of teaching material, technology.

Alice made an interesting point connecting English and technology. She noted that "technology communicates in English so that English is an access to information in the world." She pointed out that "Ninety percent of the world's technology, all that information, is in English. You can't get it any other way. So that's a real cultural imperative. English has a stranglehold on that information and the computer is their access to it."

The director, Dr. Nelson, perceived technology from an administrator's point of view. Dr. Nelson's opinion about technology was "in the middle but toward the negative." First of all, the director was not very convinced by the power of technology as a learning/teaching tool yet, "That the students ultimately learn more from having the technology than from not having the technology. If it's just a game and it doesn't result in any improvement in their proficiency, what's the point?" Second, the director was overwhelmed by the rapid change of technology and yet was unsatisfied with the available software. She explained: "It's always changing. We're always learning new programs, new word processing packages. It takes a heck of a lot of time to do that, to keep up, to upgrade ourselves as well as the equipment. And as yet, I haven't seen any good applications of that to the classroom setting, or even to the language lab without an enormous investment of money which we don't have." Third, the director was struggling with the possible problems when we implement a technology
from an administrator's point of view: "We are hampered by our classroom locations, by our budget, by the physical and time considerations, where the teachers would have to preview the materials to figure out what language elements to exploit from it, how to make it understandable to their particular students and so forth."

It is unfortunate that the director was not very positive about technology. However, the concerns and worries she had from an administrator's viewpoint should be recognized as the barriers that anybody can encounter when we attempt to implement new technology into a traditional setting. The cost and benefit, or the balance of budget in terms of money and time are the most practical issues that we have to deal with. In general, an administrator takes the responsibility for overcoming the social, political, and financial barriers. However, in order to fully incorporate technology in social and educational contexts, the responsibility should be shared by all members of a certain setting. In reality, a technology-motivated person in a certain setting often takes the responsibility and lets others realize the need, possibility, and advantages of using technology in learning and teaching. It may be hard to implement a new technology if we consider the efficiency of technology only in terms of money and time rather than learning and teaching.

In summary, students had positive feelings about technology in their language learning, but had little experience in using it for their language learning and did not know how to use it yet. The instructor had positive opinions about technology and some experience in using the computer in her classroom teaching, but she believed the computer use would be more proper for
individual learning than classroom learning. The director's concern was more from an administrative point of view than a learning/teaching point of view.

Locus of control: student-centered vs. teacher-centered  The locus of control is always an important issue in classroom setting whether it is teacher-centered or student-centered. Teacher-centered instruction aims at imparting knowledge from a teacher, but student-centered learning involves in critical thinking, problem solving, or experiencing (Cuban, 1993). Cuban (1993) characterized teacher-centeredness as "whole-class instruction, teachers talking most of the time while students listen, a limited range of activities done by the entire class (such as using the textbook or worksheets), and little voluntary student movement" (p. 273), and student-centeredness as including "learning centers, tables clustered so that students can speak and work together," increasing "use of small groups for instruction, and relatively free student movement," having "students decide what to study and how much time to spend on particular topics" or using "learning centers as the primary means of instruction" (p. 273).

In the ELLIS activity, the locus of control was changed very naturally. In the classroom, Alice usually led the discussion and often called the students' names to answer. The students participated more toward the middle of the semester. However, the student-centered learning was created by Alice and she remained as an invisible captain. In the classroom ELLIS activity, there was no invisible captain; the students were the captains and Alice joined them. Starting from the students' selection of the features of ELLIS, the students and Alice opened a dialogue and watched it. The students often had questions, read the
descriptions of the information together and asked questions, and Alice often added her explanation and showed the examples of the language use.

However, the change of the locus of control did not happen right away. In the beginning, Alice tried to cover everything in ELLIS. Alice took the initiative in opening the dialogue, moved to open each module of dialogue, read the description of each highlighted item in Vocabulary, Culture, or Phrase. As in classroom activity, Alice used the strategy of adding and supplementing her explanation, relating to the students' situation, and exemplifying the language use. But basically she followed the sequence of ELLIS. Later, Alice controlled her pace, asking the students to choose the items they want to explore more often. Smoothly, the students adjusted to the system Alice created. Then the students took the initiative in choosing and exploring the information in ELLIS and Alice followed.

Although the locus of control was changed from teacher-centered to student-centered, Alice was conscious of the issue of teacher control. She believed that teacher control was still needed to a certain degree in language learning; otherwise it was hard to know whether the students understood or not. "When I'm not in control, then it's really hard to point out connections . . . I mean if it's not teacher centered, you can't do the interrupting . . . I had specific questions I wanted them to think about." As a matter of fact, Alice sometimes tried to guide the discussion even if the students took the initiative. For example, after studying an item the "historical setting" in Culture of Literary Discussion dialogue selected by the students, Alice asked about the background factors such as the world economy, jobs, or weather. Kulad talked about weather,
such as floods or earthquakes. Alice quickly asked "Was it predictable?" using the word "predictable" which was discussed in vocabulary right before.

The change of the locus of control also brought more participation from the students, although the students had their favorite areas, depending on their needs and interest. Widjak was usually quiet in the classroom activity. But he was active in asking to choose items in Grammar since he always thought he needed to improve grammar to get a higher TOEFL score. Jang Hyun was always active in exploring Vocabulary items, but he showed more interest in Culture later.

Disorientation/distraction One of the biggest worries of teachers and researchers is if the students have a negative effect in contrast to the advantages of interactive multimedia programs. Disorientation or distraction is often discussed as a major shortcoming in an interactive multimedia environment (Heller, 1990; Marchionini, 1988). The disadvantage of the freedom of navigating and learner control in a large interactive multimedia environment is that this freedom can often causes students to get lost in the program or focus on information that is not central for learning goals. Many researchers have recommended that we need appropriate and clear navigational and conceptual tools such as a comprehensive index or map to help learners explore and discover learning in an interactive multimedia environment (Heller, 1990; Marchionini, 1988; Morariu, 1988).

The experience from the pilot study made me worry about disorientation or distraction. Alice and I discussed this matter and agreed that we must have enough time let students understand the program before we began classroom
activities with ELLIS. We had a demonstration of ELLIS and one week later hands-on practice, dividing the class into two groups so that the students could have enough chance to become acquainted with the program. Alice was very nervous about doing the demonstration and asked me to do it. But I politely rejected that, insisting it would be more appropriate that the teacher who will work with student do the demonstration.

For the demonstration of ELLIS, Alice was in charge and I worked as a typist and supplemented when it was needed. A flow chart which showed each feature and ways of navigating between features as well as the whole structure was distributed to students. I thought a flow chart for each student would be enough, but Alice wanted to have a transparency of the flow chart projected to the big screen. Because it was not possible to arrange LCD panel at that time, the students gathered around the computer monitor and Alice began to ask me to open the program. Alice's pace was very slow to me, so Alice had to say many times, "Wait, wait, Yuhsoon! Don't go yet. We gotta talk about this," of course in a very humorous way. Alice knew exactly where the students would be lost, even with their silent faces, which I couldn't notice. Alice knew exactly where to slow down, make a short break, pose questions, let them think, and make sure whether they follow with the transparency. The demonstration lasted one and half hours, which was much longer than our plan. Alice asked the students to do the next activity as the original plan, but everybody wanted to stay with ELLIS.

After this demonstration, the students had hands-on practice in two groups and then the classroom activity with ELLIS began. Along with the classroom activity with ELLIS, the students could sign up for the individual work voluntarily and five students were selected for the think-
aloud/retrospective verbalization. Based on the observation of students' individual work and the think-aloud/retrospective verbalization, it was found that disorientation or distraction were not a problem for this group of students except one case (described in Looking Inside the Learners). The students were comfortable in understanding the whole structure and could navigate through ELLIS as they wanted, although some students had trials and errors in misunderstanding of the functions of some features of ELLIS.

The demonstration, the first encounter to the students, was conducted in a whole context in which the teacher knew the students, and the students trusted and were comfortable with the teacher, although it was in the beginning period of the semester. The demonstration was conducted in the classroom as a part of the regular activities. If the students had been sent to a computer lab and instructed by a lab monitor or someone they don't know well, they might have reacted differently. They might have been disoriented or distracted in this environment since it was out of context.

Mitsuko, one of the five selected respondents for the think-aloud, was the exceptional case throughout this study. Mitsuko was intelligent and had a high proficiency of speaking and writing. However, she was constantly lost in the interactive multimedia space. In order to overcome the disorientation, Mitsuko used "process-monitoring" strategy of tracing back what she did, and "evaluating" strategy to analyze what happened and whether it worked or not. Mitsuko's attempt to overcome the disorientation using learning strategies was successful, but finally she was discouraged to attempt because of her constant lost in this environment. If Mitsuko were guided sufficiently to be comfortable to work in this environment, she could use her learning strategies to learn rather
than to overcome disorientation. In classrooms, there might be many Mitsukos who need a guide. Then the teacher's role becomes apparent for the disoriented learners in this environment. The disoriented learners need to be guided, facilitated, and encouraged by the teacher.

The students' reactions to ELLIS In an attempt to follow the context of the class, four dialogues of ELLIS were selected for the activity. A role-play activity was conducted with Registering dialogue, a group discussion with the Literary Discussion dialogue, a small group discussion activity with the Introduction dialogue, and filling out job application, writing, and group discussion activity with the Job Hunting/Interview dialogue. All the activities were resulted as very active, alive, participatory, and fun. In the beginning period, a few of the students did not understand the system of having an activity about the relevant topic after exploring the dialogue in ELLIS, but they could get it pretty soon and enjoyed the activities.

The registering, introduction, and job hunting and job interview were all very relevant topics to the students. The interest for the relevant topic to the students was highlighted and developed in order to have richer discussion when they could see the real setting. After watching the Introduction dialogue, Kulad quickly picked up a little bit unnatural expression for the situation "Nice to MEET YOU!" The discussion was developed around formula language use in greetings such as "Give me a call, we'll go to lunch" Alice explained that "We don't know if it will happen or not. It's up to you whether you follow upon it or not. You may hear that in the Memorial Union (school cafeteria building). It's
just part of the language, formula language." She also exemplified more such as "I'll let you go" instead of saying "I gotta go."

Although Alice thought she could have the same activities without using ELLIS and ELLIS "just gave us a framework," it seemed more appealing to the students. Many students thought it was "very real," "more interesting," "motivating," "active," and "can use the same thing (expression) from this program in daily life." In the classroom, usually the textbook is the most powerful tool. In the classroom activity, the textual language from the textbook can be the model for students. However, the language from the textbook is often static, unreal, and inflexible (Freeman, 1992). The audio/visual exposure to real situations with authentic language made students have more active activities, and further, let them have a close connection through which they could use the language in their lives.

Based on my observation, I believe that most students enjoyed the classroom activity with ELLIS. They participated more actively. They could have a different learning experience, student-centered learning. However, not many of the students, including the instructor, realized the value and importance of the aspects of this type of material in a classroom situation. Many students stated in the post survey that the computer is for individual use. As a matter of fact, there was one student, Phillipe, who showed a strong negative reaction to the classroom activity with ELLIS. He didn't come to the classroom activity with ELLIS after the first activity in class with ELLIS. He believed that the computer should be used individually in a lab situation and the teacher could check what individual students did. He explained, "I think for a big class the best way would be kind of with a lot of computers but each one is working on their own . . .
What the teacher can do just to check out if we understood, he could print the
dialogue with blanks to fill in just to see if we got the vocabulary. Because this is
a computer so you can do everything you want, and for me, a computer is kind
of personal."

If we have many students who have a strong preconception like Phillipe
in a classroom, what would happen? The perception or preconception of
technology affects the ways students work with technology. The teacher should
figure out ways to deal with this type of students beyond the learning or teaching
about the subject matter.

The interest for ELLIS was very high, so the sign-up sheet for individual
work was filled out quickly and there were always a couple of students who felt
badly because they missed the chance for the week. About three weeks later, the
interest for individual work had been saturated. Alice pointed out two reasons:
the students became busier toward the middle of the semester, and they came
from cultures in which voluntarism was not necessarily a common thing. But
most of all, by that time, the classroom activity with ELLIS had settled down.
Alice got the pace of controlling ELLIS activity, the students could know what
they were doing and what they could do in ELLIS activity, and the class ran
smoothly. The students felt that they were exposed to the program sufficiently in
the classroom. It was difficult to have a close connection between classroom
activity and individual work because only one copy of ELLIS could be used for
this research. Due to this limited situation, the individual work could be used
for only a voluntary basis and not been encouraged much for all students, such
as assignments or supplementary learning activity for their needs. If the
students could have an equal chance to use ELLIS, the teacher could expand the
classroom activity to individual work and have a close tie between two activities, considering students' needs and their learning style.

**Unexpected changes**

The student-centered discussion created through the ELLIS activity made some students open their eyes to new aspects of language learning. In the dialogue of Introduction, there were two different styles of sales persons at the theater. The female ticket seller had very unkind and abrupt tone of look and voice. But the young male ticket taker was very polite and pleasant. As a matter of fact, the contrast of these two sales persons was not a central point for learning in this dialogue. It was just a part of the setting. However, Han Chen picked up the difference of two sales persons' manners and many agreed. This could be developed to have a cross-cultural discussion about sales persons' manners in many different cultures. In an informal interview with Jang Hyun, he confessed that he was very surprised by the fact that an Asian student like him (Han Chen from Taiwan, Jang Hyun from Korea) having a similar educational background, noticed the importance of the socio-cultural background, which he never paid attention to such a matter. After that event, Jang Hyun tried to open up his eyes to the socio-cultural aspects of language, controlling his concern toward grammar and pronunciation. Later I could also observe that Jang Hyun built up a new learning habit of note-taking in ELLIS activity. He constantly jotted down notes and marked on some of them. I asked the reason for the marking and Jang Hyun said that he wanted to study more about those after he went home.

The different type of teaching material even challenged the teacher to try a new thing and brought a new experience to students. When Alice examined the
dialogues of ELLIS before the semester began, she thought the Literary Discussion
dialogue with *Grapes of Wrath* might be the most boring one to students.
During the time we prepared ELLIS activities, Alice changed her mind and was
challenged to try a new thing with this dialogue after she carefully paid attention
to the topic on how to have a discussion about literature. Alice rummaged
through her old files and found a literature piece "After You, My Dear Alfonso"
by Shirley Jackson. In this story, there was an on-going simple dialogue between
an white American boy, an African-American boy, and the mother of the white
American boy. Based on the Literary Discussion dialogue with *Grapes of Wrath*,
the students and Alice could have a deep discussion with "After You, My Dear
Alfonso" about stereotypes, different perceptions of culture, historical
background, mother-boy relationships, expression styles, and so on. This activity
was challenging to Alice, "I haven't had a chance to do literature for a long time
and I think I had a better time than the kids did but . . . I really hadn't taught in
years and I really enjoyed it." Not only to Alice, but also to the students, it was a
challenging activity. In the group discussion, I could notice some of the
students' eyes were sparkling. Wong, Uni, and Ahmed were usually quiet and
not very participating in the classroom discussion. But in this discussion, they
were the most active participants and picked up on many good points. In an
open-ended post survey, I found that half of the students were negative, "a little
bit boring," "didn't understand it very well," or "made me confused." But the
rest were very positive, "I love that story!" "very helpful to discuss all things in it
like meaning," "learned how to against/argue if I don't like other people
answer," "can learn how to discuss some topics," or "tells me how to act in the
society."
Sometimes Alice had to adjust her teaching style to this setting. When the students were watching the dialogue, Alice often wrote down words that she wanted to explain on the blackboard, even though it was dark because of the LCD panel use and whispered to me "It's really hard to wait. I want to explain now." She felt that she lost her spontaneity of teaching, but soon she made adjustments. When the students were watching the Literary Discussion dialogue, Alice wrote down "morale" and "propaganda" because she did not want to stop the dialogue to explain those words. After moving up to Vocabulary, Alice said "There it is. 'Morale!'" and explained about the word.

Alice did not hesitate to point out confusing descriptions provided in ELLIS. When Alice thought the description was wrong, she did not want to compromise the meaning. In Introduction dialogue, "I see your point" was defined as "I agreed." Alice disagreed and asked Dr. Nelson, who was invited to observe, "Ann, do you think so?" Dr. Nelson shook her head and said "Sometimes we say 'I see'." Alice said "Still doesn't mean 'I agree'. It's more like 'I understand'. Bad definition!" All laughed. Alice picked up another case of "I don't see it that way." It was defined as "I don't agree" but Alice explained that it meant "I understand it differently." Alice tried to introduce to students authentic and accurate use of language rather than just follow the information provided.

While Alice and I prepared classroom activities, the same type of discussions as we had before the semester began was conducted for each activity. The problem we encountered was that we were often wondering about who took the initiative since it was a contrived situation for the research, even though I tried to make the setting as natural as possible. I asked Alice to have absolute
control for her teaching and the class, but she asked me many times, "Is it OK for your research?" Often times, Alice had to be convinced to try something because it was her first attempt using a computer program for her teaching. Alice also related this matter to a teaching point, "Honestly there were two of us working that in every classroom. If I had to do all the punching up and teaching too, that would be a whole different ball game."

The technical concern from the teacher's viewpoint is an important aspect that we should be concerned about when we are incorporating technology. As noted before, Alice "wouldn't want to be responsible for all that technology."
The new changes which occur by incorporating technology, such as technical concern, preparation for teaching using new technology, and new adjustments for teaching style and class management should be carefully discussed and examined. The responsibility and enjoyment of incorporating new technology in a school should be shared by all members of the school community, the administrators, teachers, parents and students, not by the teacher alone.

In the post-interview after we finished the ELLIS activity, Alice summarized the situation by saying that we tried to incorporate classroom activities into the technology rather than incorporate the technology into the classroom activity. For the future use, Alice thought, "If I have something where there is a lesson on ELLIS that the class could benefit from as a whole, I'd come get it, but I would not build a class around it. I would not let it dictate what I wanted to do. I would use it when I wanted. I would use it as a tool and in a lab where the students could come if they needed or individually when we could come as a class when we had a need for that given topic or whatever we were doing. I would not make the tool run me; I want to run it."
It is important how we perceive and adopt technology to learning and teaching. Alice's concluded statement, "I would not make the tool run me; I want run it," should be noticed, although her statement was made in the contrived research situation. As noted before, Alice had a teaching philosophy of "intervening" whenever it is needed, even though she wanted to create a student-centered learning environment for the students. As her teaching philosophy of "intervening," the initiative role of using technology should be made by the teacher and further shared by the students.

Wrapping-up

For this case study, I began with a guiding question "How is interactive multimedia incorporated into an ESL learning environment?" I, then, developed the guiding question to more specific questions on the teacher and students' perceptions of an interactive multimedia environment, the teacher's role and the students' interactions in this environment.

The setting for this research was a contrived situation in which I asked the class to use technology for my research rather than a purely naturalistic setting in which the class is already using technology. However, the study should provide insightful findings which can provide "vicarious experiences" to other settings.

The students, instructor and director came from all kinds of directions in terms of technology perceptions and experiences. The majority were positive, but everybody had different experiences, perceptions, and expectations. The perceptions of technology greatly affected the way of using technology. Most of the students were positive and cooperative for classroom learning with technology except Phillipe, who strongly showed a negative reaction to the
classroom activity. His preconception that the computer should be used only for individual learning never let him change or be cooperative in the classroom using technology. The director's concern for technology from the administrator's viewpoint kept her being positive or actively adopting technology to the traditional setting. However, we should recognize that the administrator's concerns are real and practical barriers that we should recognize and try to solve. The instructor and most of the students were open and positive to the technology as a learning/teaching tool. However, they didn't admit the power of technology wholeheartedly as a tool for classroom learning and teaching. The activities with ELLIS seemed much more appealing, motivating and brought more active participation, but some students and the instructor believed that it would be the same without using ELLIS. Although they enjoyed and had new experiences with technology, it was hard to change their preconception about technology.

Is the director in charge of breaking the barriers of adopting a new technology? Does the instructor of a class have to be in charge of controlling the class if we have twenty Phillipes in the class? When we use technology in the classroom and school, the technology is not a mere learning/teaching tool anymore. It creates a new environment in which all the members interact together. The barriers, problems, excitement, enjoyment, learning/teaching process and outcomes should be shared and discussed together.

