

The Effects of Learner Control on Computer-Assisted Language Learning in a Hypertext Environment vs. a Linear Text Environment

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Abstract

Hypertext instructional approaches have been widely applied to web-based computer-assisted language learning (CALL) instructional design. The major difference between a hypertext instructional approach and a linear text instructional approach is that a hypertext system has network branching capabilities and referential links, which allow learners high degree of learner control. This study investigated the effects of learner control on computer-assisted English language learning in a hypertext versus a linear text learning environments. The instruments used in the study include two versions of English learning tutorial programs, a pretest, a posttest, and an attitude questionnaire.

The results of the experiment show that the students of the hypertext approach did not have significantly poorer learning performance than the students of the linear approach as found in the past learner control studies. In fact, the high degree of learner control in the hypertext approach leads to students' better learning attitude, and

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motivation, and even lower sense of disorientation. These findings suggest that, in computer-assisted English language learning, a hypertext learning environment with high degree of learner control can be as good as, or even better than a conventional linear learning environment.

Keywords: computer-assisted language learning, hypertext, linear text, learner control

I. Introduction

Hypertext systems have been widely applied to computer-assisted language learning (CALL) instructional design. The flexibility hypertext offers in both structure and style makes it perhaps “the most effective technology system to date for individualizing instruction” (Jonassen, 1988, p14). However, hypertext was originally developed for use in information retrieval, not as an instructional system. Due to the lack of empirical verification, research on the overall effectiveness of hypertext is still lacking (Burton et al., 1995; Jacobson, 1994).

Learner control is an important component in hypermedia/hypertext design (Kinzie & Berdel, 1990). Previous studies on learner control found that learners under computer control or very limited learner control consistently performed better than learners under learner control (Carrier, Davidson, & Williams, 1985; Ross & Morrison, 1988; Steinberg, 1977, 1989). From literature review we can see that most of the learner control programs in the previous studies used linear text presentation, which does not allow learners to really control their process of learning. However, hypertext, with network branching capabilities and referential links, provides mechanisms to enhance a student’s ability to link and construct understanding in multiple ways in language learning. Learners are freed from the traditional linear, highly directed flow of presentation, and can really control their process of learning. Nevertheless, whether or not a student actually learns from the hypermedia/hypertext mechanisms is at question (Irish, 1994).

In addition, a high degree of learner control in a hypertext environment may cause problems of disorientation, distraction, and cognitive overload (Conklin, 1987a). Therefore, more empirical studies are needed in order to provide guidelines to designers and developers of CALL computer programs.

II. Purpose of the Research

The purpose of this study is to investigate the effects of learner control on computer-assisted English language learning in a hypertext environment versus a linear text environment. Two different versions of computer-assisted instructional tutorials, using a hypertext approach (HA) and a linear approach (LA) respectively, were developed as the primary instruments in the study. The following general hypotheses of the research are formulated: (1) concerning knowledge acquisition, LA will have a better learning result than HA; (2) HA will produce a better learning

attitude and a higher learning motivation than LA; (3) HA will result in a higher sense of disorientation than LA.

III. Literature Review

This section reviews the related studies on linear approach, hypertext approach, and learner control.

A. Linear Approach

A linear approach is based on the findings of behavioral psychology, mainly Skinner's stimulus-response theory (Skinner, 1954). In a linear computer-assisted instruction program, information is presented in small portions on each computer screen, which is called a "frame." Learning occurs as frame builds upon frame, step by step (Skinner, 1958, 1968). From the review of the past studies (Balajthy, 1987; Gagne, 1965, 1967; Lanza & Roselli, 1991; Lin, 1991), we can conclude that a conventional linear program generally includes three characteristics. First, the sequence of frames is unvarying, and all the learners go through the same logical line of learning in a sequential, beginning-to-end path through the instructional material. Second, learners could only control the rate of presentation. Third, control over sequence of instruction is imposed by the lesson author and mainly exercised by the system.

B. Hypertext Approach

Basically, a hypertext instructional approach is cognitively based on schema theory (Anderson, 1985; Norman, Genter, & Stevens, 1976), active structural networks (Norman, 1976), web learning/ teaching principles (Jonassen, 1986, 1991), and generative learning principles (Wittrock, 1974, 1978). According to the review of the studies concerning these cognitive principles, we can conclude that human knowledge is represented in an active semantic network, which consists of nodes (schema) interconnected to each other by links. Learning is a process of associating new information with existing knowledge. It is indeed an individualized and constructive process. Therefore, in instruction, it is very important to have instructional material organized and presented in a web frameworks that matches the semantic network of the learners so that the learners can interrelate connected material to create an appropriate web of their own.