Among many new changes and adjustments, it seemed the most important that the locus of control in classroom learning and teaching was changed. Student-centered learning could occur naturally in this environment and the teacher could adjust the degree of teacher control depending on the
needs and situation. Alice was constantly trying to create student-centered learning in regular classroom activities. Her attempt was fairly successful, although she had to remain as an invisible captain to remind the students to be the center. In the classroom activity with ELLIS, Alice didn't need to remain as an invisible captain. However, Alice wanted to keep her teaching philosophy of "intervening" whenever it was needed. Consistent with her teaching philosophy, Alice showed a similar reaction to adopting technology for her teaching. Alice concluded that she would not allow the technology to change learning and teaching. Rather she would want to use the technology as a tool to transfer to its original setting.

I, as an investigator of this research, was glad to see Alice's reaction to technology. It is ideal for the teacher to show the model of how to use computer. We have to teach the students that they are the owners to make the computer work for them as Papert (1980) strongly claimed. This ownership is especially important in an interactive multimedia environment which allows the freedom, but also requires the responsibility.

The students' interactions in this environment were varied. First of all, most of the students enjoyed the new experience and the challenge of using the new learning material. The ELLIS experience enabled the students to share different learning styles and motivate each other, as in the episode of Han Chen and Jang Hyun. Many students could react differently with the new type of activity which could be brought by the new technology, as in the episode in the literary discussion with "After You, My Dear Alfonso." Most of all, the students were able to be part of the student-centered learning and finally become the center of the learning by themselves in this environment. Interestingly enough,
disorientation or distraction were not a problem in this particular setting in which we tried to incorporate a new technology in a whole context.

If we can expand and develop the student-centered learning which naturally occur in this environment, the students would be able to take responsibility for their individual learning. The teacher's appropriate guidance facilitation to connect the classroom learning and individual learning would enable the students to be more independent and self-directed.

I hope that the findings from the process of five selected students' individual learning with ELLIS (which is described in Looking Inside the Learners) can provide insights to tie together classroom learning and teaching, and individual learning through the tool of technology.

Notes

1. In this paper, I called the director of IEP as Dr. and the other instructors as their first name. As a matter of fact, all the instructors that I mentioned in this paper including Alice are Ph. Ds. The reason I used different title is not because I respect them differently, but only because I used to call them as the way I did in this paper as I've know them, although I respected them all.
LOOKING INSIDE THE LEARNERS

Introduction

As the educational advantages of interactive multimedia have been recognized, there have been great demands and interests to know how we can use interactive multimedia most effectively for learning and teaching. Since an interactive multimedia environment allows the learners to have the freedom of navigation and a high degree of learner control, it is especially emphasized that the teachers and researchers have to understand both what and how the students learn using this type of material (Chapelle, 1990; Dunkel, 1991; Chapelle, 1994).

Agreeing with the claims in the literature, I became interested in seeing how freely students navigate in this environment, what affects students' learner control, and finally, what they learn in this environment. When students are working with an interactive multimedia program, the freedom of navigation is realized by the interactions the students make and the learner control is realized by the learning strategies the students employ to make decisions for the interactions.

In this study, I began to look at how an interactive multimedia is incorporated into an ESL learning environment. After I investigated how an ESL interactive multimedia program can be used in the classroom setting, and what the students can learn in the classroom with an interactive multimedia program, I wanted to investigate closely how the students work individually, what they do, and eventually how they make a connection with the classroom learning and their own individual learning. If the students make a connection with the classroom learning and their individual learning, does the classroom learning help them be
independent and responsible using the benefits of interactive multimedia? What can the students learn from an interactive multimedia program combined with classroom learning, and how can they utilize it for their independent and responsible learning?

In this chapter, I will first discuss four themes that I want to address to investigate individual work closely. Second, I will present the research process. Third, I will present the data sources and data analysis for the four themes. Fourth, I will present a case report for each of the respondents, discussing the four themes for each case. Finally, I will present the summary.

Four Themes

In order to investigate individual students' work closely, I want to describe the similarities and differences of each respondent under the themes that I focused on. My main focus was on investigating the extent of non-linearity and extent of learner control in an interactive multimedia environment, (see Research Questions 4 & 5), because the freedom of navigation and the demand of learner control were the two key factors in interactive multimedia. I wanted to know to what extent the students freely navigate in this environment and to what extent they use their learner control, and finally how the relationship between the freedom of navigation and the learner control affects their in-depth and independent learning. I was also interested in investigating the differences between working on the program when the students had a certain purpose for using it and when they didn't. I wanted to see the differences in the students' approaches using the features of the program depending on whether or not they had a task to perform. I also noticed from the
pilot study that the students' attitudes toward the program were all different, especially because working in an interactive multimedia environment was new to them, and their different attitudes affected their working style on the program.

Thus, the major themes that I focused on were navigation and the extent of nonlinearity in students' paths through the program, degrees of learner control and in-depth learning, relationship with the tasks, and general attitude toward working in an interactive multimedia program.

The freedom of navigation was carried out differently by each of the respondent's patterns of exploring and navigating in this environment. The different pattern of exploring and navigating produced by selecting different interactional modifications provided in the program showed the extent of nonlinearity of navigation.

Then, I focused on how the respondents had in-depth and independent learning so that they took responsibility for their own learning, depending on the different degrees of learner control in terms of whether they learned and interacted deeply or superficially, whether they were active or passive learners. The different degree of learner control was carried out by employing different learning strategies in this environment. I also wanted to see if there was a relationship between the respondents' interactional patterns and the extent of nonlinearity, and the learning strategies they employed.

I also focused on the respondents' different reactions when they had a task and no task. When the respondents had a task, they approached to the task differently depending on the perception of the task. The different perceptions of the task influenced the way how to gather the information from the program and get a clue for the task.
The general attitude and perceptions toward the program were focused on to see how the respondents' attitude and perceptions influenced how to approach, deal with the program, and solve the problems or barriers encountered in this environment.

For all these four themes, I also wanted to investigate the traits of respondents' connecting the classroom learning and their individual learning. Do the respondents make connections between the classroom learning and their individual learning or not? If they make some connections, are the connections similar or different for each respondent? What do they take from the classroom learning and how do they utilize it in their own individual learning?

Research Process

In order to have a close and in-depth investigation of the individual students' interactions with the interactive multimedia language program, I asked a selected group of five students language learners to interact with ELLIS. To examine the respondents' interactions and thinking processes of learner control, I videotaped their interactions with the program and collected think-aloud and retrospective interview data to investigate thinking processes.

After the demonstration, hands-on practice, and one classroom activity with ELLIS, at the end of Week 3 (see Appendix C), Alice and I selected five respondents. In order to select five respondents, I used purposive sampling in which the respondents were selected for the purpose of the study. The concerns for the purposive sampling were voluntarism, sex, nationality, placement test score, and ability and willingness to think aloud. The first concern was voluntarism. When I
first introduced my research on Week 1, I announced that the students who volunteered would get priority to be selected as one of the five respondents. During the demonstration, hands-on practice, and one classroom activity with ELLIS, five students, Jang Hyun, Widjak, Han Chen, Phillipe and Jose, volunteered. From the pilot study experience, I found that the think-aloud was not an easy task for nonnative speakers working on a new type of learning material. Thus I decided to have think-aloud training before I began a close examination of the selected group of learners. Unfortunately, Jose gave up in the think-aloud training because it was too hard for him. Alice and I decided to replace him with Mitsuko, who was interested in individual work with ELLIS. Two of the students were in the high range of the placement test score, two in the middle, and one in the low range. Alice and I decided to work with these five respondents, although the majority were from Asia and male because the majority of the class was from Asia and male (eleven students including were from Asia and eleven out of sixteen students were male). Thus, the final five respondents were Jang Hyun, Han Chen, Widjak, Phillipe and Mitsuko. After they agreed to participate, they signed the Consent Forms (see Appendix E).

I assigned each respondent to work on one day from Monday to Friday (e.g., Jang Hyun on Monday, Han Chen on Tuesday, and so on). After they agreed to participate, I conducted the orientation to the think-aloud and retrospective interview. Since the think-aloud verbalization was a new experience to the respondents and it was not easy to get used to performing two tasks, working on the program and verbalizing their thinking processes, I provided sufficient warm-up and a training period for the respondents to obtain good quality data. The respondents received a handout of Think-Aloud Instructions (see Appendix R), and I showed the demonstration of think-aloud with ELLIS using myself and the
demonstration video tape of think-aloud edited from the pilot study. Instructions focused on completeness and sufficient explanation. The examples are as follows (cited in Ericsson & Simon, 1984):

"In order to follow your thoughts we ask you to think aloud, explaining each step as thoroughly as you can" (Smith, 1971).

"Think, reason in a loud voice, tell me everything that passes through your head during your work" (Claparede, 1934).

"The chief thing is to talk aloud constantly from the minute [you begin to work on this program], for I want to get everything you happen to think of, no matter how irrelevant it may seem" (Patrick, 1935).

"Don't plan what to say or speak after the thought, but rather let your thoughts speak, as though you were really thinking aloud" (Silveria, 1972).

Weeks 4 and 5 were a period of becoming acquainted with the program individually and practicing the think-aloud/retrospective interview. I assigned each of the five respondents a day to work on ELLIS for about 45 minutes and do a think-aloud/retrospective interview for about 15 minutes. I was present to answer questions and to help the respondents if there was a serious problem which inhibited continuous work.

During Weeks 6, 7 and 8, I conducted think-aloud and retrospective interviews with the five respondents with instructions and reminders when the respondent lapsed into silence (e.g., "keep talking," "what are you thinking about?"). I was present, helping the respondents only when they had a serious problem which inhibited continuous work, and making notes and questions for the retrospective interview.
In order to investigate more focused information of the learners' thinking processes, I employed the retrospective interview. On Weeks 6, 7, and 8, immediately after the think-aloud verbalization, the respondent and I reviewed the videotape of think-aloud verbalization, which helped the respondent recall her/his thinking processes. Based on the observation notes, I asked questions focusing on metacognitive decisions (i.e. "Why did you do that?", "How did you do that?", "What makes you do that?", etc.), and also encouraged the respondent to recall the thinking processes which I did not ask about while viewing the videotape.

Data Collection and Analysis

The data collection for investigating the four themes was from two sources: 1) interactional movements from videotapes, and 2) interactional thinking processes from the videotapes of think-aloud verbalization and audiotapes of the retrospective verbalization. I conducted videotaping of interactional movements to investigate the navigation pattern and extent of non-linearity. I also employed a combination of think-aloud and retrospective interviews to investigate the thinking processes of learner control (Ericsson and Simon, 1980, 1984). The think-aloud and retrospective verbalization revealed the respondents' learning strategies in making decisions in an interactive multimedia environment. The respondents' interactional movements with think-aloud were videotaped with the camera focusing on the computer screen. The retrospective interviews were audiotaped. Both videotape and audiotape were transcribed.

I will describe the data sources and analysis for each of the four themes that I addressed earlier.
Navigation pattern and extent of nonlinearity

The navigation pattern and extent of non-linearity were focused on as evidence of manifesting freedom of navigation in an interactive multimedia environment. The interactional movements from the videotape revealed the respondents' actual interactions with the program. To analyze the actual interactions with the computer, Chapelle's (1994) concept of "CALL texts," which was created in the interactions between the computer and the student, was employed.

It is recognized that CALL has the potential for individualized instruction; however, the traditional CALL research failed to provide clear details of the interactions between the students and the computer. As classroom research requires precise descriptions of the interactions in classrooms, it has been strongly argued that CALL research should characterize the interactions with CALL materials in order to understand what and how particular students learn using CALL materials (Chapelle, 1990; Dunkel, 1991; Chapelle, 1994). It is also noted that it is necessary to describe interactions in a similar way to compare the significant similarities and differences which affect language learning.

CALL texts are produced where the computer takes an interactive role. The emerging texts are produced by the participants, the students and the computer, and provide evidence for the quality of the learning experiences (Chapelle, 1994). To analyze the CALL texts, two aspects of the CALL texts were considered: 1) elements of the texts, and 2) structures of the texts which may affect language learning.

In order to describe the elements and the structures of the CALL texts, Sinclair and Coulthard's (1975) classroom discourse analysis system was adopted, based on the notion that CALL activities should be described consistent with the ESL
classroom discourse (Chapelle, 1990). Sinclair and Coulthard's classroom discourse analysis system is comprised of five categories (ranks) in a hierarchical structure. Units at each rank have structures realized by units at the rank below. The units at the lowest rank of discourse are acts. In classroom discourse, for example, an elicitation act which requests a linguistic response can be used as the head of an initiating move. Moves are made up of acts, and moves become a higher rank, labeled as an exchange. For example, opening (initiate), answering (response), and follow-up (feedback) moves realize a teaching exchange. At the next level, many types of exchanges such as a teaching exchange compose a transaction. Finally, the lesson, made up of a series of transactions, is the highest unit of classroom discourse. This discourse analysis system, developed for the classroom in which the teacher and the students take part as participants, was applicable to CALL texts, in which the computer and the students take part as participants.

In ELLIS, the students' interactions are realized by the different types of modification exchanges. The students can have input from the computer by selecting and listening to a dialogue; then they can have various interactional modifications because ELLIS provides exchanges, including many different types of modification exchanges. The students can make their own decisions to select different types of modifications; then the computer can give modified input for the students' selections. The students can take the modified input as an intake for language learning.

The way to analyze the elements of CALL texts of ELLIS and the types of modification exchanges are presented below with an example text. The structure of the program ELLIS and the potential interactions using ELLIS are presented in Appendix S. For example, if a student chooses the Vocabulary option (see
Appendix S: Vocabulary/Cultures/Phrases), at the lowest rank, the acts the computer can perform are showing a dialogue, asking vocabulary items, and showing a description of the vocabulary the student chooses. The acts a student can perform are selecting a vocabulary option, and selecting a vocabulary item. Each act alone or combined with other acts defines a move. The act of showing a lesson by the computer is a move as input. The acts of selecting the vocabulary option and selecting vocabulary item by a student, and asking vocabulary items of the computer are moves as modification requests. The act of showing a description of the vocabulary is a move as modified input. The three moves, input, modified request and modified input, in turn, make a modification exchange which functions to provide descriptions. As shown in Appendix S: ELLIS, ELLIS lesson exchanges, which consist of choosing a lesson, listening to a lesson, and a number of modification exchanges such as listening, repeat, slower rate, practice, description, explanation, follow up, confirmation, role play, clarification, and expansion, teach exchange, focus exchange, and frame exchange compose a transaction. Then, a number of similar types of transactions compose a lesson in ELLIS, the highest level of interaction.

In ELLIS, six different types of exchanges such as choose, listen, frame, focus, teach and modification were allowed. The modification exchanges were differentiated as repeat, practice, slower rate, description, explanation, follow up, confirmation, role play, clarification, and expansion, depending on the different functions of modification.

The Choose exchange allows the students to select different types of activities, such as Conversations or Practices and different Lessons in ELLIS. The Listen exchange allows the students to listen to and watch the lesson dialogue after they
select a lesson. The Frame exchange allows the students to Quit or Exit from one option to move to other options (e.g., Quit Recording in Pronunciation and move to Vocabulary, Exit from Conversations and move to Practices). The Focus exchange allows the students to focus on getting information or Help to understand the content of the Lesson or the function of the features of ELLIS (e.g., Objectives, Scenes in Conversations Menu, Help on every screen). The Teach exchange allows the computer to teach the students by initiating a question, giving an answer and feedback (e.g., questions in Practices or Minimal Pairs).

In ELLIS, the students can modify the input by the computer (e.g. show a Lesson), asking for modification by selecting different options provided in the program; then the computer shows the modified input. The modification exchanges are various in ELLIS since ELLIS provides many options to explore and the function of each modification is different. The Repeat modification exchange allows the students to Stop/Repeat/Back-up or Skip a dialogue to enhance their understanding or listening comprehension. The Practice modification exchange allows the students to practice speaking or listening by Recording their pronunciation of words or parts of the dialogue in a Lesson. The Slower Rate modification exchange allows the students to slow down the speed of the dialogue and listen to the plain tone of the dialogue in a Lesson by clicking Slower Audio. The Description modification exchange allows the students to understand the words, idioms or cultural points by having a description of Vocabulary, Phrases or Culture options. The Explanation modification exchange allows the students to understand the grammar point by having an explanation of a grammar point in Grammar or Grammar Guide options. The Follow Up modification exchange allows the students to follow up the understanding of the grammar point by clicking the Hear or View options. The
Confirmation modification exchange allows the students to confirm their understanding by having Video with Script, Key Words, or No Words in the Video option. The Role Play modification exchange allows the students to practice speaking by role playing the character in the dialogue in the Video option. The Clarification modification exchange allows the students to clarify the points of articulation of a sound by clicking the Profile or X-Ray View option in Pronunciation or by clicking the Hear option in Minimal Pairs. The Expansion modification exchange allows the students to expand their understanding by clicking the Hear All Words option after selecting a sound in Pronunciation.

Table 1 shows how the potential interactions are carried out through showing the actual interactions by student A from the pilot study. The exchanges made by student A are described as follows:

(Choose)(Listen)(Modification:Repeat)(Listen)(Modification:Description)(Modification:Practice)
(Choose)(Modification:Clarification)(Frame)(Choose) (Teach)(Teach)(Teach)(Frame)

Analyzing the data from the videotape using the "CALL texts" framework gave me a detailed description of what students actually did and how the potential or the intended use of the program was carried out. This detailed description gave me an understanding of the quantity and the quality of interactions showing the navigation pattern and extent of nonlinearity. Tables (2 to 6) of each respondent's interactions showed the types of interactional movements, the quantity of use of interactional movement, and the changes of interactional movements over time. The think-aloud/retrospective interview data was also used to know the respondent's intention for the interactions.
Table 1. Student A's interactions in ELLIS

<table>
<thead>
<tr>
<th>Participant</th>
<th>Act</th>
<th>Move</th>
<th>Exchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td>Ask activity types</td>
<td>Offer</td>
<td>Choose</td>
</tr>
<tr>
<td>Student</td>
<td>Choose Conversations activity</td>
<td>Choose</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Ask Lessons options</td>
<td>Offer</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Choose a Lesson (Small Talk) and Module Lesson (4th)</td>
<td>Choose</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Show the 4th module of Small Talk</td>
<td>Show</td>
<td>Listen</td>
</tr>
<tr>
<td>Student</td>
<td>Listen to the Lesson</td>
<td>Listen</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Request Stop</td>
<td>Stop</td>
<td>M:Repeat</td>
</tr>
<tr>
<td>Computer</td>
<td>Stop the Lesson</td>
<td>Obey</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Request Repeat the Lesson</td>
<td>Repeat</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Repeat the Lesson</td>
<td>Obey</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Show the Lesson</td>
<td>Show</td>
<td>Listen</td>
</tr>
<tr>
<td>Student</td>
<td>Listen to the Lesson</td>
<td>Listen</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Select Vocabulary option</td>
<td>Select</td>
<td>M:Description</td>
</tr>
<tr>
<td>Computer</td>
<td>Ask which vocabulary to choose</td>
<td>Offer</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Select a vocabulary</td>
<td>Select</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Show a description of the vocabulary</td>
<td>Show</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Select Grammar option</td>
<td>Select</td>
<td>M:Explanation</td>
</tr>
<tr>
<td>Computer</td>
<td>Ask which grammar item</td>
<td>Offer</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Select a grammar item</td>
<td>Select</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Show an explanation of the gr. item</td>
<td>Show</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Choose Exit</td>
<td>Choose</td>
<td>Frame</td>
</tr>
<tr>
<td>Computer</td>
<td>Exit</td>
<td>Obey</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Ask activity types</td>
<td>Offer</td>
<td>Choose</td>
</tr>
<tr>
<td>Student</td>
<td>Choose Conversations activity</td>
<td>Choose</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Ask Lesson options</td>
<td>Offer</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Choose a Lesson (Driver's License) and Module Lesson (2nd)</td>
<td>Choose</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Show the 2nd module of Driver's License</td>
<td>Show</td>
<td>Listen</td>
</tr>
<tr>
<td>Student</td>
<td>Listen to the Lesson</td>
<td>Listen</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Select Script option</td>
<td>Select</td>
<td>M:Repeat</td>
</tr>
<tr>
<td>Computer</td>
<td>Ask which script line to choose</td>
<td>Offer</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Select a script line</td>
<td>Select</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Show the script line</td>
<td>Show</td>
<td></td>
</tr>
</tbody>
</table>
Table 1. (continued)

<table>
<thead>
<tr>
<th>Student</th>
<th>Select Recording</th>
<th>Select</th>
<th>M:Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td>Begin Recording</td>
<td>Order</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Record one's voice</td>
<td>Obey</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Stop Recording</td>
<td>Order</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Ask listening options</td>
<td>Offer</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Select Voice</td>
<td>Select</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Give Voice</td>
<td>Give</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Select Pronunciation option</td>
<td>Select</td>
<td>Choose</td>
</tr>
<tr>
<td>Computer</td>
<td>Ask Vowel/Consonant</td>
<td>Offer</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Select [dz]</td>
<td>Select</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Select Female Profile View</td>
<td>Select</td>
<td>M:Clarification</td>
</tr>
<tr>
<td>Computer</td>
<td>Give Female Profile View of [dz]</td>
<td>Give</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Choose Exit</td>
<td>Choose</td>
<td>Frame</td>
</tr>
<tr>
<td>Computer</td>
<td>Exit</td>
<td>Obey</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Ask activity types</td>
<td>Offer</td>
<td>Choose</td>
</tr>
<tr>
<td>Student</td>
<td>Choose Practices activity</td>
<td>Choose</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Ask which Level to try (E/M/D)</td>
<td>Offer</td>
<td>Choose</td>
</tr>
<tr>
<td>Student</td>
<td>Choose Easy Level</td>
<td>Choose</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Ask task types (V/C/G/LC)</td>
<td>Offer</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Choose Culture task</td>
<td>Choose</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Give a question</td>
<td>Initiate</td>
<td>Teach</td>
</tr>
<tr>
<td>Student</td>
<td>Answer the question (right)</td>
<td>Response</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Give an answer and feedback</td>
<td>Feedback</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Give a question</td>
<td>Initiate</td>
<td>Teach</td>
</tr>
<tr>
<td>Student</td>
<td>Answer the question (wrong)</td>
<td>Response</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Give an answer and feedback</td>
<td>Feedback</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Select Retry</td>
<td>Select</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Give a question</td>
<td>Initiate</td>
<td>Teach</td>
</tr>
<tr>
<td>Student</td>
<td>Answer the question (right)</td>
<td>Response</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Give an answer and feedback</td>
<td>Feedback</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Choose Exit</td>
<td>Choose</td>
<td>Frame</td>
</tr>
<tr>
<td>Computer</td>
<td>Exit</td>
<td>Obey</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>Choose Quit</td>
<td>Choose</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>Quit</td>
<td>Obey</td>
<td></td>
</tr>
</tbody>
</table>
Degrees of learner control and in-depth learning

The degrees of learner control and in-depth learning were focused on to investigate how the respondents made decisions employing different learning strategies in an interactive multimedia environment. The different degrees of learner control are carried out by employing different learning strategies not only to select options, but also to take the information from the options as learning. Depending on the degrees of learner control, the learners can take the information as their own learning, so called in-depth learning, or merely open and visit the information. The process of employing different learning strategies for learner control can be revealed by think-aloud and retrospective verbalization.