Based on those cognitive principles, texts in a hypertext system are stored as

smaller discrete units in separated nodes, which are linked together into complex networks. Hence, nodes and links are recognized as the basic building blocks of hypertext (Conklin, 1987a; Jonassen, 1989; Balasubramanian, 1994). Nodes of information are usually limited to what can be presented on a single screen. The most popular metaphor for nodes are note-cards (Jonassen, 1989). Nodes of information may be in the form of text, graphics, video sequences, audio sequences, and windows (Conklin, 1987b). Links tie the nodes together, allowing users to navigate among nodes. Two major types of links existing in a typical hypertext system are referential links and organizational links (Conklin, 1987a, 1987b). The uniqueness and flexibility of the nodes together with the power of linking provide hypertext systems with the network branching capability. It breaks the sequential processing tendency by allowing readers to modify the sequence. Readers may decide what information is relevant to them and what sequence produces meaningful learning to them.

C. Learner Control in a Linear Text vs. a Hypertext Environments

The degree of control that authors allow learners to have in a particular computer-assisted instructional program varies along a continuum, with total learner control at one end and total computer (or program) control at the other (Newkirk, 1973). With total learner control, the program authors would allow a learner maximum possible freedom to choose the amount of content, the sequence, and the pace of learning (Goforth, 1994; Reeves, 1993); on the contrary, with total computer/program control, a maximum level of author control is imposed to these variables.

The basic assumption underlying learner control is that a learner is the best judge of the instruction needed for effective learning. However, the past studies regarding learner control of computer-assisted instruction failed to support this assumption (Carrier, Davidson, & Williams, 1985; Ross & Morrison, 1988; Steinberg, 1977, 1989). While learner control of instruction tends to be motivational (Large, 1996), it does not necessarily improve performance (Murphy & Davidson, 1991). Students who received learner control strategies required less instructional time, but their performance was consistently lower than the performance of those students who received computer control (Murphy & Davidson, 1991). It seems that learner control is a valuable tool for its motivational benefits, but that it must be supervised, particularly with naïve learners (Irish, 1994).

One of the major factors that lead to students' poor performance in the past

learner-control studies might be a linear approach of text presentation. Lin (1991) argues that linear text presentation in the past studies would unavoidably lead to the failure of learner control because the rigid structure of a linear computer program does not provide the flexibility and capability that students need to really control their learning. Besides, the linear instructional approach raised some problems for individualized instruction since it assumed that all learners acquire knowledge in the same logical order (Lin, 1991). However, the way that each individual would prefer to access, interact with, and interrelate knowledge is distinct (Jonassen, 1986). In computer-assisted English learning, there is not any particular instructional sequence that is “the most suitable” one for every learner. Each learner may have his or her own preference to view the instructional material in a sequence that best meets his or her needs.

With a linear instructional approach, the same learning order perceived by the program author is applied to all learners. Learners are not allowed to follow their own learning process. They can not really decide what kind of information is relevant to them and what sequence produces more meaningful learning. Therefore, the learner control provided in a linear instructional approach is really very limited.

Unlike linear text presentation, learners can have much more control over both learning sequence and content presented by a hypertext system (Balasubramanian, 1994). Hypertext design allows authors to create multiple path-ways (structures, branches, or alternatives) for learners with different interests, permitting learners to determine their own individual learning sequence based on their own needs (Jonassen, 1986). Consequently, more individualized instruction will be provided in a hypertext learning environment.

IV. Research Methodology

This section will discuss: (1) the instructional content of the tutorials, (2) the designing features of the linear and hypertext tutorial programs, and (3) the experimental methods.

A. Tutorial Content

The instructional material of the tutorials is based on Chapter Five of *Interactions II: A Reading Skills Book*, entitled *Lifestyle*. It includes two articles with the titles of ‘Our Changing Lifestyles—Trends and Fads’ and ‘Breaking Stereotypes—An Inside Look.’ The tutorials are divided into three parts--Part One

(‘Our changing Lifestyles--Trends and Fads’), Part Two (‘Breaking Stereotypes—An Inside Look’), and Exercises; in each part there are different sections as follows:

- Part One--Text , Vocabulary, Translation, Reading Comprehension
- Part Two--Text, Vocabulary, Translation, Reading Comprehension
- Exercises--Vocabulary, Grammar & Structure, Translation

Both linear and hypertext tutorials include the following common features:

1. Text--Students can listen to the pronunciation of a single sentence or a whole paragraph as many times as they like to, and stop the pronunciation at any time they wish to.
2. Vocabulary--Including pronunciation of each vocabulary word, English definition, Chinese definition and examples.
3. Translation--Chinese translation of the text is provided to help those students who have difficulty understanding the meaning of the text.
4. Reading Comprehension--Multiple-choice questions are provided to check students' comprehension of the text.
5. Exercises--Including questions of vocabulary, grammar and structure, and translation. Correct answers and appropriate feedbacks are provided to make sure that students know the correct answer of each question.

B. Tutorial Designing Features

Two computer-based instructional tutorial programs were developed with *Multimedia ToolBook Authoring System for Windows* based on the major characteristics of the linear and hypertext instructional approaches presented in table 1.

Table 1

A Comparison of the Major Features of the Linear and Hypertext Approaches:

Linear Approach	Hypertext Approach
Theoretical Bases: *behavioral psychology: stimulus-response theory	*cognitive psychology: schema theory

Learning Principles

- *proper reinforcement to learning
- *web learning/generative learning

Basic Elements

- *screens
- *nodes and links

Sequence of Instruction

- *sequential presentation
- *non-linear presentation
- *preorganized sequence
- *learner-directed sequence
- *static internal organization
- *dynamic network-like structures
- *computer control
- *learner control
- *non-individualized instruction
- *individualized instruction

The major differences between the two tutorial programs can be summarized as Table 2 in terms of (1) interface design, (2) network branching capabilities, (3) branching options, and (4) learner control of instructional sequence (See Table 2).

Table 2

A Summary of the Differences between Linear and Hypertext Tutorial Programs

Linear Tutorial Program	Hypertext Tutorial Program
<p>Interface Design</p> <p>Linear sequence of screens with buttons to go forward or backward</p>	<p>A stack of note cards with two-level tabs and built-in buttons within text of articles</p>
<p>Network Branching Capabilities</p> <p>No</p>	<p>Yes, through:</p> <ol style="list-style-type: none"> 1. Two-level tabs 2. Built-in buttons in the text
<p>Branching Options</p> <ol style="list-style-type: none"> 1. previous screen 2. next screen 3. first screen of previous section 4. first screen of next section 	<ol style="list-style-type: none"> 1. previous screen 2. next screen 3. first screen of any other section within the same part 4. first screen of any other part 5. any related screen of other section
<p>Learner Control of Instructional Sequence</p>	

1. Can only follow a preorganized linear sequence	1. Can have total control of network-branching sequence
2. Can not determine the order of viewing based on personal needs	2. Can determine what to see next based on personal needs

For example, In a linear tutorial (see Appendix A for sample screens), while students are reading the English article in the Text section, if they do not know a word, they can only go to the first screen of the next section--Vocabulary section--to look up the word in an alphabetical order and then come back to the Text section. Otherwise, they can view the learning materials in a sequential order. That is, they can finish reading the article first, and then go to the next section--Vocabulary section, to study all the new words in an alphabetical order. After that, they can read the Chinese translation in order to make sure they have understood the exact meaning of the text. Finally, they can do the Reading Comprehension questions to better comprehend the article. Students are not allowed to jump from one section to any of the other sections, for example, from Text to Translation. They can only view the instructional materials in a preorganized order.

On the contrary, learners of the hypertext approach could totally control the instructional sequence and have to constantly decide what to see next. For example, while learners are reading the text, they could have the following choices: (1) listen to the pronunciation of a paragraph and stop the pronunciation whenever they like; (2) look up a word in the Vocabulary section; (3) see the Chinese translation of a paragraph; (4) practice the Reading Comprehension questions; (5) go to Part Two to read the second article; (6) if they like, they can even do the Exercise questions before they read these two articles. Appendix B shows the sample screens of the hypertext tutorial. Quick and direct access to a target section is the basic characteristic of this hypertext tutorial design. With the network branching capabilities, learners can choose to view any instructional section at any time based on their needs.

C. Experimental Methods

1. Instruments

The instruments used in the study include two versions of tutorial programs as described above, a pretest, a posttest, and an attitude questionnaire. The pretest (see appendix C) and posttest (see appendix D) are identical in form, item number and item type, which include questions of vocabulary, grammar and structure, reading comprehension, and translation. Students are provided adequate opportunities to

practice these types of questions in the tutorials.

As to the attitude questionnaire (see appendix E), the questions are divided into four subsets to assess subjects' (1) attitude toward the tutorial program (questions 1 to 5), (2) attitude toward the tutorial content—English (questions 6 and 7), (3) learning motivation (questions 8 and 9), and (4) sense of disorientation (questions 10 and 11).

2. Procedures

In the experiment, subjects met four times. First, they took a pretest before they learned the assigned English lessons. Then, they met twice to learn the lessons from the tutorials for about three hours. A week later, they took a posttest and answered an attitude questionnaire. In addition, the screens the subjects had viewed, the time they had spent on each screen, and their learning sequence were recorded.