Since research in psychology has sought to understand the mechanisms and internal structure of cognitive processes, the interests in the appropriate method of collecting data on learners' own intuitions and insights about the ways they organize and process information has increased (Ericsson & Simon, 1980). Similarly, in ESL, the increased interest in learners' characteristics or learners' strategies has prompted many researchers to seek the appropriate methods to investigate those matters (Cohen, 1987; Faerch & Kasper, 1987).

Introspection has been identified as one of the most common methods for reflecting on one's own thought processes or uncovering the rules of productive thinking (Schoenfeld, 1985). Ericsson and Simon (1980) defined concurrent verbalization as when information is verbalized at the time the subject is attending to a task, and retrospective verbalization as when a subject is asked about the cognitive processes that occurred at an earlier point in time. Through concurrent verbalization, process observations can be obtained in which the researcher can get a sequence of verbalizations corresponding to the sequence of generated thoughts.
Through retrospective verbalization, post-process observations can be obtained in which data can be collected after a task is completed, such as "memory for thought-processes during the task, memory for presented information, and recollections of the strategies used" (Ericsson & Simon, 1987, p. 30).

Think-aloud and retrospective verbalization are recognized as valuable data collection methods for thought processes for human performance. Think-aloud verbalization, like concurrent verbalization, is more appropriate for retrieving short-term memory (STM), which stores information recently acquired by the central processor and is directly accessible for further processing (Ericsson & Simon, 1980).

Although think-aloud verbalization is appropriate for retrieving cognitive processes, it has a limitation since subjects are asked to perform the task and the verbalization at the same time. Retrospective verbalization is more appropriate for retrieving long-term memory (LTM), which must be retrieved (transferred to STM) before it can be reported (Ericsson & Simon, 1987). Since the cognitive processes are represented as sequences of states of heeded information (thoughts), retrospective verbalization can probe for the heeded information after the completion of a task (Ericsson & Simon, 1980; Ericsson & Simon, 1987) despite the fact that subjects lose their memory to a certain degree during the interval.

For this study, a combination of think-aloud and retrospective interview was used. The think-aloud verbalization was employed to investigate learning strategies in the interactive multimedia environment. The retrospective interview was employed to investigate more focused information on employing learning strategies in the interactive multimedia environment. The categories of learning strategies in this particular environment were developed from emerging data. The primary
learning strategies were identified in the pilot study. After the research began, more strategies were identified and added from the emerging data. For example, most of the strategies were developed from the pilot study, such as "plan(language)," "plan(program)," "need(l)," "need(p)," "want(l)," "want(p)," "evaluating(l)," "evaluating(p)," "self-evaluating," "process monitoring," "managing," "confusion" and so on. After the research began, new strategies emerged such as "evaluating(goal)," "challenging," or "mind-wandering." When a task was given, a new strategy, "evaluating(g)," emerged as a strategy to analyze one's own understanding or action to approach the goal. Due to the new characteristics of the respondents, "challenging," emerged as a strategy of disagreeing or unaccepting the information given in the program and "mind-wandering" emerged as a strategy of losing interest in or concentration on working on the program, distracted by outer circumstances.

Whenever the new strategies emerged throughout the data analysis, they were added to the list of learning strategies employed in ELLIS. The definitions and the examples of verbalization of each learning strategy are presented in Figure 4.

I analyzed the verbal texts using Lincoln and Guba's (1985) principles of unitization and categorization (described in Situating the Technology). The example is shown in the Appendix V. The students' interactions were described in parentheses and my observation was described after the "-" symbol. The respondents' think-aloud verbalization was transcribed in between the interactions. On the left column of the transcription, the interactions were described by exchange types. The unitization of the think-aloud verbalization was marked by the slash "/" in the transcription. On the right column of the transcription, the learning strategies as categorization of think-aloud verbalization were described.

I conducted the reliability test with a TESL graduate student for unitization
Analyze: separating the information into its parts in order to find out their nature, function, or relationships
"g" Open the mouth and the tongue goes straight.

Browsing: looking through the possible options to make a decision
"Where shall I go?" "Which one to choose?"

Challenging: disagreeing or unaccepting the information given in the program
"I don't think so." "I don't believe this." "It's wrong.

Comment: making comments and expressing one's own feelings or opinions either positively or negatively
"It's too slow." "It's funny." "I don't like this." "These really helps.

Comparing with Culture: making a comparison with one's own culture
"We don't have quarter system in our country." "Tuition is different from ours.

Comparing with Prior Knowledge: making a comparison with one's own prior understanding and knowledge of language
"I thought this meant 'expenses'"

Comparing with Myself Situation: making a comparison with one's own situation
"Wow, these guys are overnighting for study, too." "If my American friend does this to me, would I take it positively or negatively?

Confirming: making sure one's own understanding
"Oh, this is it." "Ah ha, now I understand.

Confusion: being lost of one's own processes or the processes of the program
"What happened? I don't understand." "Oh, I think I'm lost." "What's going on?

Decision: making up mind to do something and showing the action
"Stop." "Exit." "Quit.

Evaluating (g): making more analysis of one's own understanding or action
"It's not what I want to do." "This one needs more explanation." "Actually it's very hard to do.

Evaluating (l): judging the language use
"used to be' is a good word to use.

Evaluating (p): judging the program
"Video is more helpful, especially Key Words.

Figuring Out: getting a clue and understanding the meaning
"I got it." "Now I know what's going on for universities.

Figure 4. List of learning strategies employed in ELLIS
Managing: checking one's understanding of the management of the program
"How can I try Hear again?" "How can I go there?"

Mind-Wandering: losing interests or concentration of working on the program, distracted by the outer circumstances
"Now my mind is just floating in my home town in Japan."

Monitoring (l): checking and verifying the comprehension and performance of one's own language
"Today I learned about infinitives in grammar class."

Monitoring (p): checking and verifying the structure and the functions of the different features of the program
"I think it was under Survival skills."

Need (l): having a need to do or try something for one's own language comprehension or performance
"I need to practice my pronunciation."

Need (p): having a need to do or try something in the program
"I need to see this dialogue carefully."

Plan (l): having a plan for upcoming interaction for one's own language comprehension or performance
"I'll try to find out the word 'propaganda'."

Plan (p): having a plan for upcoming interaction in the program
"I'll try one of the Survival-Academic. "Let me start with Pronunciation, today."

Practicing: utilizing or applying the usage of language learning for the point given in the program right at that moment
"I can make a sentence with 'having a tough time.' I'm 'having a tough time' doing think-aloud."

Predicting (l): guessing or expecting the meaning based on one's own knowledge
"Credit hours! Maybe it's for a week." "Does it mean nearby freeway?"

Predicting (p): guessing or expecting the structure or the function of the program
"It must be under Culture."

Process Monitoring: tracking, checking and verifying one's own processes using the program
"I saw this one last time. "Well, I think I missed one word."

Questioning (unclear) (l)(p): questioning and asking oneself for the uncleanness of the meaning of language or the program
"Now, what's this?" "What is this, View?"

Figure 4. (continued)
Questioning (want to know) (l)(p): questioning and asking oneself to know the meaning of language or the program  
"What's the meaning of this word?" "What does it mean 'pick up another class'?"

Reasoning: providing reasons for the decisions or actions that one made  
"(Exit.) Because I'm not interested in this topic any more." ".... because I can catch the main idea easily."

Repeating: repeating a chunk of language in the program  
"(I'd appreciate leaving as early as possible.) I'd appreciate leaving as early as possible."

Self-Evaluating: judging one's own language comprehension and performance  
"I didn't know that." "It's too difficult for me." "I think I know this part." "Still, I don't get the clue for the task." "I think I am weak in [r] sound."

Want (l): expressing a willing to do or try something related to language learning  
"I want to know this word."

Want (p): expressing a willing to do or try something in the program  
"I want to go to next module." "I want to see the dialogue one more time."

Figure 4. (continued)

and categorization of a part of two respondents' think-aloud verbalization. The rater used the learning strategy list I developed, but was asked to add or change the strategies freely. I randomly selected two pages of the think-aloud transcript of two respondents. The reliability of unitization was 95%, showing two units difference between the investigator (40) and the rater (42). The reliability of categorization was 85%, showing 6 different categorizations out of 42 strategies. The examples of different categorization between the rater and me are as follows: for "I think it's better to choose Financial Management first /and then try Budgeting later," the rater categorized as "evaluating(p)," but I categorized as "evaluating(g)." After the negotiation we decided on "evaluating(g)" because choosing Financial Management was more related to the given task as an approach to the goal rather than an
approach to the program in that context. For "Let's try the second one /since I tried
the first one," the rater categorized as "reasoning," but I categorized as "process-
monitoring." After the negotiation, we decided on "process-monitoring" because it
seemed like reasoning but it is more related to monitoring what the respondent had
been trying. For "To skip, I have to click menu," the rater categorized as "plan(p),"
but I categorized as "managing." After the discussion, we decided on "managing"
because it is more related to the decision about how the respondent manages the
function of the program rather than a simple decision to choose something in the
program. Similar negotiation was conducted for the discrepancies and finally we
reached the same categorization.

For the evidence of the degrees of learner control and in-depth learning, the
learning strategies developed in working with ELLIS through the think-aloud
verbalization, and retrospective verbalization were used. The learning strategies
categorized using Lincoln and Guba's (1985) principles of unitization and
categorization gave me an understanding of different types of learner control. The
retrospective verbalization gave me a more focused understanding of why and how
different types of learner control were used. I also wanted to see if there was a
relationship between the interactional movements employed and the learning
strategies employed.

In order to determine whether the respondents had in-depth learning, I
examined the types of strategies they chose, how the strategies were chosen, and
how they were used in a whole context.
Relationship with the tasks

In order to see the relationship of learning strategies and learning tasks, a task was given two times, in Week 6 and Week 8, and no task was given in Week 7. With the given task, I wanted to investigate the respondents' thinking processes to get clues for the task rather than analyzing their product of the task. After discussing it with Alice, I gave the respondents a writing and cloze task and suggested exploring some lessons in ELLIS. The topics of the tasks were chosen in relation to the topics of the suggested lessons in ELLIS to investigate how the respondents use this type of material, ELLIS, to connect and get clues for the task. The types of task were chosen as one writing task to investigate how the respondents organize their thoughts and plans to write on the given topic and one cloze task to investigate how the respondents get clues to fill in the blanks using this type of material. On Week 6, a writing project on "How to spend $100,000,000 for the World" was given (see Appendix T). It was suggested that they could use two lessons in ELLIS, "Financial Management-Long Term" and "Budgeting-Short Term," to organize their thoughts and plans for this task. On Week 8, a cloze task which was revised from the two lessons in ELLIS, "Driver's License" and "Shopping at Convenience Store," was given (see Appendix U). I also wanted to see the difference in the students' approach to the program when they had tasks to perform and when they didn't, so no task was given on Week 7.

For the evidence of the relationship with the task, both the interactional modifications the respondents selected and the learning strategies through the think-aloud/retrospective verbalization were used. In order to get a clue for the given task, the respondents needed to decide both on what to explore and how to use the information.
To determine whether the respondents made a connection between their interactions with the program and the given task, I examined to what degree the respondents gather information from the program to solve the task, and to what extent they connected to the nature of the task.

General attitude

The general attitude of the respondents was a focus in this study because the general attitude and perceptions toward the program would influence how the respondents approached and dealt with the program and solved the problems or barriers encountered in this environment.

The data to investigate the general attitude was from think-aloud and retrospective verbalization. During the think-aloud and retrospective verbalization, the respondents expressed their feelings, opinions, or difficulties about working with the program as well as their learning strategies. Most of the verbalization related to general attitude in think-aloud was categorized as "comments."

Case Report

Jang Hyun

Jang Hyun was a Korean male. He had a high Placement Test score. He was studying in IEP for six months to improve his English proficiency. He was quiet in the class, but eager to learn. He was good at making definitions for vocabulary words in the classroom discussion.
Navigation and extent of nonlinearity

Jang Hyun's pattern of navigation was decided by his needs, "I need to know the culture," rather than trying everything possible. He never visited Grammar because he didn't feel the need to explore grammar with ELLIS, "I don't want to study grammar with this [ELLIS]." To confirm his listening comprehension, Jang Hyun wanted to explore Vocabulary, Phrase or Culture. The second time, he expanded his exploring pattern, adding (Modification:Clarification) or (Modification:Expansion), but didn't change his pattern radically. The last time, he brought a plan to practice pronunciation, connecting classroom learning and individual learning. Realizing his pronunciation problem of [r] and [l] in the classroom, he planned to practice his pronunciation using the advantages of ELLIS (see Table 2).

On Week 6, Jang Hyun showed a pattern of repeating the unclear parts of the lesson, using (Modification:Repeat), then (Modification:Description) visiting Culture, Phrase or Vocabulary to confirm the meaning.

On Week 7, Jang Hyun used (Modification:Confirmation) or (Modification:Slower Rate) using Video/Script or Slower Audio to confirm his listening comprehension other than simple (Modification:Repeat). When Jang Hyun tried Pronunciation, he worked more on (Modification:Clarification) or (Modification:Expansion) using Profile/X-ray View or Hear All Words rather than (Modification:Practice) using Recording; in other words, he tried more on distinguishing different sounds rather than practicing to pronounce the sounds.

On Week 8, Jang Hyun mostly practiced Minimal Pairs. Since Jang Hyun was interested in [r] and [l] sounds, he tried many tricky ones for him such as [ar] [air] [er] [ir] [rr] [r] [al]. In Minimal Pairs, Jang Hyun mostly used (Teach), merely testing
Table 2. Jang Hyun's interactional movements in ELLIS

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himself whether he was right or wrong and didn't try (Modification:Clarification) or (Modification:Practice) functions to confirm using Hear Word or Recording.

**Degrees of learner control and in-depth learning** Jang Hyun was always interested in cultural differences. The event in which Han Chen picked up the saleswoman's manner in the classroom activity with ELLIS (described in detail in Situating the Technology) made Jang Hyun realize the need and importance of the cultural aspect of language learning. He noticed that the idioms were related to culture and the cultural background was very critical for complete understanding. He admitted that "If I use this [program] in Korea, I would just study vocabulary, grammar . . ." But he realized that "I think half of the learning English is learning the culture."

In the lesson of "Shopping at Convenience Store," Jang Hyun was curious about "can't change anything larger than," so he tried to explore that under Culture. After Jang Hyun read the description that stores do not usually carry bills larger than 20 dollars because of the burglars, he showed "reasoning(l)"/"self-evaluating"/"evaluating(l)" (line 1-3). In the retrospective interview, Jang Hyun showed the trait of deep analysis for his concern on cultural differences, "First I compared with Korean situation and compared with my knowledge of American culture and decide whether it makes sense or not." For the matter of "can't change anything larger than a $20.00 bill," Jang Hyun was thinking "I couldn't guess why at all. Then it reminded me that in America people usually don't use big bills like in Hub or small store. In Korea, the reason can be we don't have enough changes. But here it was so different. I didn't know this before, but when I read it makes sense with my background knowledge of American culture."
Jang Hyun’s cultural concern made him focus on video to know the real life situation, not merely the language. He was very interested in settings, even if those were not the main focus of the lesson. In the lesson on "Registering," Jang Hyun found that Keisha brought her own drink to cafeteria, which was unusual in Korea because in Korea they had to buy the food or beverage in that restaurant. Jang Hyun noticed that two friends paid separately in the lesson of "Shopping at Convenience Store." He applied this cultural knowledge to his situation, "It was interesting to know how they pay here. Are they doing Dutch pay or not? I thought if I go with my American friend, what would I do? If my American friend did this to me, would I take it positively or negatively?" Jang Hyun could compare different cultures and apply the information to a real or imaginary situation.

**Relationship with the tasks**  
With the writing task, Jang Hyun was consistently trying to relate to the task. Jang Hyun's overall plan with the program was to catch the main theme, then confirm unclear things. He would try all the modules of suggested lessons for the task, even if he was not very interested in some of them, then catch clues for the task. Jang Hyun was confused and frustrated because he couldn’t get any clue for a while, asking himself, "How can I connect this to the task?" "Where can I get something right to make connection to the task?" After constantly trying to connect to the task by listening to all the modules of
"Budgeting-Short Term," Jang Hyun got the clue of establishing a priority and dividing for the needs, "How can I apply this to the task? OK, let me try to put priority for the items. Rent, food, utilities, transportation..." Jang Hyun expected to get a clearer clue from the lesson "Financial Management-Long Term", but he was very interested in exploring Culture; then he forgot about the task.

With no task given, Jang Hyun wanted to get what he needed most in the limited time, "I know the program pretty much so I want to get what I need in a limited time at most." Jang Hyun brought a plan to work on easy and interesting lessons in ELLIS and on pronunciation of [r] and [l].

With the cloze task, Jang Hyun decided to do it later using his general strategies since he was used to doing the cloze tasks at school.

**General attitude** Jang Hyun was organized and structured, always bringing a plan and developing the strategies of overall planning within a time limit.

**Han Chen**

Han Chen was a male from Taiwan. His placement test score was in the middle range. He was studying in IEP to enter an American university graduate studies program. He had an outgoing style and was active in the classroom.

**Navigation and extent of nonlinearity** Han Chen couldn't explore ELLIS deeply the first time because of the heavy duty of think-aloud, but could explore it in various ways the second time. The last time, Han Chen was concerned about his needs. He chose the lesson "Registering," expecting to get some information because he will be a regular student at ISU, although he had seen the
lesson many times in the class. He spent much time in Pronunciation and Grammar because he had a big concern for correct pronunciation and correct use of grammar in writing and real conversation, "I want to use correct English grammar in speaking and writing." (see Table 3)

On Week 6, Han Chen was dominated by think-aloud rather than focusing on his own learning. He visited many places, such as Vocabulary, Grammar, Grammar/View, Video/Script, or Pronunciation. However, many of his visits ended up as mere visits. He had needs, so he made plans, but he was distracted by doing think-aloud and paying attention to whatever was shown on the monitor rather than concentrating on language learning.