V. Research Results and Discussion

This section first describes the sample used in the experiment, and then presents major statistical findings. Since the purpose of the research is to find out whether the means of two independent populations, namely LA and HA, differ from each other. T-test was used to analyze the data. In addition, since the implications of making a Type I error (rejecting a correct null hypothesis) and a Type II error (failing to reject an incorrect null hypothesis) appear to be the same, a significance level of 0.05 was set a priori.

A. Sample Description

Two hundred and twenty-five students from four Freshman English classes of Feng Chia University participated in the study. The students of each class were randomly assigned to one of the two treatment groups: linear approach (LA) and hypertext approach (HA). There were 113 subjects assigned to LA and 112 to HA. Ninety-five subjects of LA and 93 of HA completed the experiment.

B. Pretest and Posttest

Table 3 presents the mean scores and standard deviations of pretest and posttest scores for both treatment groups; Table 4 shows the outcome of the analysis of t-test. From table 3 and table 4 we can see that HA group had a higher posttest mean score (74.15) than the LA group (70.68). However, there were no significant differences of both the pretest and posttest mean scores between two treatment groups. Therefore,

the null hypothesis of the equality of the means of posttest scores for two treatment groups was not rejected.

Table 3

Group Means and Standard Deviations for Pretest and Posttest Scores

Treatment Group		Pretest	Posttest
LA	Mean	37.24	70.68
	SD	14.53	18.94
HA	Mean	36.76	74.15
	SD	16.16	17.65

Table 4

A Summary of T-test of Pretest and Posttest Scores

	DF	t	p-value
Pretest	186	0.2137	0.831
Posttest	186	-1.297	0.196

The results of posttest show that learners in LA did not perform significantly better than those in HA group. This is not consistent with the findings of past learner control studies which found that students under computer control or less learner control situations performed consistently better than those under more learner control situations. This may be due to the factor that the referential links and network branching capabilities provided in this study but not provided in most of the previous learner control studies allow learners to really control their learning, which may consequently improve HA subjects' performance. This finding suggests that during the process of computer-assisted English learning, it is helpful to allow learners to cross-reference the information about vocabulary, translation, reading comprehension practices, and grammar-structure exercises while they are reading English articles.

C. Learning attitude and Motivation

The questions of attitude questionnaire (see Appendix E) were divided into four sub-scales to evaluate: attitude toward program (questions 1 to 5), attitude toward content (questions 6 and 7), learning motivation (question 8 and 9), and sense of disorientation (questions 10 and 11). The means and standard deviations for each scale are listed in Table 5. T-test was used to analyze the scores of the four scales respectively (see Table 6).

Table 5
Group Means and Standard Deviations for Attitude Scores

Treatment Group	Attitude Toward Program	Attitude Toward Content	Learning Motivation	Sense of Disorientation
LA				
Mean	3.19	3.46	3.37	2.81
SD	0.73	0.81	0.89	0.98
HA				
Mean	3.81	3.45	3.37	2.49
SD	0.64	0.81	0.90	1.00

Table 6
A Summary of T-test of Attitude Scores

	DF	t	p-value
Attitude Toward Program	186	-6.193	0
Attitude Toward Content	186	0.097	0.922
Learning Motivation	186	-0.805	0.422
Sense of Disorientation	186	2.223	0.027

The results show that HA had better attitude toward tutorial program than LA ($p=0$); however, the anticipated outcome that learners in HA would have better

attitude toward content and higher learning motivation was not supported. Surprisingly, HA had significantly lower sense of disorientation than LA ($p=0.0274$).

HA subjects had significantly better attitude toward program. This result is not consistent with other learner control studies (Denton & Woods, 1975; Judd, Bunderson, & Bessent, 1970; Lai, 1993; Lin, 1991) which found that learners under learner control do not necessarily have better attitude toward program because they had to make decisions throughout the instruction about what materials to see and in what order they would see them. This is more cognitively demanding. However, in this study, significantly lower sense of disorientation was found in HA group. The problem of using hypertext as an instructional system--the lack of sense of closure and unfamiliarity with the network branching structure and organization--did not happen in this study as it did in other hypertext studies (Lai 1993; Lin 1991). This explains why better attitude toward program was found in HA subjects in this study because they did not feel distracted and disoriented while viewing the hypertext tutorial. However, the tutorial content in this study only includes two articles. The scope is so limited that learners may not feel disoriented. More studies with larger scope of content are needed to study this issue.

The major factor for HA learners to have lower sense of disorientation than LA learners in this study may be the interface design. The note card screen layout of the HA tutorial present a whole picture of all the instructional sections and parts covered in the tutorial. Learners can easily track what they have viewed and what to expect. On the contrary, on each screen of the LA tutorial, learners can only see what the previous and the next sections are. It is difficult for them to figure out how much more material they need to see and what to expect. This finding suggests that it is important to reduce learners' sense of disorientation while designing the interface of a hypertext instructional system so that learners can enjoy the control over a hypertext program, which consequently would improve their attitude toward program.

VI. Conclusion

The purpose of this study was to investigate the effects of learner control on computer-assisted language learning in a hypertext and a linear text environments. It had been anticipated that a conventional linear approach would achieve better learning results than a hypertext approach because previous learner control studies did not support the assumption that learners know what is the best for them at any given time in an instructional sequence (Carrier, Davidson, & Williams, 1985; Ross & Morrison,

1988; Steinberg, 1977, 1989). However, the experimental results of this research were not consistent with the anticipation. The hypertext approach did not achieve significantly lower learning results than the linear approach in this study. It supports author's assumption that learners of previous learner control studies might not have the freedom to really control their learning because those learner control programs did not provide network branching flexibility and capability. The finding confirms that learner control programs with hypertext network branching capability can lead to a better learning result than those without such capacity in computer-assisted language learning. Nevertheless, more studies are needed to find out what kinds of design features can be used to further improve the effectiveness of a hypertext instructional system.

In addition, the presumed disadvantage of a hypertext approach that high-degree of learner control might lead to a higher sense of disorientation (Conklin, 1987a; Gay 1986) did not happen in this study; on the contrary, the LA subjects showed a higher sense of disorientation. The note card interface design of hypertext approach might contribute to this result.

These conclusions suggest that in computer-assisted language learning a hypertext instructional approach can be as good as or even better than a linear instructional approach.

Recommendations for Future Research

Although this research is limited in scope, it points to several issues for further research. First, if time and facilities are allowed, it is important for future research to conduct experiments on a larger scale tutorial, including more English articles, references, and an on-line dictionary. Second, the subjects participating in this study were all Feng Chia University students, so the findings could only be generalized to university-level students. It is crucial for future research to involve subjects of other age groups. Finally, more studies employing different interface features are necessary to further improve the effectiveness of a hypertext instructional approach on computer-assisted language learning.