On Week 7, Han Chen was more relaxed and freely tried whatever he wanted. Han Chen showed a stronger tie to his needs or interests than the first time. He began with the lesson "Registering" expecting to get some information for being a regular student at ISU and opened many lessons that he hadn't tried before, such as "Literary Discussion," "Business Discussion," or "Making Introductions." Every time Han Chen opened different lessons, he had a specific need, such as the need for communication especially to enter the university for "Literary Discussion," the need to learn some special phrases for "Business Discussion," or the need to make new friends at ISU for "Making Introduction." In each lesson, Han Chen showed the pattern of visiting Vocabulary, Phrases or Culture briefly to know unclear words or to confirm whether the meaning he understood was right or not. Han Chen visited Grammar a couple of times, but he couldn't get what he wanted, then clicked Hear to see the function of Hear. Han Chen liked Video/Key Words because "we can catch the main idea from key words." Han Chen wanted to try new things such as
Table 3. Han Chen's interactional movements in ELLIS

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<th>Week 8</th>
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Video/Role Play, "I thought of the last time of what I did and I actually did some different from the last time like Video/Role Play." Han Chen also used the (Modification:Repeat) function many times, "I would like to imitate his tongue. I wanted to pronounce it because sometimes my stress is not correct so I can take up again to see his stress." Finally, his interests in pronunciation made him stay very long in Pronunciation, "I think the Pronunciation is very useful because maybe you cannot find any materials that you can practice pronunciation like this, the pictures and also the computer." Han Chen used various modifications such as (Modification:Clarification), (Modification:Expansion) or (Modification:Practice) using Profile/X-ray View, Hear All Words or Recording.

On Week 8, Han Chen didn't focus on the task because it was not very difficult to do. In Conversations Han Chen once used (Modification:Slower Rate) and (Modification:Practice), using Slower Audio and Recording to know the function of those options, but didn't use it for learning. He spent most of the time in Grammar studying "Gerund/Infinitive" and "Preposition," which were tricky for Han Chen and might be helpful for TOEFL. He spent the rest of the time in Minimal Pairs based on his experience of miscommunication when he said, "There is a group, R[rr]ed Cross." In Minimal Pairs, he used the (Teach) function to test himself and always clarified the other sound, using (Modification:Clarification) function.

Degrees of learner control and in-depth learning Han Chen made a decision to try something, but often ended up with "mind-wandering" (line 4, 6). He repeated this pattern on Week 6. It is hard to say that he had in-depth learning in this process.
(selecting Budgeting-Short Term 1st Module)

1 Exit! / Because I am not interested in this topic any more. decision, reasoning
2 So maybe I am going to find out some topic that I like and plan(p)
3 interesting./ Let's go to Conversation with Choices. Yeah! plan(p)
4 I can go to New York to see the (statue of liberty in Chinese), mind-wandering
5 I don't know how to say it in English.

(Choices pop up)
6 What's that? questioning-unclear
7 OK, that's not what I want to do. evaluating(g)
8 I don't know what's going on here now. I really don't know. confusion
9 An the dating, it costs a lot of money to date a girl. Oh, that's too mind-wandering
10 bad. My poor father.

However, Han Chen's interest in grammar was very high. He was always concerned about correct use of grammar in speaking and writing. Han Chen's first visit wasn't very meaningful; it was just a visit. When Han Chen visited Grammar the third time, he found that he could make it meaningful for his needs. Han Chen stayed in Grammar, enjoyed it and took grammar points for his learning.

(Grammar) - 'Gerunds & Infinitives-M'

1 How about a grammar? plan(p)

- read
2 Oh, so some verbs must follow a rule, which means, present evaluating(l)
3 progressive form..... Yeah, in this part, we can see often in the TOEFL test.
4

(Next) (Next)

5 Yeah, I wish I could copy this page...... want(p)
6 Good. comment
7 (Some verbs must following infinitives...... repeating
8 'afford' 'appear' 'attempt' 'deserve' 'fail')
9 I 'fail' to pass the driver's license in the state of Iowa two times. practicing
10 I can learn from my mistakes because I don't pay any fee to comparing w/ myself
11 pass the test, so I can try one more and one more and maybe I repeating
12 pass ten times.
13 ('learn' 'offer to' 'pretend' 'promise') repeating
14 I 'promise' to speak English as much as possible. practicing
15 ('refuse') repeating
16 I 'refuse' to know a girl through matchmaker. / My parents practicing
ordered me to know a girl through matchmaker.

They are disappointed with me./Because I 'refused'.

(see) The whole idea is not 'see' here.

Interesting, huh? Am I wrong before? Good.

(Next) - verb + gerund or infinitive

('continue' 'hate')

Yeah, I 'hate' to go shopping.

('like' 'love')

I 'love' a girl.

('prefer to')

I 'prefer to' drink a tea instead of a coffee.

('start') Good.

(Next) - difficult level

('ask' 'choose' 'help' 'need')

I 'need' to pass the TOEFL. I 'need' to pass the driver's license.

Good.

('verb + objective + infinitive') Good.

('encourage' 'I encourage'... 'permit'

'persuade' encourage' and 'persuade' are more.... )

He 'encourage'ed to take a writing class.

My parents 'persuade' me to get married soon.

I don't think so.

(Next) - verb + infinitive / verb + object + infinitive

- read

Oh,... I didn't know that.

('arrange' 'plan' 'wait')

It could be two ways to say something, but usually we just say

he wants to say something; we don't say he wants for him to

say something. / It's more troublesome to say the complicated

sentence. / In dialogue, we can speak as easy as possible.

-Grammar Guide Menu pops up at the end

(Preposition)

Preposition is one of the major topics in the TOEFL tests in the

grammar section, / so maybe I can learn something from this

page.

('on' 'at' 'in')

Yeah, I would like to know what kind of verb must follow

preposition.

Like, I thought 'on' TOEFL test the computer design was 'on'...

(Next, Next...)

Maybe I can find something if I just 'on' 'in' next.

I am interested 'in' think aloud.

('of') I'm thinking 'of' taking a vacation.

I'm thinking 'of' spending the spring break in California.
Han Chen made a plan to visit Grammar (Gerunds and Infinitives-Medium Level) without any clear intention (line 1) and simply read the descriptions. Then Han Chen tried to make a sentence in think-aloud using the example verb "fail" in the explanation (line 9). He tried to make a sentence utilizing the grammar point again (line 14); then he developed this "repeating" and "practicing" strategy consciously for each example verb (line 16, 18, 19, 22, 24, 26, 29, 34, 35). When Han Chen practiced the use of infinitive verbs, he utilized those for his own real use, not merely to modify those from the description. He developed this practice for another grammar point, Preposition (line 50, 52, 53, 54, 55, 67, 71), and made it his own learning. During this process, Han Chen also developed "evaluating" or "self-evaluating" strategy (line 39, 41, 42, 56, 61) in addition to the simple "repeating" and "practicing" strategy. The information provided in ELLIS stays as an idealistic entity unless the learners have a moment to make it meaningful for themselves, like in Han Chen's case. The learners can make the meaningful moment in their own
way like Han Chen, but there is a need to help and facilitate the learners to make those meaningful moments for them.

When Han Chen worked on Pronunciation, he showed a deeper level of analysis using "analyzing" and "evaluating" strategies (line 1, 9, 11, 13) and a deeper level of learning using the "self-evaluating" strategy (line 4, 16, 18).

(click [g])
(click Male view, X-Ray View)
1 'g' Open the mouth and the tongue goes straight. repeating, analyzing(l) self-evaluating
2 I got it. self-evaluating
(click Hear All Words)
3 'get' 'egg' 'gag' 'giggle' 'great' 'grass' practicing

(click [e])
4 The [e] sound, I used to pronounce not exactly. self-evaluating
(click Male view, X-Ray View)
5 'e' 'e' 'e' 'e' 'e'...... practicing
(click Hear All Words)
6 'bet' 'mesh' 'pen' 'head' 'neck' 'guess' practicing
7 OK, the other words. I would like to find the [th] sound, want(l)
8 but I cannot find it here. Maybe not here. monitoring(p)

(click Consonant-2)
9 Oh, oh [th], here! This one is difficult too. evaluating
(click [dhl])
(click Male View, X-Ray View)
10 One more time. want(l)
(click X-Ray view)
(click Hear All Words)
11 This sound is difficult. evaluating(l)
12 'this' 'the' 'other' 'smooth' 'either' 'then' practicing
13 By the way, the 'smooth' is not this sound. analyzing(l)
14 Why did they put it on this example? questioning:want to know (click 'smooth')
15 Oh, 'smooth'. figuring out
16 Ok. Oh, I used to pronounce smooth[a] self-evaluating
17 but actually, it's smooth[ə]. confirming
18 Oh, I see, it's my mistake. I used to make a mistake. self-evaluating

((click [th])
19 OK, again! want(l)
(click Male View)
20 I don't think so. Correct? challenging
Han Chen also showed a very interesting reaction when he disagreed with the given information from the program. Although he repeated the same procedure of Male View, X-Ray View and Hear All Words, he couldn't believe the [th] sound from the program, showing "challenging" (line 20, 21, 24, 27). Then he made a decision to confirm this information with the teacher.

**Relationship with the tasks**  
With the writing task, Han Chen did not pay attention to the task. Han Chen's plans were spontaneously made and he did not explore the program deeply. Han Chen began with the suggested lesson "Financial Management-Long Term" and tried the first module, but didn't have the intention of connecting it to the task. Overall, Han Chen merely visited here and there, not trying hard to connect anything to the task.

With no task given, Han Chen was concerned about his needs. He chose the lesson "Registering," expecting to get some information because he will be a regular student at ISU although he had seen the lesson many times in the class. He spent much time in Pronunciation and Grammar because he was very concerned about correct pronunciation and the correct use of grammar in writing and real conversation.
With the cloze task, Han Chen decided he could do the task later easily and spent more time exploring ELLIS because it was the last time that he could use the program.

**General attitude** Han Chen was challenging the information from the computer when he didn't agree with the given information. He wanted to confirm the information with personal help. This phenomenon implied the importance of human involvement and the teacher's role in using technology. When the [ɔ] and [ə] sounds were very confusing to Han Chen, he challenged the program, not accepting the information given in ELLIS. He tried both sounds with Male View and Hear All Words, but still couldn't believe what the computer said, "I don't think so. Correct? No, No... I can't believe it... I can't believe it. One more... I should ask instructors how to pronounce this word. I don't think it is correct, what I heard on this computer."

Although ELLIS provided information in an unbiased and neutral manner, the respondents' reactions were different. When Han Chen explored in Pronunciation, he showed gender preference. In Pronunciation, there was a Female View and Male View for Profile View, and X-ray View to show the animation for the articulation point for the pronunciation. He preferred the Male View and never tried the Female view, "Why do they always begin with Female View? I don't agree. I like Male View because I am a boy."
Widjak

Widjak was an Indonesian male. His placement test score was in the low range. His goal was to enter an American university graduate studies program. He was anxious to get a higher TOEFL score to get admission for graduate studies.

Navigation and extent of nonlinearity

Widjak showed a consistent pattern of listening to dialogue lessons, employing (Modification: Confirmation) using Video/Script, and (Modification: Description) or (Modification: Explanation) visiting Vocabulary, Phrase or Culture. He wanted to test his language skills such as Vocabulary, Grammar or Listening Comprehension using Practice items. The last time, he focused on practicing Minimal Pairs. In Minimal Pairs, he also wanted to practice as many questions as possible, focusing on the quantity rather than in-depth learning (see Table 4).

On Week 6, Widjak applied his general language learning strategies to working with this program. In his learning English, "I always study vocabulary or phrases first, then grammar." Widjak tried the same pattern in this program. Because ELLIS started with viewing and listening to the dialogue of a lesson, Widjak took the unclear words while he was listening, and used the (Modification: Confirmation) function, visiting Video/Script to look at the script. Then, Widjak used (Modification: Description) function heavily to know the exact meaning of vocabulary or phrase. When something was still unclear to him, Widjak tried another function (Modification: Explanation) using Culture, "But I still don't know. I'll try another one, maybe Culture, then I can find something that can explain . . . " After he figured out the meanings of the unclear words, he explored Grammar.
Table 4. Widjak's interactional movements in ELLIS

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On Week 7, Widjak worked with the lesson "Budgeting-Short Term" and "Job Hunting." Widjak brought a plan to open the lesson that he hadn't tried before, but he was accidentally opened "Budgeting-Short Term," which he had worked on last time. But he didn't try to move and instead listened to the dialogue of that lesson. Then he opened "Job hunting" because "I know I'll get a job in the future." As he did when working with the lessons, Widjak followed the similar pattern of beginning with (Modification:Confirmation) function using Video/Script, then visited Vocabulary, Phrases, or Culture to explore or confirm the exact meaning. He checked the time and he moved to the Practices section. He tried various Practice items such as Grammar, Vocabulary, and Listening Comprehension. Widjak wanted to try as many questions as possible in the time limit. Thus he decided to read Feedback carefully, not to use Retry, even if he was wrong. For his listening comprehension in Conversations, he tried to know the exact meaning, but for the listening comprehension in Practices, he tried to get a whole idea.

On Week 8, Widjak began with the suggested lessons for the task "Driver's License" and "Shopping at Convenience Store" and worked for a while for Listening Comprehension/Medium Level in Practices section; then he worked in Minimal Pairs. In Minimal Pairs, he tried as many combinations as possible such as [ey] [e] [i], [ah] [uh], [air] [our], [w] [y], or [i] [ee] [ey] [e] [ir] [il]. He concentrated on distinguishing sounds using (Teach) function only and never tried (Modification:Clarification) except a few of (Modification:Practice) using Recording.

**Degrees of learner control and in-depth learning**  
When something was unclear, Widjak used "comparing with prior knowledge" strategy and picked up related words in the context. In the lesson on "Registering," he picked up unclear
words, "earn credits," "full load," and "pick up another class." First he compared the new information with his pre-conception. For example, he didn’t know that "earn" could be used for credits as well as for money, or "load" and "pick up" had abstract meanings.

Widjak couldn’t express much in the think-aloud, but he could explain what he was thinking more in detail in the retrospective interview, "And from what I don’t know, 'load' means, in my mind, it's like truck. Later I know the meaning. Not exactly the same meaning, but similar. In my mind, 'load' is put something in the truck or in the container. Not in this sense, similar meaning, but not physically, it's abstract." Widjak used the similar strategies for the words "food," "meal," "lunch," and "snack" even though he knew the meaning roughly.

**Relationship with the tasks**

Widjak brought his overall plan to work on Conversations and Practices. But the task was given, so he changed his plan and just worked on two suggested lessons in Conversations. To get a clue for the task, Widjak focused on the "budget" and "expenses" "So if I have this budget, I have to make budget for $100,000,000 and what were the expenses" and wanted to know the exact meaning of two words, "so what I have to know is what's the exact meaning of 'budget' and the 'expenses'." Although Widjak began with a good clue of planning on how to spend expenses for the budget and tried to make connections with the
task throughout his work, "After I read this one [task instruction] and then I worked on computer, I didn't let me forget this one," he couldn't come up with any specific ideas that he could use for the task.

With no given task, Widjak could concentrate on working on what he needed and think-aloud was much easier for him to do. As with his original plan, he could work on Conversations and Practices and watched the time to control his work, using equal time for both sections.

With the cloze task, WJ didn't want to spend time for the task. However, he began working on two suggested lessons for the task in order to open Practices because ELLIS didn't allow students to open Practices unless they had worked on Conversations for a while.

**General attitude** Widjak always brought a plan, but he was a busy learner, attempting to try the most in the time limit in terms of quantity rather than quality of learning. He always wanted to learn and to test himself as much as he could in the time limit. He always had a great deal of pressure to improve his TOEFL score. He believed that if he was exposed to many different types of questions, it would help him improve for TOEFL. This belief made him try many practice questions, but he did not focus on analyzing the language or developing his strategies.

When Widjak couldn't understand the feedback of a Practice question, he couldn't accept it, "I don't know. I don't understand. Why, why? I don't agree with this," and wanted to ask his instructor or conversation group teacher.
Phillipe was a French male. He had a high Placement Test score. He was applying to a community college. He was interested in verbal group discussion to improve his speaking skill.

**Navigation and extent of nonlinearity**

Phillipe showed a consistent pattern of confirming his listening comprehension using (Modification: Confirmation) and (Modification: Role Play), then (Modification: Description). He was very interested in correct pronunciation. Realizing his pronunciation problem in the classroom with the instructor's help, Phillipe brought a plan to work on it with ELLIS. In Minimal Pairs, he focused on distinguishing sounds that he had a problem with rather than trying many sounds (see Table 5).

On Week 6, Phillipe worked on many lessons because he started with the suggested lessons for the task and then changed his mind to work on interesting lessons for him. But he showed a similar pattern of visiting Culture, Vocabulary or Phrase, then employing (Modification: Confirmation) using Video/Script and (Modification: Role Play) using Video/Role Play. Phillipe liked Video/Script, "I prefer the scripting video because it's right under the bottom. Each sentence is right there like a movie." He also liked Video/Role Play because "I could act... You become more aware of your accent when you can hear yourselves when it is recorded." He visited Pronunciation briefly, but he was not satisfied at all because the words were not related to the dialogue.

On Week 7, Phillipe spent most of his time in Minimal Pairs trying the [th] sound, which Phillipe thought was his weakness. He worked on the [th] sound,
Table 5. Phillipe's interactional movements in ELLIS

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<tr>
<td>(Teach)-listening</td>
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remembering that the [th] sound was analyzed in the Listening/Speaking class, but it was not enough. First he used (Modification:Clarification) for every word, clicking Hear Words, for both words but after several tries, he clicked Hear Words for the other pair. He was interested in practicing the [h] sound which French does not have, but the [h] sound was not provided in this program. Phillipe spent a fairly long time browsing through which pairs of sound to choose in Minimal Pairs or which lesson or module to choose in Conversations. After a long browsing, Phillipe worked on "Literary Discussion," showing a similar pattern of visiting Vocabulary or Phrase briefly and Video/Script and Video/Role Play. After another long period of browsing, Phillipe worked on Grammar at Difficult Level in Practices.

On Week 8, Phillipe worked on "Driver's License" and "Shopping at Convenience Store." Since the task was to fill out the blank with vocabulary words or simple phrases, Phillipe visited Vocabulary or Phrase rather than Culture. But in every module of the dialogue, he didn't forget to try Video/Script or Video/Role Play, using (Modification:Confirmation) or (Modification:Role Play). After working on conversations, Phillipe worked on Minimal Pairs, focusing on [th] and [ð] sound. This time, he tested himself using (Teach) function and used a few (Modification:Clarification) or (Modification:Practice) functions. Phillipe was confident in distinguishing [ss] and [th], but not [ð] and [ø] yet.

**Degrees of learner control and in-depth learning**

Phillipe could recognize his [th] pronunciation problem in the class. He connected the classroom learning and his individual learning with ELLIS. He practiced many [th] sound questions in Minimal Pairs using "evaluating" strategy to evaluate the program and "self-evaluating" strategy to evaluate his weakness.
(select Consonant in Minimal Pairs)
(dick [th])
'either'/'ether' (Right)
'sheath'/'sheath' (Right)
'thy'/'thigh' (Wrong, Retry, Hear Both Words)
'this'll'/'thistle' (Right)
'teethe'/'teeth' (Right)
'saw'/'thaw' (Right, Hear Other Word)
'tense'/'tenth' (Wrong, Hear Both Words, Retry, Right)
'sigh'/'thing' (Wrong, Hear Both Words, Retry, Right)
'sunder'/'thunder' (Right)

1 I am gonna keep trying this more, plan(l)
2 because in Listening/Speaking class, we've been trying this sound reasoning
3 [th] /and I like this program more than we did practice. evaluating(p)
4 .......
5 For me, the difference between the accent and I think this is the self-evaluating
6 most difficult pronunciation,/ maybe it's different for some Korean comparing w/ culture
7 or Arabians.

Relationship with the tasks With the writing task, Phillipe wanted to use his own idea to write about how to spend $100,000,000 for the world instead of getting ideas from the suggested lessons in ELLIS. However, he worked on the suggested lessons to get the vocabulary words for the task. He browsed through "Budgeting-Short Term" modules, but decided that those wouldn't fit the task and opened "Financial Management-Long Term." He tried all the modules of "Financial Management-Long Term" lesson, but he couldn't get any clue for the task. Then he quit trying to connect the program to the task and worked on interesting lessons for him such as "Casual Introduction" and "Making Introduction."