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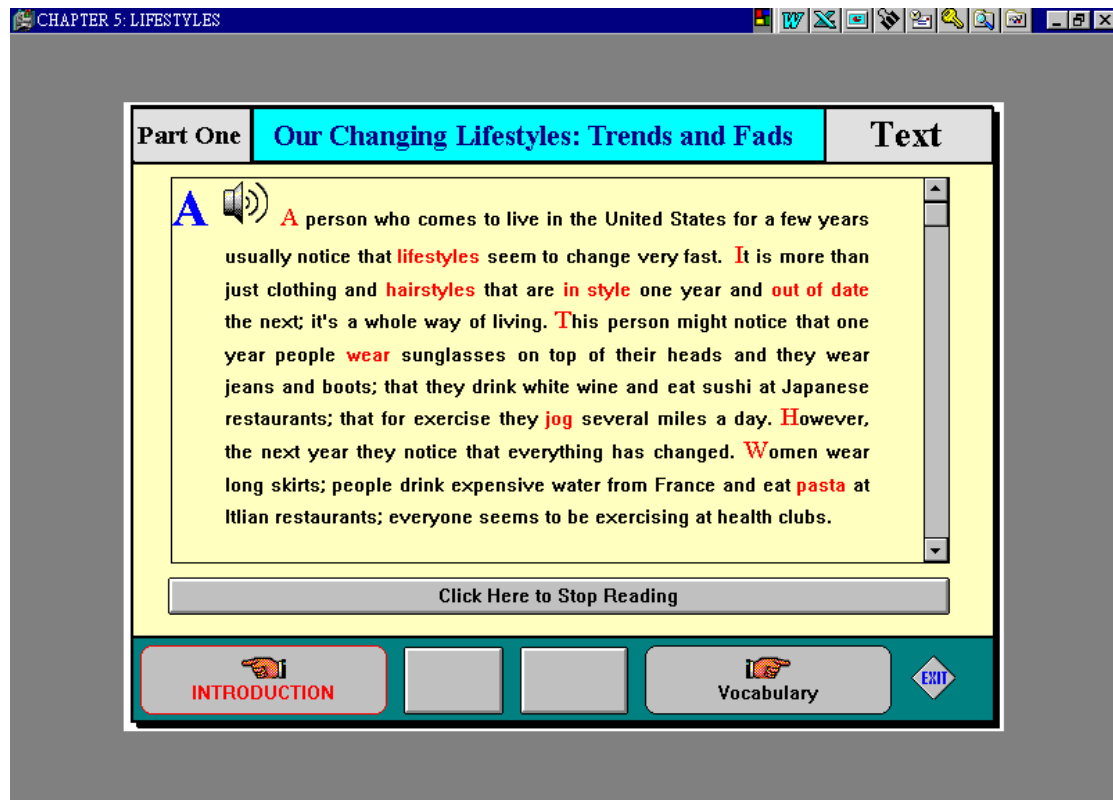
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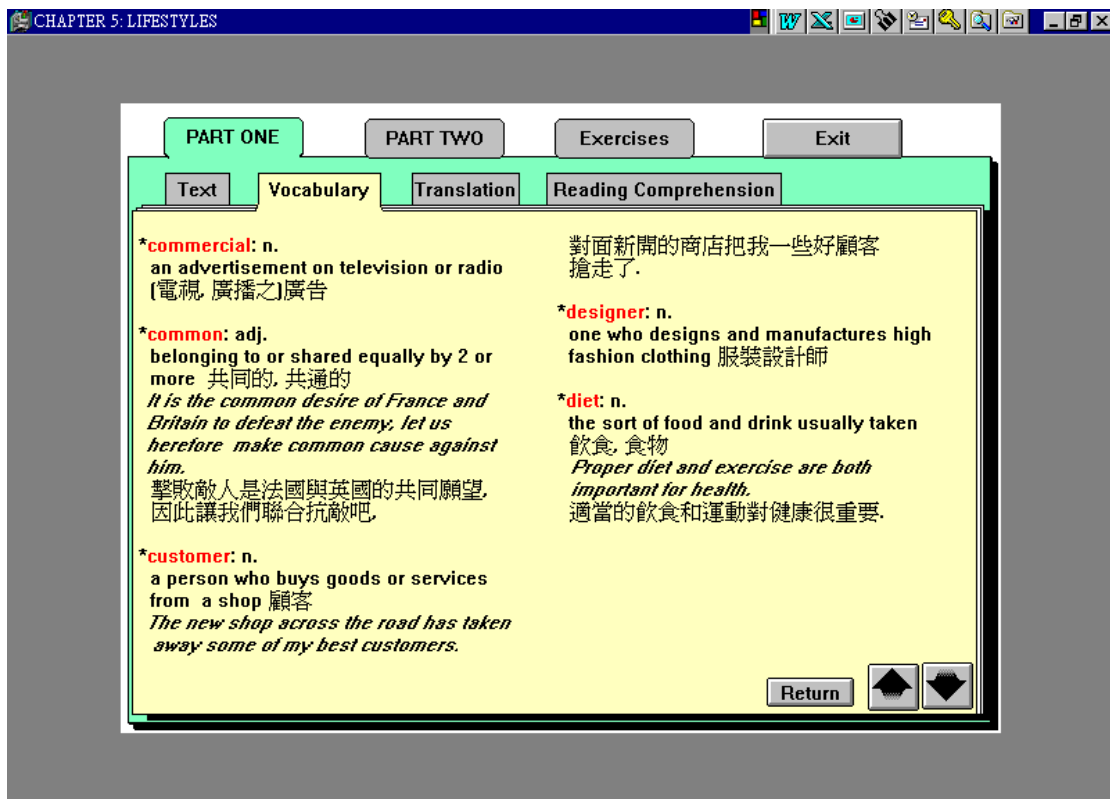
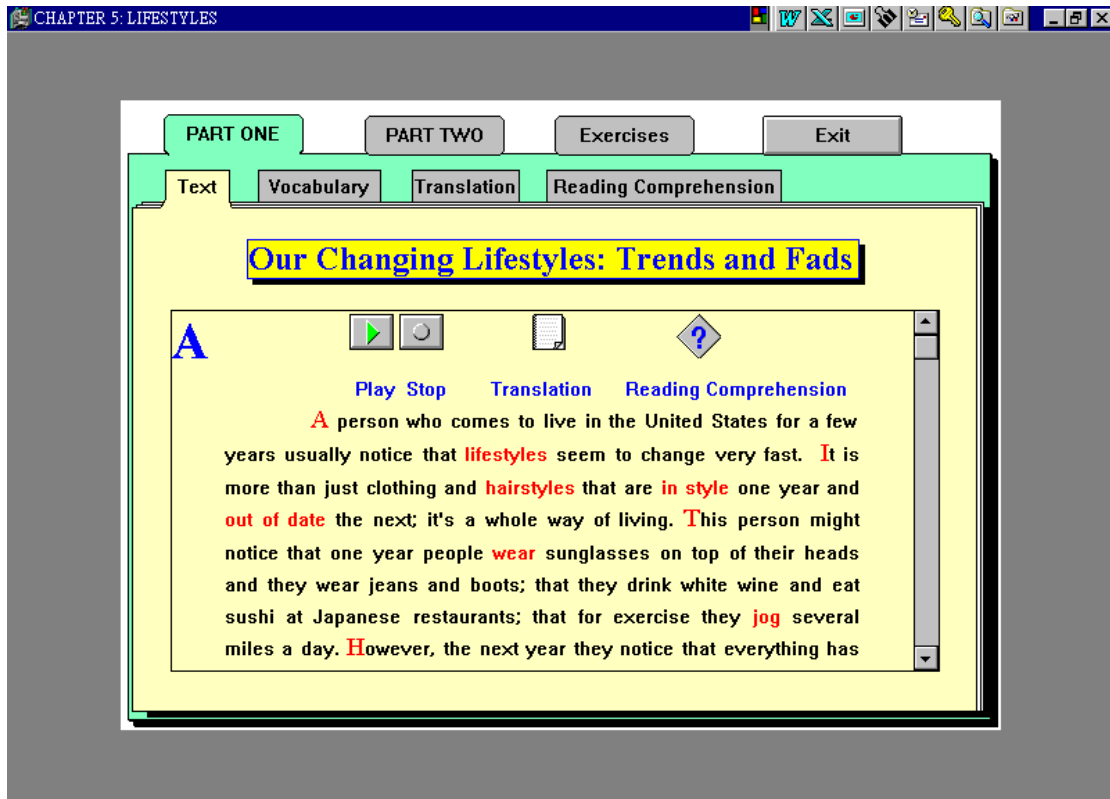
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Appendix A: Sample Screens of the Linear Tutorial