With no task given, Phillipe brought a plan to try something that he hadn't done before. He mostly worked on Minimal Pairs and was very satisfied with it because he could choose the sound he wanted to practice and the sound was very clear so that he could see the differences.
With the cloze task, Phillipe decided to do it later, but worked on the suggested lessons for the task, "Driver's License" and "Shopping at Convenience Store" showing a similar pattern of visiting Vocabulary or Phrase to confirm the meaning of unclear words, then Video/Script and Video/Role Play.

**General attitude** The degree of expectation for technology was different. Phillipe expected a very high level of technology for the program. In Minimal Pairs, Phillipe expected the computer to generate question patterns depending on the students' answer level and patterns. Phillipe was also very disappointed when he found that the words in Pronunciation were mere example words for the sound and not related to the dialogue of the lesson. This was because Phillipe thought that practicing separate sounds wasn't meaningful at all.

Phillipe also had a strong preconception about technology and computer use. He believed that the computer should be used individually in a lab situation and the teacher could check what individual students did. "I think for a big class the best way would be kind of with a lot of computers but each one is working on their own. . . . What the teacher can do just to check out if we understood, he could print the dialogue with blanks to fill in just to see if we got the vocabulary . . . Because this is a computer so you can do everything you want, and for me, a computer is kind of personal." As a matter of fact, Phillipe was the only student who didn't come to the classroom activity with ELLIS after the first activity in class with ELLIS.
Mitsuko

Mitsuko was a Japanese female. She was a junior-high level English teacher in Japan. Her goal was to be in IEP for six months to improve her English speaking skills. She was shy, but manifested very correct English. She agreed to participate in think-aloud because she was interested in different types of teaching material for ESL learners.

Navigation and extent of nonlinearity

Mitsuko had a hard time navigating freely in this environment. Due to her high computer anxiety and misunderstanding of the structure and the function of this program, Mitsuko was lost many times and became a passive learner in this environment. She tried to solve the problem by tracing back what she had been done very logically; however, she ended up confusioned when she encountered other problems. Mitsuko's navigation pattern was exploring the program one by one following the format of ELLIS (see Table 6).

On Week 6, Mitsuko used her general strategy of exploring everything one by one, following the format of this program. Therefore, Mitsuko began with the first module of the first lesson "Registering," which was not related to the task at all. Mitsuko was mostly interested in Culture, comparing the information with her culture, so she visited Culture first. She tried the items in Culture one by one. Then, she moved to Vocabulary and Grammar, following the same pattern. When she was in Grammar, she wanted to try Hear. Due to the misunderstanding of the function of Hear, Mitsuko was accidentally in the wrong place and totally lost what to do and where to go to get out of there. Mitsuko tried to trace back what she did, although it
Table 6. Mitsuko's interactional movements in ELLIS

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was not very successful and mostly ended up being confused for a while. However, during the process of tracing back, she could understand what happened. Then, Mitsuko went back to the Script page and tried to listen and watch each line of the dialogue. When she tried (Modification:Practice) using Recording in Script, she was confused again. With help from me, Mitsuko could move to the second module of the first lesson and tried the similar pattern of exploring.

On Week 7, Mitsuko decided to work in Practices section. She had a hard time selecting the right item and right level for her, simply being confused by which one to click first. She selected Easy Level and tried Vocabulary and Culture, then worked for a while in Minimal Pairs. She still had problems in understanding the structure and function of the program.

On Week 8, Mitsuko decided to understand the context of the dialogue, so she worked with the suggested lessons "Driver's License" and "Shopping at Convenience Store." When she had a similar problem to the one she had the first time, she didn't want to spend time to solve the problem. She quit trying the problem and moved to the next lesson to connect to the given task. In order to understand the whole meaning, she used the (Modification:Confirmation) or (Modification:Repeat) function, using Video/Key Words or Slower Audio many times.

**Degrees of learner control and in-depth learning**

When Mitsuko was lost in this space, the use of the "process-monitoring" strategy made her think logically and try to trace back what she had done, and finally solve the problem.

(click 'I've got to' in Grammar)
- read the explanation
1 Now, what's this?  

questioning: unclear
2 Oh, Hear, Back, Next. OK, I'll click Hear.
   (click Hear)
   hear
3 What's happened?
4 I understood only 'I don't have any paper' but I wanna listen again
   so I'll go View.
   (click View)
   view
5 No, No, it's not what I want to do.
6 I want to hear that I listened, how can I do that?
7 I'll try Hear again.
   (click Hear)
   hear
8 Now I understood 'I don't have any paper' 'She doesn't go to school.'
9 But I don't understand next sentence.
10 So I'll go, maybe this one, Back.
   (click Back)
   read
11 Huh? What's going on?
12 I know these things.
13 Now what should I do to listen again?
14 I'll go back Hear again.
   (click Hear)
   hear
15 No, it's not what I want to do.
16 Hum, Help!
   (click Help)
   read
17 Now I lost my way.
   browse through the buttons in Help
18 What should I do? OK, I don't know /but I'll click Help.
   beep
19 OK, I'll click this one, but I don't know what's gonna happen.
   -back to Script
20 It looks like, hum, what's this?
21 These sentences...... This is a first thing, I mean, it looks familiar, and last time I went to Grammar from this, from here,
22 so I'll go Grammar.
   (click Grammar)
   Yes, and I clicked this one.
   'I've got to'
23 Yes, and what did I do? I don't remember what I did next?
24 But probably I wanted to Hear,
   so I wanna Hear again.
   (click Hear)
   hear
25 OK, now I understand.
26 She said 'I don't have any paper' 'She doesn't go to school' and 'Didn't you go?'
Mitsuko was confused about what happened after she clicked Hear (line 1-3); then she had a problem of "managing" (line 7, 14). After she realized that she was lost (line 18), she tried to use Help, but it wasn't successful. When she saw something similar to what she did, she began to use "process-monitoring" for tracing back (line 22, 23, 25, 26, 27, 33) and finally she was "figuring out" what she did and what was wrong (line 29). Mitsuko briefly confirmed about the whole process by "analyzing" and "self-evaluating" (line 30-35).

**Relationship with the tasks**

With the writing task, Mitsuko couldn't get any clue for the task. When Mitsuko read the instruction for the task, she thought budgeting for the world was too big for her. After Mitsuko began to work on the program, she totally forgot about the task.

With no given task, Mitsuko worked in Practices section because it was the third option that she hadn't tried yet on the Main Activity Menu. She didn't bring any specific plan. She still had problems in understanding the structure and function of the program.

With the cloze task, Mitsuko worried about filling in the words, but later changed her strategies to understand the whole context so that she could have a summary, then fill up the words. She was lost again trying Hear in Grammar, but she didn't want to stay there to solve the problem; instead, she moved to the next module to get some clue for the task. In order to get a whole picture to fill up the words, Mitsuko focused on listening to the lessons very carefully.
General attitude  Mitsuko was constantly lost in this environment until the last time, due to her high computer anxiety, "Working on the computer, I always have pressure because I always have pressure to read English and understand, but think aloud doesn't bother me." She had a hard time to manage the program and was frightened and bothered by the beep sound when something was wrong, which made her be more passive and hesitant to try something actively. To understand the structure of the program, she could have used the flow chart of ELLIS, but she didn't use it.

Summary

In this summary, I will summarize the four themes that I investigated, then discuss the relationship between interactional movements and learning strategies and the different learner styles in an interactive multimedia environment. Finally, I will present possible suggestions to the program designers and teachers, and discuss the connection between classroom learning and individual learning.

Navigation and nonlinearity

The navigation pattern and the extent of nonlinearity were investigated in terms of the different interactional modifications selected by the respondents. Most of the respondents worked on their needs and interests and kept a consistent pattern of navigation. Most of the respondents didn't change their nonlinear navigation pattern much, although some expanded on their navigation pattern over time.

In terms of interactional modifications, ELLIS provides three types of modifications. The first type is for simply getting information, such as (Listen),
(Teach), (Modification:Description) or (Modification:Explanation). The second type is for confirming the information or exercising of the information, such as (Modification:Clarification), (Modification:Confirmation), (Modification:Follow Up), (Modification:Expansion), (Modification:Recording), (Modification:Slower Rate), (Modification:Repeat) or (Modification:Practice). The third type is for navigating in the program, such as (Frame), (Choose) or (Focus).

All the respondents took advantage of using the modifications provided in ELLIS to confirm their understanding and listening comprehension, but the styles were all different. When the respondents listened to the dialogue, they all wanted to clarify the unclear parts. However, the approaches to clarifying the meaning were different. Jang Hyun and Han Chen used (Modification:Repeat) by repeating the dialogue parts, then used (Modification:Description) or (Modification:Explanation) by visiting Vocabulary, Phrase or Culture. Jang Hyun and Han Chen wanted to confirm their understanding by listening first, then clarifying the meaning of the words or phrases. Widjak used (Modification:Confirmation) by visiting Video/Script, then (Modification:Description) or (Modification:Explanation) by visiting Vocabulary, Phrase or Culture. Phillipe used (Modification:Confirmation) or (Modification:Role Play) by directly visiting Video/Script or Video/Role Play. Widjak and Phillipe wanted to confirm their understanding and listening comprehension by visually confirming the script first, then exploring the meaning of the words or phrases.

In-depth learning and degrees of learner control

The degree of in-depth learning was investigated in terms of the degree of learner control employed by the different learning strategies and the process of how those learning strategies were used. Interactive multimedia programs provide a
huge amount of information and allow learners to explore many different paths and functions; however, that doesn't guarantee that the learners use them for learning. Only when the information becomes meaningful to learners so that they can confirm sense-making for them, can they stay, enjoy and take the information as their own learning.

The learning strategies employed by the respondents in this environment could be categorized in four groups. The first group of strategies, such as "decision," "need(l)(p)," plan(l)(p)," and "want(l)(p)" are used to make a decision to try something or to move in the program. The second group of strategies, such as "analyzing," "comparing with culture/prior knowledge/myself situation," "confirming," "evaluating(g)(l)," "figuring out," "monitoring(l)," "practicing," "predicting(l)," "questioning(unclear/want to know)(l)," "reasoning," "repeating," and "self-evaluating" are used to explore and learn information. The third group of strategies, such as "browsing," "comment," "confusion," "managing," "monitoring(p)," "predicting(p)," and "process monitoring" are used to work with the program. The fourth group of strategies, such as "challenging," and "mind-wandering" are affective in nature and involve students' interactions with the program.

The "process-monitoring" strategy was the most functional one in making a decision in this environment. Using "process-monitoring" strategy, the respondents could be more organized and structured as they tried to explore and learn or to move somewhere to navigate in the program.

Relationship with the tasks

The relationship with the tasks was investigated in terms of how the respondents gathered the information and got the clues to solve the given task.
Overall, the respondents were more concerned with exploring ELLIS to get more information for their learning rather than focusing on the given task. With the writing task, Jang Hyun was the only one who tried to get a clue for organizing his thoughts for the given topic. Widjak and Phillipe focused on getting a clue for the vocabulary they needed for the task. Han Chen and Mitsuko were overloaded by exploring ELLIS, doing think-aloud and getting clues for the task.

With the cloze task, all the respondents except Mitsuko decided to do it later, just using their general knowledge. Jang Hyun, Han Chen, and Phillipe skimmed through the suggested lessons and worked on their own needs. Widjak opened the suggested lessons simply to go to Practices because ELLIS didn't allow students to open Practices unless they worked on Conversations for a while.

**General attitude**

The general attitude toward this type of program was investigated in terms of how the respondents approached to and dealt with the program when they had problems or barriers. All the respondents enjoyed ELLIS and working in this environment. Nobody was bored working with this program. All the respondents considered it a privilege to work with this new type of program. They were eager to learn with this program. Even though the think-aloud was hard in the beginning, everybody got used to it and enjoyed the chance to see her/his thinking processes.

The huge amount of information in ELLIS and the time limit in this research situation became an issue. This situation made many respondents develop a big plan about the length of time and the part of ELLIS to work with.

All of the respondents, except Mitsuko, were comfortable in this environment. There were some occasions in which the respondents were not sure about the
functions of the features of ELLIS, but they could easily figure them out after some trial and error.

Some interesting attitudes, such as challenging the given information or gender preference were found because the respondents had different characteristics and learning styles.

Relationship between interactional movements and learning strategies

The types and the quality of the interactions between the students and the computer were very different from each other. The interactions were mixed with the degree of the learner's control of the program, style, perception of her/his needs and interest, or the awareness of individual strategies and how those work. It was hard to examine which affects which and to what extent.

Most of the respondents used the first group of strategies described above such as "plan," "want," "predicting," "decision" strategies to make a decision when they moved from one place to another place. In between these movements, when the respondents stayed to work on one type of interactional modification such as (Modification:Description), (Modification:Explanation), or (Modification:Confirmation) to explore and learn the information, they used mostly the second group of strategies such as "evaluating," "self-evaluating," "analyzing," "questioning," "figuring out," "confirming," "comparing with culture" and added the third group of strategies when they had problems of working with the program or monitor their work in the program, and fourth group of strategies to express their feeling or opinion about the program or the circumstance.

The degree of in-depth learning was decided by the learning strategies that each respondent employed rather than the different type of interactional
modification they chose. For example, Han Chen visited Grammar many times using the (Modification:Description) function. In terms of interactional movements, he used the same function of interactional movement. However, there was a big difference between his first visit to Grammar and the last visit to Grammar. When he first visited Grammar, he simply read the descriptions using the "repeating" strategy. When he visited Grammar last, he developed a "practicing" strategy and facilitated his own learning. Thus, it was hard to say that there was a fixed relationship between the interactional movements and learning strategies employed.

I assumed that the respondents who used complex functions such as (Modification:Clarification), (Modification:Confirmation), (Modification:Follow Up), (Modification:Expansion), (Modification:Repeat), (Modification:Slower Rate) or (Modification:Practice) might show a higher degree of learner control and in-depth learning than the ones who used simple (Teach), (Listen), (Modification:Description), or (Modification:Explanation) functions. Again, it was hard to see such a relationship.

The fact that there was no clear relationship between different interactional movements or the extent of nonlinearity and the degree of learner control or the different learning strategies indicated that the extent of nonlinearity doesn't guarantee in-depth learning. It would be hard to know the meaning of the extent of nonlinearity if I investigated the extent of nonlinearity merely using different types of interactional movements. The interactional movements should be interpreted in terms of think-aloud and retrospective data; these data reveal the intent behind the students' interactional movements. I would suggest that Chapelle's CALL texts framework is more proper for investigating the pattern of searching for information rather than the depth of learning.
Different learner styles

In general, most of the respondents employed a variety of interactional movements and learning strategies for their needs and interests and showed a gradual improvement of learner control. Among the various learner styles, Jang Hyun was the most successful learner and Mitsuko was the most unsuccessful learner in this environment.

Jang Hyun was very efficient for working in an interactive multimedia environment in many senses. Jang Hyun was organized and structured. He always brought a big plan on how to work in this program and knew how to adjust it. He was very sensitive and open in the classroom activity with ELLIS and knew how to connect classroom learning to individual learning. His sensitivity for the connection of classroom learning and individual learning made him a model in this environment even though he was from typical drill and practice type disciplined background. His constant attempt to relate to the task made him get a essential clue to organize the structure of themes to write about a certain topic. He understood the structure and the functions of the program well enough. Thus, he was comfortable in this environment and could enjoy his own learning.

Mitsuko had a hard time working in this environment. She had a high level of computer anxiety, which made her a passive learner in this environment. The ELLIS space was too huge and the paths were too complicated for her. She wanted to explore the program one by one, merely following the paths determined in the program. When she encountered problems, mostly lost in this space, she knew how to use high levels of metacognitive strategies. However, her ability to employ high levels of learning strategies could not be used for her own in-depth and independent learning. Instead, she had to use those for overcoming her disorientation. As she
argued, she needed a guide, facilitation and encouragement. Although she had the
flow chart, which showed the map of paths in ELLIS, she didn't use it. She probably
needed human help.

Suggestions to the program designers and teachers

The respondents showed various patterns of visiting different parts of the
program depending on their learning styles, needs or personal preferences.

Although it was hard to define why which was the mostly used, Culture and
Minimal Pairs were the most popular ones for all of the respondents (see Tables 2 to 6). Culture was used by most of the respondents quite often, perhaps because they
couldn't easily get the cultural information in the class or from other types of
material. Minimal Pairs was intensively used by most of the respondents after they
found out their pronunciation problems in the class. The respondents liked minimal
pairs because they could practice and test themselves on a very specific matter for
their needs a great number of times because ELLIS provides the various combination
of comparisons and a great number of items. Pronunciation was not very popular
because it provided several fixed words for the pronunciation point so that the
respondents couldn't get much connection to their needs. Although all the
respondents liked Minimal Pairs, many expressed that it would be better if the
meaning of the word were also provided. I would suggest that the information of
the linguistic items can be provided as holistically as possible, rather than discretely.

The Repeat function (stop/skip/back-up) of the dialogue was highly used by
many respondents, although they could use Slower Audio when their listening
comprehension wasn't clear. (The volume of Slower Audio had a problem on Week 6 and 7. It was fixed later and I emphasized that they could use it. The initial
problem might have limited the respondents' active use of that function.) Many said "I like a real one," which showed that they preferred authentic language data. However, providing a boosting function such as Slower Audio should not be discouraged because it can be used meaningfully for many users.

Many liked Video/Script which showed the script of each dialogue in big sizes of text font right underneath the video; Widjak expressed the reason, "I feel much closer." For some users, visual aids were very helpful for understanding and listening comprehension, especially focused visual aids.

Although many respondents showed different patterns and preferences of use, I would suggest that it is better to provide a variety of functions and features, aiming for many different type of learners. The problem, then, is that the program becomes more sophisticated and complicated to use and navigate. I observed that most of the respondents didn't use the Help option when they had problems. Even if they used the Help option, they didn't pay much attention to the formal textual information. Since the respondents didn't use the Help option very often, I was able to observe when they had problems and also what kinds of problems they had. There were some occasions when the respondents didn't understand the function of the program, but most of the occasions were when they were lost in this environment. I suggest that it would be better if there were a Help button which shows a map of a navigation path like the flow chart of ELLIS (see Appendix B) and indicating the place where the user is lost so that s/he can find out where s/he is, where to go, and what to do next.

The use of different features of the program was not various, as shown in the tables 2 to 6. The confirming types of modifications were not much used although the full range of the program use was demonstrated and used in the classroom.
activity. Most of the respondents kept their original navigational style and didn't change much. I would suggest to teachers that there is a strong need to teach and emphasize the possibility of full range of use to students and check how students are working with this type of program and facilitate their having a better understanding and use of the program for better learning.

Connection between classroom learning and individual learning

When there was a problem or disagreement with the given information, many respondents wanted to go back to the teacher to get a help from the teacher. This phenomenon indicated a strong importance of the teacher's role and human involvement for using technology. Thus, using technology in the classroom situation in which the teacher and peers work together should be emphasized.

Many respondents, like Phillipe, Jang Hyun, and Han Chen, connected their classroom learning and individual learning with ELLIS. Jang Hyun realized his pronunciation problem, "I remembered, in class, Kelly picked up my pronunciation problem of [r] and [l] so I wanted to try that in ELLIS." Han Chen also realized his pronunciation problem, "You know, just now before I come here, I talk with the conversation group and I talked to my leader. I say 'There is a group, Red Cross' but she doesn't understand. So that's why I wanted to try the [l] and [r] sound ... I cannot find any other materials that I can practice pronunciation like this, the pictures and also the computer." Phillipe also realized his pronunciation problem of [th] in class, "She explained how to make correct sound but I didn't know how to."

By this time, they all knew what ELLIS can do and what they could do with ELLIS. Using X-Ray or Profile (Male/Female) View in Pronunciation, they could see the exact articulation point from the person's mouth and animation. In Minimal
Pairs, they could make a combination of sounds and practice a great number of questions distinguishing the difference between the sounds. They recognized that realization of the problem was not enough in considering how to solve it efficiently. They could make decisions about what to work on with ELLIS because they knew that they could have some instruction and learning with this type of program.

I can conclude that the classroom learning and individual learning can be strongly tied together using this type of material. This type of material should not be used alone in the lab situation, simply assuming that a computer program is ideal for individual learning. Once the teacher and the students understand the material, the teacher can facilitate the students' learning, exposing them to the material and leading them to utilize it for their needs and interests. The students can be exposed to and made aware of their learning strategies and develop them. The awareness of many different types of learning strategies from others' examples can help the students try new strategies and adjust them to their needs and styles.
CLOSING THOUGHTS

Freedom and Responsibility

When I stopped by Alice's beautiful house to ask her to edit my dissertation, the yellow and red trees in her garden made me realize it was a beautiful autumn day and I already have been visiting her house almost a year for my research. She and I have known each other for years, but we became close friends as our lives intertwined during the last year. We had our meetings so often in her living room, often interrupted by her cat Bazee or my daughter Ji Ah, who constantly asked me how she to draw my face, "Happy face or serious face?", to discuss the classroom activities with ELLIS and to check how those worked out and what we would do next. Sometimes we went out into the country far south of the town to feed her horses, but we kept talking about my research. This time, I asked her closing thoughts for my research after she was done editing. She agreed with most of the results and found them true. She said, "I was just doing it as we decided. Now I am reading it and I can have more insight." I believed that there must be meaning to bringing technology into classroom and Alice believed she could do something with it. We interplayed our point of view about situating technology and we shared an understanding of her teaching, my view of technology, and most of all, the students' learning.

When Dr. Owen, the director of the software company which produced ELLIS, visited Ames, we met and enjoyed discussing my research results. Dr. Owen was very interested to know how the students reacted to the program and also how the program worked out as a classroom teaching/learning tool. He told
me about the process of preparation to create the program based on a great number of observations of the students' work with the program and discussion with the teachers. But he knew that those attempts were not authentic so that he was very excited to hear how the students really interacted with ELLIS in my research. During the conversation, Dr. Owen was very impressed when I showed the flow chart of ELLIS (see Appendix B) and talked about how it was helpful for the students. I was glad that he was very open and eager to improve the program from the students' perspectives. After this conversation, I realized the need of viewing and creating a program from the viewpoint of "experiencing" from the users' viewpoint rather than merely "providing" from the program designer's viewpoint.

The interaction with Alice and Dr. Owen helped me to perceive my research from the different viewpoints of teacher, program designer, student and researcher. As I look back on what has happened during my research, I realized that "freedom and responsibility" was the beginning point that I wanted to investigate and the last issue on which I want to focus. I was curious to know what students are actually doing, how they are doing it, and to what extent they use freedom in this environment, which was believed to, where students can freely navigate, learn and explore in their own ways. If the students can have freedom, does the freedom guarantee their in-depth and independent learning, which is the ultimate goal of education?

Many researchers (Fischer & Mandl, 1990; Jonassen & Grabinger, 1990; Marchionini, 1988; Marchionini, 1990) had claimed that the distinctive benefit of interactive multimedia is the freedom of navigation in a well-linked database system. It is believed that interactive multimedia provides nonlinear paths in a
huge and rich information storage space and that this promises a great potential for education, providing a breadth and depth of information seeking. They (Fischer & Mandl, 1990; Jonassen & Grabinger, 1990; Landow, 1990; Marchionini, 1988; Marchionini, 1990) also recognized the danger of the fallacy that merely linking information and accessing it doesn't guarantee a dramatic improvement in learning. Thus, many researchers (Duffy & Knuth, 1990; Fischer & Mandl, 1990; Gay & Mazur, 1989; Hannafin, 1984; Jonassen & Grabinger, 1990; Marchionini, 1988; Milhelm & Azebell, 1988) emphasized the importance of learner control to meaningfully interact and dynamically control information in interactive multimedia. As Fischer and Mandl (1990) claimed, interactive multimedia per se remains as "idealistic entities" without the "users' interpretative acts" (p. xvix), which require a high degree of learner control. Marchionini (1990) and Heller (1990) also indicated the possible problems of losing track or confusing the goal of interactions in this environment as disorientation and distraction, respectively.

As shown above, there have been sufficient claims about the benefits and the needs of interactive multimedia as the freedom of navigation and the demand for learner control, respectively. However, there has not been sufficient discussion about how we can make connections between the freedom of navigation and the demand for learner control so that they can have in-depth and independent self-discovery learning. How can the learners take the responsibility for learner control so that they can make the freedom of navigation meaningful? Without learners fully taking the responsibility for control, interactive multimedia environments cannot be effective learning environments.
Then, do the students take all the responsibilities? How do they take responsibilities? How do they change the responsibilities to the freedom to enjoy learning? We all begin to talk about the freedom in interactive multimedia environment, but as a matter of fact, we should begin to talk about the responsibility. I believe that these two, freedom and responsibility, should interact together in order to have in-depth and independent learning.

In order to investigate the extent of the freedom of navigation and learner control, I focused on two points, the types of interactions and the thinking processes which decide the interactions. The types of interactions ELLIS, the program that I used for my research, provided were interactional modifications which were very similar to the interactional modifications L2 learners can have with the native speakers (foreigner talk) or with the teachers in classrooms (teacher talk). The types of interactional modifications of ELLIS are repetition, slower rate, description, explanation, confirmation, clarification, expansion, or follow up and so on. Although the program provides many types of modifications for language learning, the students didn't use them all. Most of them began with their learning style or the needs they perceived for themselves. Some of them wanted to confirm their listening comprehension by exploring the exact meaning of words, some by repeating the dialogue. Some of them felt the need to explore cultural points, some to explore grammar because they thought that was their weakness and wanted to improve it. In addition to that, the students didn't change their interaction style much; however, some expanded their style a little bit during their use of the program. The freedom of navigation was carried out differently and not as much as many authors suggest it will be.
The respondents in my research showed different degrees of learner control and different moments of responsibility for learner control.

Jang Hyun showed the danger of making interactive multimedia as an "ideal entity" if not touched by users' interpretative acts, "If I use this [program] in Korea, I would just study vocabulary, grammar . . ." But Jang Hyun opened his eyes to focus on the cultural aspect of language learning which he had never paid attention to through the classroom discussion and have in-depth learning, realizing, "I think half of the learning English is learning the culture." Without the classroom discussion, Jang Hyun couldn't have the moment to take the responsibility for learner control. If he used the program as his perceived needs, he couldn't fully receive the benefits of the program, and further, couldn't have in-depth learning.

Han Chen was wandering around a lot, but later he had in-depth learning through the think-aloud. Han Chen had a meaningful moment of in-depth and independent learning speaking out to utilize the grammar points. So he could incorporate ideal entities into his own learning. Without the think-aloud experience, he couldn't take the responsibility for learner control. When he was motivated to speak out, making a sentence using the grammar point through think-aloud, he could take the description of the grammar point in the program as his own meaningful learning.

Widjak showed a trait of in-depth learning; however, he was mainly a "try as much as possible" type learner in this environment. He showed in-depth learning when a task was given so that he had a specific purpose. When he didn't have a specific purpose to work on the program, he enjoyed the freedom, but didn't take the responsibility much. Without the given task which gave him
a purpose to use the program, he would merely try all the possibilities of the program. However, mere visiting wouldn't guarantee his own in-depth and independent learning.

The common points of the three cases are there was a connection to turn the ideal entities to their own useful and meaningful learning. The connections were, classroom discussion for Jang Hyun, think-aloud for Han Chen, and given task for Widjak. If there were no connections, they might limit their use of the program, wander around, or merely visit as many places as possible. Then who could make the connections? Who is responsible for making the connections?

Connect Classroom Teaching to Individual Learning

When I designed this study, I wanted to do a deep analysis, investigating what students are actually doing and how they are doing it in the interactive multimedia environment. In order to make the deep analysis more meaningful, I wanted to begin with the bigger picture which must affect students' learning in a new environment. I began to look at the IEP, the students, teachers, and the classroom teaching/learning that I worked with. While I was designing my study, I believed there must be some connections between classroom instruction and individual learning. I wanted to situate the technology from the class and move to individual work. I didn't know what kinds of connections we could make, which would work, or which would not work.

One of the most important findings from the classroom activity with ELLIS was the creation of student-centered learning and students' active participation. In the regular classroom activity, Alice tried to make her teaching
student-centered. The students were from many different cultural and educational backgrounds. Some of the students cooperated well to the student-centered learning which Alice was trying to create; some didn’t. Sometimes they did, sometimes not. However, in the classroom activity with ELLIS, student-centered learning was created gradually, but naturally. The new learning/teaching tool made the student-centered learning easier than in the classroom. The student-centered learning can be a model in which the students take an initiative role of learning. When the students take an initiative role of learning, they can experience the meaning of being independent and responsible for their own learning.

On the other hand, in the classroom, there are always interactions, such as teacher-student or student-student. Working with the computer, there is an interaction, student-computer. The computer is inactive in this interaction, in contrast to the classroom learning in which both parties are active. However, if we can transfer the dynamics of human interactions in the classroom to the interaction with the computer, we can make the student-computer interaction more dynamic. Jang Hyun’s episode of opening his eyes to the cultural aspect of language through the classroom discussion can be a good example of transferring the dynamics of student-student interaction in the class to student-computer interaction. A student, Han Chen, could recognize the point related to culture and made it an issue through the active student-student interaction in the classroom. The dynamics of student-student interaction inspired Jang Hyun to realize the importance of an aspect of language learning which he had never recognized before.
I found that many students made the connection between the classroom learning and their individual learning in this study. Many students could recognize their pronunciation problems through the teacher's help in class. The recognition of the problem was not enough. They needed to analyze and explore more how to fix it and practice it individually. Those students who worked on ELLIS individually could make connections realizing that they could do something with ELLIS about that matter. They could use a high level of learning strategies, such as "evaluating," "self-evaluating," or "practicing" to solve the problem and experience their own independent, responsible and meaningful learning.

As I contemplated these events in the classroom, such as transferring the dynamics of student-student interaction to student-computer interaction, self-awareness of the connection of classroom teaching to individual learning, the role of teacher as a resource, and the events in think-aloud for creating in-depth learning through the classroom discussion, think-aloud, or given task, I could consider the responsibility in a new sense. The responsibility should be shared. The responsibility should not be loaded only onto the students. The students should not be sent to the individual learning situation alone, wandering around, not knowing what to do. The teacher and the students in the class can share the responsibility. The teacher can inspire and facilitate the independent and responsible learning. The students can do it for each other. The whole class can do it for each other.
Pedagogical Implications

How can we create a whole learning environment in which we can use technology most efficiently? What kinds of role can we take as a student and a teacher?

The freedom could be fully carried out when the students take the responsibility. However, the responsibility can be shared by the teacher and the students. In order to create a sharing of responsibility, the teacher has to take an important role and can be an organizer of an on-going interaction between the students and the computer.

In congruence with Vygotsky's (1978, 1981) emphasis on the role of adult guidance in a social-cultural learning, the students using technology should be guided by teachers to be independent and responsible learners. According to Vygotsky (1978), "Every function in the child’s cultural development appears twice: First, on the social level, and later, on the individual level; first, between people (interpsychological), and then inside the child (intrapsychological)" (p. 57). First, children's intellectual development is mediated by adults' modeled frameworks and guidance. Then, the children become more experienced and take responsibility for their learning, as the adults gradually reduce their role of modeling and guiding. In a technology learning environment, the teacher needs to be a model for the students so that they can become independent and responsible for their learning using technology.

When the technology is being used as a learning tool in the classroom, it becomes a public domain. The teacher can make an initial introduction, inspire the students as to how to use it for their own learning, facilitate them to make
the connection, and stay as a resource for their learning. The classroom activity using technology and the students' individual learning should not be separated, but rather be connected as an on-going interaction.

If the students work with an interactive multimedia program as merely visiting many options and test themselves as to whether they were correct or not, what would be the difference from merely flipping around the textbook and checking themselves in workbooks? We can make interactive multimedia useful and meaningfully different from the traditional teaching material because we can have in-depth and independent learning using the power of the freedom of navigation in a well organized and huge information space and taking the responsibility for learner control.

When the students work individually, it is very important to help the students be aware of what they are doing to be in-depth and independent learners. The students should be open to see what they are actually doing, whether it's working or not, which activity is working better, which ones are for different purposes and how they can improve to work it better. The think-aloud experience for the five respondents for my study was a very meaningful experience for all of them. It was hard, but it was definitely worth it. Han Chen's use of "practicing" strategy to speak out to utilize the grammar points through think-aloud was the best example.

With my experience using think-aloud verbalization for my research, I found that think-aloud can be used not only for a research technique, but also for a classroom learning technique. Through the process of think-aloud, the students could be aware of what they were doing and how they were working
out. The self-awareness of the students' learning process and the use of their learning strategies help them improve those skills.

In order to use think-aloud as a classroom learning/teaching technique, the teachers need to be trained. Since think-aloud is used as a research technique, teachers might begin to self-study by reading the relevant literature. I would recommend a reading group or workshop. Through self-study, teachers can learn the fundamental concepts and techniques, develop techniques, and exchange ideas and techniques. These activities can help teachers interact with the students not only from the teacher's viewpoint, but also from researcher's viewpoint.

After sufficient training of think-aloud technique, the teacher can be the orchestrater of students' individual learning. The teacher can watch how they are doing and keep a record of it. The teacher can have verbal or written discussion with the students so that they can recognize they are guided and facilitated. In some classroom situation, perhaps, the intensive think-aloud may be a hard one to implement. But any method which allows the students to open their thinking processes and examine those processes can work, such as keeping a journal. The interval of implementing think-aloud and the degree of intensity of think-aloud or whatever can be controlled.

I would recommend making each student's thinking processes and their failure and success public domain. The teachers can collect various thinking processes and have the students share them. The teachers can help students to present their successful thinking processes to peers and discuss them together. Let the students be aware of the variety of learning strategies and share those and try for themselves to see whether they can use for them or not. Through this
process, the disoriented or distracted learners can be guided and facilitated not only by teachers but also by peers. Facilitating and orchestrating all these interactions is the teacher's job initially, but shared with the students.

The technical concern was one of the important issues which emerged from my study. The technical matters can be serious barriers for situating the technology. The cost of keeping up with the rapid change of technology in terms of software and hardware, and the investment of time and personnel, as Dr. Nelson indicated, should be considered and set up before situating the technology. The technical management, including installing and trouble shooting, as Alice indicated, should be taken care of. The classroom management using technology, as Alice indicated, should be also considered. In order to use the technology efficiently in the classroom, the teacher should be trained or the teacher should have an assistant.

All these matters often overwhelm teachers and administrators. However, all these matters should be considered in a whole political, social and cultural context in a certain setting. If we bring up these matters to an educational community including administrators, teachers, students and parents, we can overcome those barriers. Situating technology would be a heavy job if we have to take the responsibility individually.

Once the technology is incorporated, the next issue would be how we use it. The rapid development of technology often made people misunderstand that technology can be a tool that students and teachers can rely on for their learning and teaching. However, technology is not a tool which provides everything that we need for our learning and teaching although it is very capable. Technology,
rather, is a tool with which we can make our learning and teaching more efficient, meaningful and powerful.

Alice's attitude toward technology, "I would not make the tool run me; I want to run it," should be notable. The initiative role of using technology should be made by the teacher and further shared by the students. The way the teacher uses technology in the classroom should be a model for the students, enabling them to work with the technology to be independent and responsible learners.

The role of the teacher using technology becomes clearer when we consider the event of "challenging" in think-aloud by many respondents. When the students had problems understanding the information and instruction from the computer, they wanted to confirm the information by asking the teacher. Even though the computer is believed to be capable, the students wanted to get a human's help, someone whom they could trust and rely on, when they had a problem. The teacher should be a resource for explanation, correctness, and confirmation.

In sum, in order to make interactive multimedia an efficient and meaningful learning environment as claimed in the literature, we need to view the freedom and responsibility as interrelated and realize that each makes the other more meaningful. The responsibility should be taken in an atmosphere of freedom, as students take more responsibility, they can get more freedom; then the freedom can lead to more responsibility. We have to make the learning environment in which the interactive multimedia is being used cohesive and integrated. The students should not be left alone to take the whole responsibility. The understanding and manipulating of the interactive
multimedia should be shared and improved by the teachers and students. The teacher, students, and computer are all important members of an orchestra which can be created as a whole learning environment. Again, the role of each of the members should be interactive.

Recommendations

Incorporating the technology into the classroom brought many changes as shown above. There was a shift of the locus of control in learning and teaching. Bringing the technology into the classroom, using ELLIS as a classroom activity in an ESL class, changed the teacher-centered learning to student-centered learning or changed the student-centered learning to more absolute sense of student-centered learning. In the process of change, the students could exercise learner control using technology. Through the use of technology, the exercise of learner control made the students realize their roles in individual learning and connecting individual learning and classroom learning. The teacher could confirm the role of teacher in connecting individual learning and classroom learning using technology, as Alice manifested. This whole process made the students and teacher realize the meaning of freedom and responsibility in learning and teaching. Can we expand these local changes which occurred in a certain ESL classroom to global changes in education in a larger setting, schools and communities?

Restructuring education has been an important issue in education over a decade. Many educators and researchers (e.g., Collins, 1991; David, 1991; Sheingold, 1991) believed that the education should be restructured overcoming
the limits of traditional model of education and technology can take an essential role in restructuring education. Educators recognize the critical need for students to learn how to think, to understand concepts and ideas, to apply what they learn, and to be able to pose questions and solve problems (Sheingold, 1991). Restructuring seeks to transform the current education system into the system which is capable of providing students with the kinds of skills they need in today's world and the world of tomorrow (David, 1991). Restructuring challenges to the goals for student learning. Then how do we restructure education? How do we start teaching students to apply skills, understand concepts and solve problems, work collaboratively, and take responsibility for learning?

Many educators and teachers (e.g., Collins, 1991; David, 1991; Sheingold, 1991) believed that well-integrated use of technologies can support restructuring. The introduction of technology can lead to changes in learning and teaching changing the role of students and teacher, as we experienced in my research. Technology has the potential of synthesizing and displaying complex quantitative and qualitative information derived from a variety of sources, as ELLIS provides information of many linguistic items of English with high level of audio and motion video capability so that ESL students can watch, listen to, interact with and learn from. Bringing technology can open a new learning/teaching environment. In this new environment, students can access information in a variety format, learn and explore actively. Teachers can facilitate students' learning, working with students as colleagues, and making decisions together, rather than delivering information and testing them, as Alice and the students decided together in the classroom activities with ELLIS which
linguistic item they want to explore and discuss together. The new roles and relationships between students and teachers in classrooms with the help of technology can change the concept of the roles and relationships of learning and teaching, as many students in that class experienced that they could make decisions in the classroom activity rather than waiting for the teacher's instruction and they could take the initiative of their own learning using technology. This new roles and relationships between students and teachers can contribute to change the entire educational system breaking the wall of rule-bound, top-down and result-oriented relationships between teachers and administrators, and schools and homes. Technology alone cannot overcome the limits and solve problems of traditional education, but can contribute in a variety of ways.

I believe that the changes that I experienced in my research with one type of advanced technology, an interactive multimedia program, in a local setting, an ESL classroom, in one subject matter, English can expand to larger settings, any schools, and any subject matters, further to education. The local changes that I experienced were doable ones that can be expanded to global changes in restructuring education. In that local changes, the technology was a tool to bring the changes. Technology can be integrated into curriculum as a tool to restructure education so that students can be the center of learning, further enjoy the freedom of learning and take the responsibility of learning.
BIBLIOGRAPHY


ACKNOWLEDGEMENTS

This research could not have been completed without many people's support and encouragement. Among many supporters is Dr. Ann Thompson, my major professor, to whom I want to express my deepest thanks. Without her constant positive encouragement and thoughtful advice, I could not have even started my research and certainly would not have completed it. I also want to express my appreciation to Dr. Roberta Abraham and Dr. Carol Chapelle, who guided me at every step of the process with invaluable and thoughtful insight. I offer special thanks to Dr. Leslie Bloom, who convinced me that I could be a qualitative researcher. I also thank Dr. Rex Thomas and Dr. Richard Warren, who offered me continuous support.

I owe a great deal to Dr. Frank Otto, who allowed me to use his excellent ESL interactive multimedia program, ELLIS, for my research. I wish to thank Dr. Barbara Matthies, who generously opened the door of IEOP for my research. I send my special appreciation and love to Dr. Mary Fry, who was so generous and open to the challenge of working with technology. She was a never-ending resource for encouragement, advice, and humor. Nobody could be a better friend than Mary. I cannot find any special words to thank all of the students that I worked with, who were so kind and cooperative. Among all those students, I cannot forget five students, Jung Hoon, Han Ching, Witjack, Samuel, and Terumi, and their eagerness to learn. I also thank Kayt Sunwood, my peer debriefer, who gave me her different viewpoints which were a catharsis for my research.