Appendix B: Sample Screens of the Hypertext Tutorial



Appendix C: Pretest

I. Vocabulary: Fill in the blanks with words from the list below. 45%

renovation	trend	celebrities	fad
stereotypes	nationwide	exterminator	renovate
lifestyles	slang	contact	fashion
communal	profit	burnout	variety
awesome	fame	manufacturer	appreciate
stereotypical	unavoidable	self-confidence	diet

- _____ 1. Mike has been showing symptoms of _____ for the past few months, and now he's even thinking of changing careers.
- _____ 2. Old people like living together as a group because they can feel safe and help one another in their _____ house.
- _____ 3. Before Sergio came to the United States, he believed in a lot of _____ about Americans; he was positive they all drove big cars, drank beer, and ate hot dogs.
- _____ 4. I'll try to call him, but if I can't get him by phone, I'll _____ him by mail.
- _____ 5. When they visited Hollywood, they hoped to see some actors and other _____.
- _____ 6. They don't want to pay workers to fix up their old house, so they're doing most of the _____ work themselves.
- _____ 7. I couldn't understand everything she said because she used a lot of _____ words.
- _____ 8. Almost nothing in modern life escapes the influence of _____ including clothing, hairstyles, music, books, etc.
- _____ 9. They have offices _____, so you can do business with them in most major cities of the country.
- _____ 10. Our factory didn't do very well last year, but we think that we can probably make a _____ this year.
- _____ 11. His desire for black hats is only a passing _____ because this interest lasts a very short time and change very quickly.
- _____ 12. A person live in the modern may notice that _____ seem to change very fast.
- _____ 13. A social _____ lasts a long time and becomes a true part of modern culture. It might be the use of personal computers or an interest in good health.
- _____ 14. Proper _____ and exercise are both important for health.
- _____ 15. She didn't like her work because it lacked _____; she was doing the same things all the time.

II. Grammar & Structure: Choose the incorrect one from the four underlined parts. 15%

1. Clothing and hairstyles are usually in style one year and out of date next year.
A B C D
2. For a while, it seems that some names are "in," but suddenly theses same names are "out".
A B C D
3. After living in a country for a long time, meeting many people and have many different experiences there, we may change our opinions about the country.
A B C D
4. I called a friend of my parents as soon as I got to San Francisco to ask him whether I could stay at his home.
A B C D
5. It might be a good idea never throw anything away because it often comes in style after ten years of being out.
A B C D

Appendix D: Posttest

I. Vocabulary: Fill in the blanks with words from the list below. 45%

renovation	trend	celebrities	fads
stereotypes	nationwide	exterminator	renovate
lifestyles	slang	contact	fashion
communal	profit	burnout	variety
awesome	fame	exterminate	appreciate
stereotypical	unavoidable	self-confidence	diet