Il Sun Kim, who never let me get discouraged, supported me through her prayers and was my model for being a professional woman. Finally I want to send
my inexpressable thanks and love to my family. My mother, who believes that education is most precious and valuable and who exemplifies her belief, is my mentor and empowerer. My sisters never stopped encouraging me to pursue my goal. Most of all, my husband, Young, and my daughter, Ji Ah have been my best supporters so that I could do something whenever things did not go well. Both of them were my best friends who shared my discouragement and excitement. Without their understanding, patience and love, I cannot be who I am. My husband's faithful support and humble sacrifice encouraged me keep going. Last, I want say to my daughter, "Ji Ah, I did it for you!"
APPENDIX A: FEATURES OF ELLIS
Main Activity Menu

The Main Activity Menu is the first screen that appears after the log in procedure. Most ELLIS activities are accessible through this screen.

Conversations Menu

Both Conversations and Conversations with Choices access the Conversations Menu, but only Conversations with Choices allows the learner to steer the storyline and outcome of the video. Activities in ELLIS are based on video segments depicting every day situations. All video segments are accessible through this screen.
Script Page

After the learner views a video segment, a script page appears. Here, the learner can use the multimedia features of ELLIS to study any line in the video that is difficult to understand.

You can access any line from the script by clicking on it. The video is shown in this window.

Vocabulary

After working with the script page, the learner has recorded and played back the line "I'm looking for a job as a waiter" at both native and slow speeds.
Grammar Guide

Clicking on a highlighted sentence or phrase takes the learner directly to a lesson in the grammar guide.

Conditional Sentences - Easy

There are three main types of conditional sentences. The first of which are possible conditions, or things that will probably happen (present or future).

Possible conditional sentences the simple present tense is used in the if clause and the future tense is used in the main clause.

Students see a brief video segment demonstrating correct usage of the grammar concept.

YOU'LL never know if you don't try.

Example Page 2 of 3

Video and Role Play

Clicking on Video brings up a menu that asks the learner how the video should be shown. The learner can watch video segments with the script running below, with keywords (verbs, adjectives, nouns, adverbs), without words, or in a role play format.
Pronunciation

This activity offers the learner countless opportunities to improve pronunciation skills.

Practice Menu

After going through all of the activities in the script page, the learner can access the practice section of ELLIS. This section provides three activities: Practice Items, Pronunciation, and Minimal Pairs.
APPENDIX B: FLOW CHART OF ELLIS
ELLIS (English Language Learning & Instruction System) Flow Chart

- Conversations
  - General
  - Check
  - Practice

- Lessons
  - Module
  - Dialogue

- Lesson Dialogue
  - Script
  - Culture
  - Vocabulary
  - Grammar
  - Video
  - Phrases

- Module Dialogue
  - Profile View
  - Record Voices
  - Hear All Words

- Script
  - Record Voice
  - View

- Culture
  - View

- Vocabulary
  - View

- Grammar
  - View

- Video
  - View

- Phrases
  - View

- Exit
- Menu
- Help
APPENDIX C: RESEARCH PROCEDURES
<table>
<thead>
<tr>
<th>Week</th>
<th>Class Observation</th>
<th>Ellis Observation</th>
<th>Interview w/ Inst. &amp; Dir.</th>
<th>Individual Lab Work</th>
<th>5 Resp. Lab Work (T/A)</th>
<th>5 Resp. Lab Work (Retro)</th>
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</thead>
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<td>X</td>
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<td>Week 2</td>
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<td>Demo 1/2 HP</td>
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<td>Audio Tape</td>
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</table>

APPENDIX D: HUMAN SUBJECTS APPROVAL
Checklist for Attachments and Time Schedule

The following are attached (please check):

12. [☐] Letter or written statement to subjects indicating clearly:
   a) purpose of the research
   b) the use of any identifier codes (names, #'s), how they will be used, and when they will be
      removed (see Item 17)
   c) an estimate of time needed for participation in the research and the place
   d) if applicable, location of the research activity
   e) how you will ensure confidentiality
   f) in a longitudinal study, note when and how you will contact subjects later
   g) participation is voluntary; nonparticipation will not affect evaluations of the subject

13. [☐] Consent form (if applicable)

14. [☐] Letter of approval for research from cooperating organizations or institutions (if applicable)

15. [☐] Data-gathering instruments

16. Anticipated dates for contact with subjects:
    First Contact                                      Last Contact
    10/4/93                                           11/10/93
    Month / Day / Year                                 Month / Day / Year

17. If applicable: anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual
    tapes will be erased:
    7/31/94                                           Month / Day / Year

18. Signature of Departmental Executive Officer       Date                                     Department or Administrative Unit
    [Signature]                                       9-23-93

19. Decision of the University Human Subjects Review Committee:
    [X] Project Approved                              [ ] Project Not Approved                   [ ] No Action Required

Patricia M. Keith                                      10-5-93
Name of Committee Chairperson                          Signature of Committee Chairperson
APPENDIX E: RESEARCH CONSENT FORM
Purpose of the Observation and Interview

The purpose of the observation and interview is to investigate the process of the interaction with a multimedia environment for ESL (English as a Second Language) learners. With the help of observations and interviews with the students, the investigator will develop a detailed description and explanation of students' interactions.

The investigator would like to observe the Advanced Level of Reading/Writing and Listening/Speaking class in IEOP (8 times, 8 hours), the demonstration of the program ELLIS (1 time, 1 hour), the hands-on practice with ELLIS (2 times, 2 hours), and the classroom activity with ELLIS (5 times, 5 hours). The demonstration of ELLIS, hands-on practice, and the classroom activity with ELLIS will be videotaped. The investigator would also like to have retrospective interviews with students who work individually with ELLIS, which will be audiotaped. After studying the information obtained during the observation and interview, the investigator may contact you again to seek clarification on one or more topics.

I, ______________________, ______________________ understand that:
(please print name) (title)

a. my participation in this study is voluntary. I may withdraw at any time by speaking to the investigator, and any information collected from me will not be used in the study.

b. the information obtained during this study will be summarized for the purposes of writing a dissertation for the investigator.

c. the recordings and notes obtained in this observation and interview will not be used other than in the dissertation.

d. I will be identified by number, not by name, in the writing of the study.

I agree to participate in this study according to the preceding terms.

________________________
(Respondent's Signature)

I agree to conduct this study according to the preceding terms.

________________________
(Investigator's Signature) __________
(Date)
RESPONDENT CONSENT FORM B

Purpose of the Think-Aloud Verbalization and Retrospective Interview

The purpose of the think-aloud verbalization and retrospective interview is to investigate the process of the interaction with a multimedia language learning program on the part of ESL (English as a Second Language) learners. With the help of think-aloud verbalizations and retrospective interviews with 5 selected respondents from the Advanced Level of Reading/Writing and Listening/Speaking class, the investigator will develop a detailed description and explanation of ESL students' interactions in a multimedia environment regarding their learning strategies.

The investigator would like to conduct think-aloud verbalizations and retrospective interviews with 5 respondents for 3 weeks. The think-aloud verbalization will be videotaped (15 times, 15 hours), and the retrospective interview will be audiotaped (15 times, 15 hours).

I, __________________________, __________________________ understand that:

(please print name) (title)

a. my participation in this study is voluntary. I may withdraw at any time by speaking to the investigator, and any information collected from me will not be used in the study.

b. the information obtained during this study will be summarized for the purposes of writing a dissertation for the investigator.

c. the recordings and notes obtained in this think-aloud and retrospective interview will not be used other than in the dissertation.

d. I will be identified by number, not by name in the writing of the study.

I agree to participate in this study according to the preceding terms.

______________________________
(Respondent's Signature)

I agree to conduct this study according to the preceding terms.

______________________________
(Investigator's Signature) (Date)
RESPONDENT CONSENT FORM C

Purpose of the Interview and Observation

The purpose of the interview and observation is to investigate the role of the ESL (English as a Second Language) instructors and the director of an ESL institution in the process of incorporating the multimedia language learning program into ESL classrooms. With the help of interviews with the instructors and the director and observations with the instructors, the investigator will develop a detailed description and explanation of interactional processes with a multimedia environment in ESL classrooms.

The investigator would like to interview the instructors and the director at the beginning and at the end of the research period (2 times, 2 hours, for each). The interviews will be audi-taped. After studying the information obtained during the interview, the investigator may contact an interviewee again to seek clarification on one or more topics.

I, ______________________, ______________________ understand that:

(a) my participation in this study is voluntary. I may withdraw at any time by speaking to the investigator, and any information collected from me will not be used in the study.

(b) the information obtained during this study will be summarized for the purposes of writing a dissertation for the investigator.

(c) the recordings and notes obtained in this observation and interview will not be used other than in the dissertation.

(d) I will be identified by title, not by name, in the writing of the study.

I agree to participate in this study according to the preceding terms.

______________________________  (Respondent's Signature)

I agree to conduct this study according to the preceding terms.

______________________________  (Investigator’s Signature)

______________________________  (Date)
APPENDIX F: RESEARCH GUIDE
RESEARCH GUIDE

The purpose of the study, ESL Learners’ Strategies in a Multimedia Environment, is to investigate the use of multimedia language learning materials within a classroom setting. The goals of this study are two-fold: background and foreground. First, to examine the background it investigates how the teachers and students in an Intensive English & Orientation Program (IEOP) Advanced Level Reading/Writing and Listening/Speaking class at Iowa State University (ISU) incorporate a videodisc/CD-ROM program, ELLIS (English Language Learning Instruction System), into their learning environment. Second, to examine foreground variables it investigates what types of learning strategies students are using when they work with the interactive multimedia program. The background of the study will employ observations of the regular classroom activity, the classroom activity using ELLIS, individual uses of ELLIS, and interviews with the instructors of the Reading/Writing and Listening/Speaking class and the director of IEOP. The foreground of the study will employ think-aloud verbalizations and retrospective interviews with five selected respondents who use ELLIS for an hour per week (for three weeks), and retrospective interviews with other individual students.

During the research period, all of your cooperation during the observations, interviews, and think-aloud verbalizations and retrospective interviews for this study will be deeply appreciated.
APPENDIX G: INTERVIEW QUESTIONS
Interview Questions for the Instructor

1. What are your teaching philosophies?
2. What are your teaching experiences?
3. What are your opinions about ESL teaching strategies?
4. What are your opinions about ESL teaching materials?
5. What are your feelings, opinions, and perspectives of technology in relation to ESL learning and teaching?
6. Are you positive or negative to a new environment such as materials, techniques? Why?
7. What are the problems or worries from outsider's viewpoint as a technology users, if there's any?
8. What do you think about Interactive Multimedia for language learning and teaching?
Interview Questions for the Director

1. What are your teaching philosophies?
2. What are your teaching experiences?
3. What are your philosophies of being an administrator of ESL institution?
4. What are your experiences of being an administrator of ESL institution?
5. What are your opinions about ESL teaching strategies?
6. What are your opinions about ESL teaching materials?
7. What are your feelings, opinions, and perspectives of technology in relation to ESL learning and teaching?
8. Are you positive or negative to a new environment such as materials, techniques? Why?
9. What are the problems or worries from outsider's viewpoint as a technology users and administrator's viewpoint, if there's any?
10. What do you think about Interactive Multimedia for language learning and teaching?
11. What would you as an administrator of language institution expect for learners when you use technology such as interactive multimedia program?
Post Interview Questions for the Instructor

1. What is your overall conclusion using technology for your teaching?

2. How were the students' reactions?

3. How was your experiences? Positive or negative?

4. What were the excitement and difficulties?

5. What are the differences between your thoughts before the technology use and after the technology use?

6. What did you have to change to use technology?

7. How would you use it next time, if you have a chance?

8. What are your recommendations to students, program designers, and other teachers?
Post Interview Questions for the Director

1. What is your overall conclusion for using technology for the program?

2. What is your opinion and feeling after the observations?

3. Did you observe any changes? If any, what was it?

4. Did you talk with the instructor or the students who used technology?

5. What are the differences between your thoughts before the technology use and after the technology use?

6. Would you recommend to try to other instructors or not? Why?

7. Do you see any differences between the instructor and administrator accepting technology?

8. What are your recommendations to students, program designers, and other teachers?
Interview Summary Form

Respondent Name:
Date of Interview:
Today’s Date:

What were the main issues or themes that struck you in this interview?

Summarize the information you obtained (or failed to obtain) on each of the target questions you had for this contact?

What else was salient, interesting, illuminating, or important in this contact?

What new or remaining questions do you have in considering the next contact with (or regarding statements from) this respondent?
APPENDIX I: EXAMPLE OF COMPLETED INTERVIEW SUMMARY FORM
Interview Summary Form

Respondent Name: Alice
Date of Interview: 1/11/94
Today's Date: 1/11/94

What were the main issues or themes that struck you in this interview?
-M lives with ESL.
-ESL is her life.
-M thinks she can teach language with anything.

Summarize the information you obtained (or failed to obtain) on each of the target questions you had for this contact?
-M has a very clear and open philosophy for her ESL teaching.
-M has tremendous amount of ESL teaching experiences (26 years), never regrets.
-M is very open to new ideas (like she accepted this try for her class).
-M is open to technology but still thinks computer will be individual learning, but also wants to see what will happen.
-M is generally positive for everything.
-M thinks ELLIS will help the students learning, but guesses that some lessons or grammar part won't help them or not be interested by the student.

What else was salient, interesting, illuminating, or important in this contact?
-ESL is her life and she really enjoys ESL teaching.
-M indicated that this society communicates in English through computers so that students have to realize that.
-M has a very clear idea about the power of word processing just like technology major person.

What new or remaining questions do you have in considering the next contact with (or regarding statements from) this respondent?
-Were there any other innovative attempt in her teaching?
-If she has, how was it? How did she feel about it?
-As a teacher who thinks that she can teach language with anything, how would she react from that point of view?
APPENDIX J: OBSERVATION SUMMARY FORM
Observation Summary Form

Institution:
Date of observation:
Today's Date:

Description of event or activity (what happened, who participated, etc.):

Significance or importance of event:

What were the main issues or themes that struck you in this event?

Anything else that was important, interesting, or illuminating?

What questions do you have regarding this event?
APPENDIX K: EXAMPLE OF COMPLETED OBSERVATION SUMMARY FORM
Observation Summary Form

Institution: Ellis (Introduction)
Date of observation: 2/25/94 (F) 9:00-11:00

Description of event or activity (what happened, who participated, etc.):
- 11 students
- The program runs much faster because it's set up in a new Zenith computer
- Handout (Cultural Differences in Introduction)

Significance or importance of event:
- Introduction topic was very good for comparing different cultures (patting, touching, kissing...) so the discussion was very active because everybody has something to say related to their culture
- Students have lots of fun, laughing, joking and all were participating (students use lots of gesture, standing, sitting, touching...)

What were the main issues or themes that struck you in this event?
- M very skillfully change direction of discussion but not in a dominating or obvious way
- Some students react differently in small group discussion and big group discussion (i.e. WJ, JH)
- M is very good at rephrasing.
- M freely picks up points like voc, idioms, grammar, pronunciation, body language....
- Students' different reaction or learning style (i.e. WJ's concern is on grammar, KL's concern is on context, TR and HW never talk in group, JH, WJ, DW, UN are quiet)

Anything else that was important, interesting, or illuminating?
- Before the class starts, casual interaction between students and the teacher about the topic around us [actually, in ESL, everything is learning]
- Some students' posture becomes more relaxed like in a theatre [students know the system of this activity and more comfortable with this]
- High expectation for the program and technology (i.e. 'raggai music', students laughing at unnatural resolution of the screen)
- Exasperating tone of "nice to Meet You" was a theme for this class (lots of laughing and jokes out of this)
- Now this class looks like a family and some are very close.

What questions do you have regarding this event?
APPENDIX L: DOCUMENT SUMMARY FORM
Document Summary Form

Investigator:
Institution:
Date:

Name or description of document:

Event or contact with which document is associated:

Significance or importance of document:

Summary of contents of document:

What were the main issues or themes that struck you in this document?

Questions regarding or generated by the document:
APPENDIX M: EXAMPLE OF COMPLETED DOCUMENT SUMMARY FORM
Document Summary Form

Investigator: Yuhsoon Park
Institution: IEP
Date: 1/26/94

Name or description of document:
- IEP Student Handbook

Event or contact with which document is associated:
-I contacted assistant-director and he was very kind, open and cooperative.
-I can assume that the students can feel very comfortable with him who is in charge of students' problems and difficulties.

Significance or importance of document:
-Everything in this Student Handbook is described and explained very easily, even the font was very big.
-It seems like IEP avoided to have a formal instruction because the proficiency levels of the students are various and all are from different backgrounds.
-These students can have all kinds of sources for IEP, students' academic life, activities, relevant organizations....

Summary of contents of document:
-IEP's teaching purpose, teaching methods, teaching materials, in/out of the class activities, instructors, assignments, TOEFL prep class, etc

What were the main issues or themes that struck you in this document?
-IEP tries to perceive everything from the students' viewpoints which is very important for language teaching/learning because absorbing into different culture is a big part of language learning
-IEP emphasizes the importance of cultural learning a lot.

Questions regarding or generated by the document:
APPENDIX N: PRE SURVEY
Questions for Computer Experiences

1. Please describe about your computer experiences.

2. Please describe about the types of software you are familiar with.

3. Are you familiar with the term "hypermedia" or "interactive multimedia"?

4. What is your opinion of using technology for language learning? Positive or negative? Why?
APPENDIX O: POST SURVEY
In the last 8 weeks, you had various class activities or individual work using ELLIS. Based on your experiences, please sit down for 5 to 10 minutes and thoughtfully fill out this questionnaire about any of your feelings, opinions and suggestions, either positive or negative. Again I greatly appreciate your time and the thoughts you share with me.

What features of ELLIS do you like? Why? If it was helpful for your English learning, in what ways was it helpful?

<table>
<thead>
<tr>
<th>Not Helpful</th>
<th>Helpful</th>
<th>Very Helpful</th>
<th>Don't Know or Remember</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Dialogue

( ) ( ) ( ) ( ) ( ) ( )

Script

( ) ( ) ( ) ( ) ( ) ( )

Recording

( ) ( ) ( ) ( ) ( ) ( )

Slower Audio

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Culture

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Vocabulary

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Do you have any suggestions for this interactive computer program (ELLIS) based on your experiences?

You had various activities with ELLIS in class. In general, did you like it or not? Why?

To help your memory, I have listed the activities you did in class. Please evaluate these activities according to the 5 scales (1-Didn't Like Much 2-Didn't Like 3-Liked 4-Liked a little 5-Liked a lot). Would you please describe what you liked and you didn't like, and provide reasons in detail?

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<tr>
<th>Date</th>
<th>ELLIS</th>
<th>Activity</th>
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<tr>
<td>2/4</td>
<td>Registering</td>
<td>Role Play of Advisor and Students</td>
<td>1 2 3 4 5</td>
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<tr>
<td>2/11</td>
<td>Registering</td>
<td>Fluency Workshop</td>
<td>1 2 3 4 5</td>
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<td>2/18</td>
<td>Literature Discussion</td>
<td>Group Discussion on “After You, My Dear Alfonse”</td>
<td>1 2 3 4 5</td>
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Were the computer presentations and follow-up activities different from other activities you have had in English classes? Yes ______ No ______
If yes, how were they different?

Was the presentation on word processing (Microsoft Word) done by the researcher in writing class helpful to you? Yes ______ No ______ If yes, in what ways was it helpful?

If you have any other comments, please describe it.
APPENDIX P: EXAMPLE OF DAILY LOG
1/26/94  (W)
15 students came with Mary and Marge. Mary did great. She is really an experienced instructor. Marge gave me warm smile in the back constantly. Students were very interested in and impressed. Mary gave up her teaching after the demo and just let them practice with the program. She said it may be hard to change their focus because they all loved the program. Han, Witjack, Samuel, and Jung Hoon were very interested in. They didn't leave the program. Overall, the demo really went well. Three students changed their mind and want to sign up for the consent form. Great!

1/27/94  (Th)
7 students came for first 1/2 hands-on practice. They all enjoyed working with the program. They were all serious to work with this. I think Mary and Marge did a good job to make this as part of their classroom activity rather than just for somebody's research.

After the class hour, some (Jung Hoon, Witjack, Samuel) wanted to work more. So Marge and I let them stay longer. Witjack talked about the pressure of TOEFL because he has to return back to his country unless he gets over 550.

I asked Kayt whether she can work with me for peer debriefing and audit trail. She said yes without any hesitation. She can give me many deep and insightful thoughts. Thanks!

1/28/94  (F)
I talked with Bialess, transcribing lady, on the phone. $ 15 for an hour long interview! It's much more expensive than I thought. I have to look for research grant or whatever.

The microteaching room supposed to be reserved for TAOS class. Something was wrong. Fortunately Charlie could move to N008.

8 students came to second 1/2 hands-on practice. They all enjoyed, too. Sumi was weird. Marge mentioned about her. Marge asked me more about my research and we discussed about the matter of linking the Ellis activity to the classroom activity. We have to discuss more.

Han-Ching told me that he wants to be one of the 5 respondents. Good!

I had to go back to work right away and I didn't have enough time to clean up. Finally I could have 30 minutes to rearrange everything and work for Iaacovos later. I wonder how I can manage my schedule until the research finishes. The schedule is too tight. Headache!
APPENDIX Q: EXAMPLE OF UNITIZATION AND CATEGORIZATION OF INTERVIEW AND OBSERVATION
Teaching Material (IEOP)(D1) Our philosophy has been not to have them repeat the same books if we can avoid it. They think it's unfair to buy a book that they don't completely finish. So there's this tension all the time. You know, "Why did you have me spend all this money if I only studied three chapters of this book? Why can't I finish it next semester?" Well, just because that's not the way we plan things.

Teaching Material (IEOP)(D1) We do choose the kinds of books that seem to suit our needs as a program for our particular clientele. From that point of view, I think we do a pretty good job.

Teaching Material (IEOP)(D1) We have to order the textbooks six months ahead, not knowing how many students, from where, at what levels we will really have. That's the most problematic thing. And we don't even know exactly which teachers will be teaching those books the next semester. So, it's hard from that point of view.

Teaching Material (IEOP)(D1) Yes, but it's hard to put your finger on just what that might be because as soon as you think you've identified a need, you're into a new semester with a new group of students with a new group of needs and it may not ever really be something that a textbook could take care of.

Teaching Material (Tech)(D2) No, but a textbook we are accustomed to supplementing or adapting to our students. A computer program we are not trained to adapt as much as our programers seem to think that we are. Every computer program for ESL that I've looked at says "the teacher with very little instruction can change the content to match those of her students and I've never found that to be true.

Teaching Material (Technology)(D1) I think more accessible audio-visual media might be useful, but we are hampered by our classroom locations, by our budget, by the physical and time considerations, where the teachers would have to preview the materials to figure out what language elements to exploit from it, how to make it understandable to their particular students and so forth.

Teaching Material (Technology)(D1) If the programs and technology are set up to be transparent to the student—in other words, if the student gets to concentrate on the content and doesn't have to fuss around with technology breaking down or not being able to use the keyboard, then, sure, it's good supplementary stuff. But we don't have it here yet. We don't have a CD player; we don't have that kind of investment yet.

Teaching Material (Technology)(D1) No, I don't think I would ever feel that we could get away from classrooms, teachers,
public materials of some sort and totally go to a computer environment, let's say. I don't think that would happen.

**Teaching Material(Technology)(D1)** Not necessarily, because why duplicate something that's already on campus that they have access to? If it's in the Parks Library, they have access to it. I don't care how they learn English, as long as they are learning, that's fine. I just don't want our program to go overboard into some very expensive technology that may, I mean, let me back up.

**Teaching Material(Technology)(D1)** Not what I have seen to this point, yeah. It's easy for us with our training to supplement a weak textbook with technology or with stuff from other textbooks. It's easily, relatively speaking, to supplement written materials. It's not easy to train any of us to be, I don't want to say programmers, but even to use a package that says it's an authoring package. I've tried to learn those, and they are, for foreign languages, maybe, where there's one language in and one language out. For ESL it would be a stupendous job.

**Teaching Material(Technology)(D1)** So we've made little steps in that direction. We've bought several programs that are video-based, and they are a nice break in the routine for the classes that we use them in.

**Teaching Material(Technology)(D1)** That the students ultimately learn more from having the technology than from not having the technology. If it's just a game and it doesn't result in any improvement in their proficiency, what's the point?

**Teaching Material(Technology)(D1)** The expense of upgrading a lab like this to something more computer-based is, I mean, I'm not convinced that there are enough materials available yet with affordable technology to make it worth our while to get farther away from textbooks. I think we are making some move toward that, but I don't think we're making giant leaps, yet.

**Teaching Material(Technology)(D2)** And then to say that this program is aimed at a particular level of proficiency needs to be supplemented by expanded to cover a broader range of proficiencies means either you get more modules with that program developed or modules from some other place are somehow spliced onto this thing.

**Teaching Material(Technology)(D2)** First of all, I would want the program to serve more levels of our students. I run a whole program here from beginning to advanced and from what I saw on that it only addresses to only one segment of our learners.
Teaching Material(Technology)(D2) It's one thing to look at the program from the students point of view. The student only has to learn how to push two or three buttons to respond to the thing.

Teaching Material(Technology)(D2) The teacher has to know what the whole teaching philosophy and goals and everything else of each part of the program may be in order to be able to figure out how to incorporate this into a program of instruction.

Teaching Material(Technology)(D2) Whether it's to send to an individual basis, whether to ask students to go through it slavishly from beginning to end, whether to assign it as part of an ongoing force or what and that learning term is pretty steep I think.

Teaching Material(Technology)(IEOP)(D1) but she still likes to teach in a classroom setting with some published textbook. But, routinely, she brings in tape recordings and movies, videos, whatever, as part of her course.

Teaching Method(D1) As far as what method works the best, I am not an advocate of any particular method, but if something works, I stick with it and if it doesn't seem to work with my particular group of students, I'll try a different approach until we find one that's satisfactory together.

Teaching Method(D1) Well, my training was in the late days of the audio/lingual method and I used it for the first years I was teaching, quite heavily, because that's what the books were based upon. But, that method works best, I think, for mechanical things like pronunciation and intonation, but it has no application to writing and composition and reading skills and so forth. So, I guess I would say a method that includes some small group work, some discovery learning and that is not quite as teacher-centered as audio-lingual was, is the method I would like nowadays.

Teaching Philosophy(D1) I suppose my philosophy is to help my students get insight into the language learning process as well as helping them to increase their proficiency in the subject.

Teaching Philosophy(ESL)(D1) Well, I guess one piece of my philosophy would be that teaching a language is a much more wholistic enterprise than teaching a subject matter like engineering or mathematics or chemistry that it involves the whole person, the whole student, and the student's life. It's more humanistic I guess I would say because the language embodies the culture and because our students bring them their own cultures. Of course, we have to deal with that dimension that's beyond just the language itself. And because most of our students are here in preparation for academic
study, we need to take into account the nature of their plans and how that affects the kind of language they'll need from now on because they come with certain stresses and strains on themselves by being in a different country, by needing to get a TOEFL score of a certain level pretty quickly, we need to take account of some psychological pressures in their lives. There are just alot of things going on in our classrooms that most people wouldn't think about when they think about teaching English.

Teaching Philosophy(ESL)(II) In terms of the philosophy thing, these are all service courses. We don't have a population of the immigration population that is going to stay. We are basically serving the University to get these people through so they can get on with their lives and go back home or whatever. And so that's a little bit different than somebody who is going to need this for life and living here. I don't teach the TOEFL test at all. I don't give any TOEFL materials in class because I think if you know the language, then the ________ will take care of itself, which I'm sure students don't agree with. But that's just the way that is. I'm right. I just want them to be able to think of the language without translating and say what they need to say and it's very utilitarian on my part. I mean, I don't care...it's nice if they understand the culture because then the language makes more sense. But they certainly don't have to buy into the culture at all. But I think my goal, particularly in listening/speaking, is to get them thinking in the language. And if we've done that by the time they get out of IEOP, they are going to survive. I'm not sure that comes as philosophy, but... They are just going to need it for the rest of their lives.

Teaching Strategy(C1) - M checking comprehension one by one => indicating where to read (i.e. read column 2, 8th line...): published where? how many people they studied? how long studied? what are the problems? => new related term introduce "designated driver"

Teaching Strategy(C1) - M pick up vocabulary, then ask main idea

Teaching Strategy(C2) - reading a paragraph in a very awkward tone and with wrong stress

Teaching Strategy(C3) - I asked M about this, she said "This is what was told by the guy. We just follow the way they did before." Basic directions were on the board.

Teaching Strategy(C3) - Many times, M helped Ss figuring out the problem by luck. [It's not her fault. Instructors who want to use WP or computer should be taught and informed the whole capacity of the program. How come Ss can use WP for improving the quality of their writing? How could teachers lead Ss for that purpose? Using computer in their class and
APPENDIX R: THINK-ALOUD INSTRUCTION
Instructions for Think Aloud and Retrospective Interview

In this study I am interested in what you say to yourself as you perform some tasks that I give you. In order to do this I am going to ask you to THINK ALOUD as you work on the tasks. What I mean by think aloud is that I want you to say out loud EVERYTHING that you say to yourself silently. I would like you to talk aloud CONSTANTLY. I don't want you to try to plan out what you say or try to explain to me what you are saying. Just act as if you are alone in the room speaking to yourself. It is most important that you keep talking. If you are silent for any long period of time I will remind you to keep talking aloud. Do you understand what I want you to do?

Good, now we will begin with some practice problems. First, I want you to multiply these two numbers in your head and tell me what you are thinking as you get an answer.
"What is the result of multiplying 14x36?"

Good, now here is another practice problem. Please think aloud as you try to
"How many windows are there in your parent's house?"
"Name 20 animals."

Now I would like you to solve an anagram. I will show you a card with scrambled letters. It is your task to find an English word that consists of all the presented letters. For example, if the scrambled letters are DORO, you may see that these letters spell the word DOOR. Any questions? Please "TALK ALOUD" while you solve the following anagram!

<NPEPHA = ?>
<ESAPU = ?>

Good, now I want to see how much you can remember about what you were thinking from the time you read the question until you gave the answer. I am interested in what you actually can REMEMBER rather than what you think you must have thought. If possible I would like you to tell about your memories in the sequence in which they occurred while working on the question. Please tell me if you are uncertain about any of your memories. I don't want you to work on solving the problem again, just report all that you can remember thinking about when answering the question. Now tell me all that you can remember about your thinking.

Good!

APPENDIX S: INTERACTIONAL MODIFICATIONS IN ELLIS
ELLIS Lesson (ELLIS)

Transaction
  Exchange (Dialogue)
  Exchange (Teach)
  Exchange (Focus)
  Exchange (Frame)
  Exchange (Choose Dialogue)
  Exchange (Listen Dialogue)
  Exchange* (Modification)
Choose Lesson

Exchange (Choosing)

Move (Modification Request)
- Act C: Ask activity types
- Act S: Select Conversations
- Act S: Select a lesson
- Act C: Ask module options
- Act S: Select a module

Move (Modified Input)
- Act C: Show a lesson
Objectives/Scenes

Exchange (Focusing)

Move (Initiate)
Act
C: Offer objectives/scenes options

Move (Choose)
Act
S: Select an option

Move (Follow Up)
Act
C: Provide help
Listen Lesson

Exchange
(Modification: Listening)

Move
(Modification Request)

- **Act**
  - S: Choose a lesson

Move
(Modified Input)

- **Act**
  - C: Show a lesson
- **Act**
  - S: Listen to a lesson
Dialogue

Exchange
(Modification: Repeat)

Move
(Input)

Act
C: show a dialogue

Act
S: Select stop

Move
(Modification Request)

Act
C: Stop the dialogue

Act
S: Select Repeat/Back-up/Play/Skip

Move
(Modified Input)

Act
C: Give the selection
Script

Exchange
(Modification: Repeat)

Move
(Input)

Act
C: Show a lesson
Act
S: Select Script options
Act
S: Ask which line to choose
Act
S: Select a script line

Exchange
(Modification: Practice)

Move
(Modification Request)

Act
D: Select Script options
Act
D: Begin Record
Act
D: Stop Record

Move
(Modification Request)

Act
D: Ask Replay options
Act
D: Select one
Act
C: Give
Slow Rate

Move
(Modification Input)

Act
S: Select Slow Rate

Move
(Modification Input)

Act
S: Give Slow Rate

Move
(Modification Input)

Act
C: Show lesson
Grammar/Grammar Guide

**Exchange**
(Modification Request: Explanation)

**Exchange**
(Modification Request: Follow Up)

**Move**
(Input)

**Move**
(Modification Request)

**Move**
(Modification Request)

**Move**
(Modified Input)

**Move**
(Modified Input)

Act
C: Show a lesson

Act
S: Select Grammar option

Act
C: Ask which grammar item to choose

Act
S: Select a grammar item

Act
S: Select Hear/View option

Act
C: Give Hear/View option

Act
C: Show an explanation
Language/Culture/Phrases

Exchange
(Modification Request: Description)

Move
(Input)

Act
C: Show a lesson

Act
S: Select Vocabulary option

Move
(Modification Request)

Act
C: Ask which vocabulary to choose

Act
S: Select a vocabulary

Move
(Modified Input)

Act
C: Show a description
Pronunciation

Exchange
  (Modification:Clarification)

Exchange
  (Modification:Expansion)

Exchange
  (Modification:Practice)

Move
  (Modification Request)

Move
  (Modification Request)

Move
  (Modified Input)

Move
  (Modified Input)

Move
  (Modified Input)

Move
  (Modified Input)

Act C: Ask
Act C: Give sound or a view
Act S: Select one
Act S: Select Here All Words
Act C: Give Here All Words
Act S: Select Record
Act B: Select Begin Record
Act B: Select Stop Record
Act C: Select Replay Section
Act C: Select one
Act C: Give
Act S: Select Point/Bar View
Choose Practice

- Exchange (Choosing)
  - Move (Modification Request)
    - Act C: Ask activity types
    - Act S: Select Practice (Items)
    - Act C: Ask level (E/M/D)
    - Act S: Select level
    - Act C: Ask task types (V/G/C/LC)
    - Act S: Select a task
  - Move (Modified Input)
    - Act C: Give questions
Practice Items (U/G/C/LC)

Exchange (Teaching)

Move (Initiate)
- **Act**
  - C: Initiate a question

Move (Response)
- **Act**
  - S: Answer the question

Move (Feedback)
- **Act**
  - C: Give an answer and feedback
Choose Minimal Pairs

Exchange (Choosing)

Move (Modification Request)
- Act C: Ask which combination to choose
- Act S: Select one type

Move (Modified Input)
- Act C: Give questions
Practice Minimal Pairs

- **Exchange (Teaching)**
  - **Move (Initiate)**
    - Act C: Initiate a question
  - **Move (Response)**
    - Act C: Give an answer
  - **Move (Feedback)**
    - Act S: Answer the question

- **Exchange (Modification Request: Clarification)**
  - **Move (Modification Request)**
    - Act C: Ask
    - Act S: Select
    - Act C: Record
    - Act C: Stop
    - Act C: Replay
    - Act C: Give
  - **Move (Modified Input)**
    - Act C: Select
    - Act C: Give

- **Exchange (Modification Request: Practice)**
  - **Move (Modified Input)**
    - Act C: Give

- **Act** C: Give

- **Act** S: Select

- **Act** C: Record

- **Act** C: Stop

- **Act** C: Give
Exit/Menu

Exchange (Framing)

Move (Initiate)

Act
C: Offer Exit/Menu options

Move (Choose)

Act
S: Select an option

Move (Obey)

Act
C: Obey
APPENDIX T: TASK 1
WHAT TO DO WITH $100 MILLION

In this project you will choose an issue and plan a unique way of dealing with it as a way of using an inheritance of $100 million, create the best plan and write an essay on the subject. You may find out useful lessons in ELLIS for this project, for example, Financial Management (Long term), Budgeting (Short Term). It may give you an idea how to plan wisely and write about it.

You are the executor of the estate of Nicholas P. Wentworth, wealthy tycoon, who died recently, leaving no heirs. In his will, Wentworth specified that his $100 million estate be used to help the world in some way. He did not, however, want to give the money to an existing charitable organization, but to establish a new one, to be called the Wentworth Foundation, which would have its own unique way of helping. He wanted the foundation to focus on one specific issue, and to have a specific plan for dealing with it. He didn't care what the issue is as long as the executor showed it was a worthy one.

You, then, must decide what that issue shall be and exactly how you will go about dealing with it, in order to use Mr. Wentworth's $100 million most wisely. You need to provide a specific plan for dealing with the issue, and your reasons for that plan.

Begin by jotting down all the issues you can think of—starving children, save the environment, restructuring schools with technology (computer), and so on. Try to think of less well known ones too, and if you can, of situations you think should be issues.

Then choose the issue that most interests or appeals to you. Not necessarily the most important one, but one you feel needs more attention or a different kind of attention—an issue that perhaps is being handled badly.

Think of several ways $100 million could be used to deal with that issue. Be as specific as you can. For instance, if you think restructuring schools with technology is the best way to help, how would you go about restructuring schools? Purchasing many computers? How many? One for each school, or one for each classroom? Would you rather spend money for purchasing software? If so, why? Would you first spend money for training teachers how to use computers so that teachers can teach students in the right way? And so on. Be as realistic as possible in your plans keeping in mind that $100 million is not a lot of money when dealing with national or international issues. You don't want the Wentworth Foundation to go broke.

When you work on ELLIS, you may take notes which will be helpful when you write an essay on this subject. When you have decided on a plan, fill out the data sheet and begin to write an essay.
Data Sheet

Description of Issue:

Reasons for Choosing the Issue:

Plan of Action:

Reasons for Choosing This Plan:
APPENDIX U: TASK 2
In order to do this project, you may find useful lessons "Getting Driver's License" and "Shopping at Convenience Store" in Ellis.

Fill in the blanks. These are the vocabulary which we use for driving.

1. It is unwise to _______ along this road. I have been caught several times by the police.

2. What is the _________ on highways in this state?

3. Your driving license is no longer _________. You must renew it immediately.

4. The police stopped me because I didn't ________ to the car on my right at the intersection.

5. Is it ________ to turn right on a red light in this state?

6. You must ________ if you want to turn either left or right.

7. Because the _________ is busy at this time of the day, my trip always takes longer.

While Kirk and Andrew are studying for tomorrow's exam, they decided to get something at the convenience store.

(K: Kirk  A: Andrew  C: Clerk)

K: Yeah. I'm kind of hungry. Do you want to go down to the convenience store and get something to eat?
A: Yeah, why not? I'd like to ________ a newspaper and some root beer anyway.
K: Well, let's go!
C: Hi, can I help you find anything?
A: Yes. Do you have Ames Tribune?
C: Yes we do, it's over there with the magazines.
A: Thank you.
K: Hey, Andy, do you want some crackers?
A: Yeah, we need some _________.
K: Okay. What about the root beer? You were going to get a _________, weren't you?
A: No, I decided to get a bottle of _________. It's a lot healthier.
C: That comes to $8.72 with _________.
A: Here you go. That should ________ it.
C: Haven't you got anything ________? I can't change anything larger than a $20 bill.
A: By the way, is there a gas station around here that's still open at this time of night?
C: Yes, there's one down on 9th Avenue and Duff. You can't ________ it. It's a truck stop.
A: Thank you.

Notes from Ellis
APPENDIX V: EXAMPLE OF UNITIZATION AND CATEGORIZATION OF THINK-ALOUD VERBALIZATION
Jung Hoon (T/A) : 2/28/94

1. (Main Activity Menu/Con/Communication-NA/Job Hunting/1st Module)
   Let me start with one lesson/What can I choose?
   (Main dialogue)
   It's easy to understand/
   (Module dialogue) -right after
   (Stop/Skip)
   -Script

   Well, why don’t I try Pronunciation today?/
   (Pronunciation/Consonant1/[r])
   Let me try [r] sound./It's difficult for me.
   (Female view/X-ray view/Hear All Words)
   -imitating each sound
   -click many words again
   -click (l)
   -Script
   Well, this is not very difficult/Why don’t I try other
   (Menu/Communication-AC/Back to Menu)
   What was the interesting one?/Oh, this one (Lit. Dis.).
   Well, no.
   (Help) -accidentally click
   (Survival-AC/Technical/1st Module)
   Let me try this one/
   (Main dialogue)
   -Script
   IWell, I think I missed one word./
   -Script
   -Rep)
   (click '...get into the program' line)
   -listen and watch
   'Nor)
   (disappointing the black guy's accent)
   (Slower Audio)
   -click the line again)
   -listen and watch
   -Script
   Ahhhhhhha! (after comparing with the slower sound)
   (Menu/Survival-NA/Job Hunting/1st Module)
   Did I see this lesson before? I don't remember./
   (Main dialogue)