- _____1. A _____ is more than just clothing and hairstyles; it's a whole way of living.
- _____2. It's almost impossible to write about specific _____ because these interests that people enthusiastically follow change very quickly.
- _____3. Food, music, exercise, books, movies, places to visit, even names go in and out of _____ very fast.
- _____4. People like to follow the lives of _____: movie stars, sports heroes, famous artists, politicians, and so on.
- _____5. People world wide believe certain _____ about people from other countries; they believe that they "know "about the countries.
- _____6. A _____ home may provide many advantages to older people, in which they can feel safe and help one another.
- _____7. Their house is already ten years old, so they plan to _____ it this year; they are going to fix it up.
- _____8. I will _____ one of my friends by phone as soon as I arrive in San Francisco.
- _____9. My father has been showing symptoms of _____. He needs to take a vacation.
- _____10. A social _____ lasts a long time and becomes a true part of modern culture. It might be the use of personal computers or an interest in good health.
- _____11. Many American teenagers like to use _____ words in their conversation such as *groovy* and *boss*.
- _____12. I am tired of the food in the cafeteria because it lacks _____ ; we eat the same food all the time.
- _____13. The policeman who had rescued the kidnapped boy soon became famous _____.
- _____14. Clothing designers and manufacturers can make a _____ if clothing styles change every year.
- _____15. If you want to have good health, you need to have proper _____ and do exercises every day.

II. Grammar & Structure: Choose the incorrect one from the four underlined parts. 15 %

1. When John had a car accident in Taipei, he immediately called a friend of him for help.
A B C D
2. I was used to commute from Chungli to Taipei every day, but now I rent a house in Taipei.
A B C D
3. For one year, people may drink white wine; however, next year everything may change and people drink expensive water from France.
A B C D
4. It might be a good idea never throw anything away because it often comes back in style after ten years of being out.
A B C D
5. I enjoy go sightseeing to other countries such as France, Italy, Canada, and so on.
A B C D

III. Reading Comprehension: 10%

I remember before I went to the United States, I believed that I already "knew" about American and Canadian culture. For example, I thought that people in the States were rich workaholics who lived in the suburbs and commuted to the cities every day. I was sure that all American families drove their big cars to baseball games

Appendix E: Attitude Questionnaire

The following statements are intended to find out how you felt about the tutorial you used. For each statement, please circle the number that best represents your views.

Strongly Disagree $\leftarrow \rightarrow$ Strongly Agree

- | | | | | | |
|--|---|---|---|---|---|
| 1. The tutorial was easy to use. | 1 | 2 | 3 | 4 | 5 |
| 2. The tutorial was interesting and stimulating. | 1 | 2 | 3 | 4 | 5 |
| 3. I am satisfied with the control that I can have over the sequence of instruction in the tutorial. | 1 | 2 | 3 | 4 | 5 |
| 4. The instructional mode of the tutorial was effective in learning English. | 1 | 2 | 3 | 4 | 5 |
| 5. I would recommend that my friends use this tutorial to learn English. | 1 | 2 | 3 | 4 | 5 |
| 6. I found the content of this tutorial to be interesting. | 1 | 2 | 3 | 4 | 5 |
| 7. I would recommend that my friends spend more time studying English. | 1 | 2 | 3 | 4 | 5 |
| 8. This tutorial has made learning English enjoyable. | 1 | 2 | 3 | 4 | 5 |
| 9. This tutorial motivated me to learn English better. | 1 | 2 | 3 | 4 | 5 |
| 10. I often had trouble figuring out where I was in the tutorial. | 1 | 2 | 3 | 4 | 5 |
| 11. Sometimes I got distracted and forgot to return where I had been to continue the learning. | 1 | 2 | 3 | 4 | 5 |

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在「超本文」及「線性文」學習環境中學習者控制對電腦輔助語言學習之影響

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摘 要

「超本文」設計已廣為應用在網路電腦輔助語言學習。「超本文」設計與「線性文」設計的最大不同處是「超本文」學習環境中提供網狀學習及參考資料的連結，使得學習者能高度控制自己的學習。本研究主要目的是要探討在「超本文」及「線性文」學習環境中不同程度的學習者控制對電腦輔助語言學習之影響。作者設計兩套課程軟體教授學生英文，並進行前測、後測及學習態度問卷調查。

研究結果顯示以「線性文」學習的學生並未比以「超本文」學習的學生有更好的學習效果，此與以往對學習者控制影響的研究結果不符。此外，此研究中「超本文」學習環境中因學習者能高度控制自己的學習，使得學生有較好的學習態度與學習動機，以及較低的迷失感。從以上研究結果可以得到一個結論，就是在電腦輔助語言學習方面，允許學習者高度控制自己學習的「超本文」學習環境不比傳統的「線性文」學習環境差，甚至可能更好。

關鍵詞：電腦輔助語言學習、超本文、線性文、學習者控制

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