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Contextualization of Texts in Japanese CAI Software for Developing Reading Skills[1]

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Pedagogical foundations of Interactive Japanese: Understanding Written Japanese.

The foundation of our approach to reading and the theoretical justification for the course design implemented in *Interactive Japanese: Understanding Written Japanese* (*UWJ*) has been discussed elsewhere (Nara 1990) but it may be useful to repeat the fundamental information here. Goodman (1967) regards reading as a sampling activity from which the tentative generalizations about the content of the reading are constantly tested and revised as more information accumulates. We believe that Goodman's characterization of reading is essentially correct. We infer, from the word 'sampling,' that the reader may not comprehend or process the entire information to achieve reading comprehension. It is thought that the reader's tentative generalizations of content and information extracted from the reading are built around the reader's expectations and intent for which the reading is conducted (e.g., Kennedy 1984; Widdowson 1984; Coady 1979). The activity of reading characterized in this manner is highly interactive in nature--a complex interaction of formal linguistic processing skills, a reader's expectation and intent, and his world-knowledge brought into the process (Coady 1979). Though researchers may disagree on details, there seems to be a consensus among reading specialists regarding the importance of interactivity in reading comprehension. This approach to reading, for that reason, is basically incompatible with the Skinnerian or traditional grammar-translation approaches to reading instruction.

Given this orientation, a general purpose of instruction for reading improvement suggests itself. If reading is a complex interaction of formal linguistic processing skills, a reader's expectation and intent, and his world-knowledge brought into the process, then a deficiency in any of these areas is likely to hinder reading comprehension. It follows that computer software for improving reading skills should contain facilities to address these problem areas. For the purpose of discussion, we will address the language skills and reader's expectation and intent first, then world-knowledge.

The necessity of linguistic skills for reading is universally accepted. Although a certain amount of information can be obtained from a text even when unknown vocabulary and grammatical items are present, it is clear that reading comprehension will be greatly enhanced if the reader is proficient in low-level linguistic skills, such as basic knowledge of vocabulary, morphology (prefix, suffix, etc.), phonology, and grammar (Richards 1985; Coady 1979). The application of these low-level linguistic skills to reading a text must be automatic to the fullest extent possible (Schneider and Shiffrin 1977; Shiffrin and Schneider 1977). In addition to these low-level linguistic skills, a proficient reader will make use of other reading skills. For example, a proficient reader knows how to extract information that is relevant to the content of reading from such non-linguistic cues as the format in which the text is presented, the type-face in which the text is printed, the type of print medium where the text is found, etc. As mentioned earlier, a good reader is able to infer the meaning of an unknown word from the context without significantly sacrificing reading comprehension.

The expectation about a text and purpose for reading it are crucial factors in reading comprehension. Good readers are able to make good use of reading strategies--those of how to approach a reading material (Krashen and Terrell 1983; Barnett 1988). The choice of reading strategy depends upon the style and purpose of a particular text. Scanning is one strategy in which a specific piece of information is sought without attempting to comprehend every detail. Skimming is reading to obtain the gist of meaning without entirely understanding the text. Complete comprehension is another strategy, often employed when reading legal documents and scholarly papers, in which the reader attempts to fully understand the content. Task-oriented reading is often employed when one reads a text in order to use that information to perform a task, instead of understanding for an intellectual purpose. A text can be read using a number of different strategies, although it is more amenable to a genre-specific reading strategy. For example, newspaper editorials are likely to be read with complete comprehension or critical reading in mind, while recipes are more likely to be task-oriented. All these texts, however, can be read with any of the other strategies in mind.

In summary, reading cannot take place when there are severe deficiencies in basic linguistic skills and application of appropriate reading strategies suitable for the purpose of reading.

A second requisite element for reading comprehension is background or world-knowledge. Background knowledge refers to basic cultural information and familiarity with the topic of a text. A similar notion of world-knowledge refers to, for instance, sequential knowledge of world events (event schema). A schema is a notion borrowed from social psychology and applied to other disciplines including natural language processing (see Schank 1972; Schank and Abelson 1977; Schank 1982). The schema theory posits that a good reader has a conceptual framework of the subject matter, and

while reading a text knows how sampled pieces of information will fit into the general conceptual framework, which, in turn, allows him to predict the event-flow of a text (Carrell 1984; Carrell and Eisterhold 1987). This knowledge is crucial for the formation of viable expectations of events at the conclusion of a text. Once such a general framework of schema is available, specific information in a text can be accommodated as an instantiation of it. Good readers are able to approach a text with expectations of the subject using learned schema, which can be tested, rejected, and restructured as more reading samples are taken (Cheng 1985; Carrell and Eisterhold 1987; Goodman 1967). Put it another way, reading can be viewed as a process of relating information already stored in memory to incoming or new information (Bernhart 1984; Kennedy 1984; Widdowson 1984; Hall and Ramig 1978 and many others) and thus cannot take place if/when the reader does not have the information with which to interact.

It is also known that the adoption of a particular perspective of a story influences how reading is understood (Pichert and Anderson 1977). This fact strengthens the case for providing an advance organizer before reading takes place. Although reading specialists do not agree on details of offering background information, they generally agree that background information and previous knowledge play a pivotal role in reading comprehension. This type of information shall be referred to as the contextual information of a text.

If the importance of contextual information is as far-reaching as claimed, it follows that poor readers have greater gaps in knowledge, are impoverished in understanding relationships among facts, and lack skills to synthesize information in a text into a coherent presentation. This generalization of poor readers seems to be correct for the most part (Anderson and Person 1984; Bransford, Stein and Shelton 1984). Further, added global skills, such as the knowledge of what one knows and appropriate study skills, are known to influence reading comprehension (Baker and Brown 1984).

It is generally thought that first language reading skills are transferred to second language reading (Coady 1979). It seems logical, then, to infer that good readers in their native language are also good readers in a foreign language. There are cases, however, in which good readers in their native languages are not proficient readers in a foreign language. This discrepancy can often be traced back to the reader's incorrect schema application and the inability to apply an appropriate schema. The incorrect schema application is often the case when the story line is alien to the reader, either through cultural differences or unfamiliarity with the subject matter (see Steffersen and Joag-Dev 1984 for instance). Another reason for poor reading comprehension may be the result of different rhetorical and discourse organization between different languages.

The aforementioned shows conclusively how crucially a reader's contextual knowledge influences his role as a reader. The contextual information of a text, more specifically the knowledge which relates to the topic of a text, ability to invoke a correct

story schema, and ability to place the text in the correct cultural framework is the second most important skill that a reader must acquire in order to become proficient in reading in a foreign language.

From these discussions, two areas of difficulty in foreign language reading can be summarized as below:

Linguistic skills and reading strategies: ability to use linguistic processing skills (e.g. skills in vocabulary, grammar, etc. and higher skills such as making inference of the meanings of unknown words), automaticity of these skills, and ability to apply an appropriate reading strategy for a specific purpose.

Contextual knowledge: ability to understand the text in the proper real-world context and to invoke appropriate schema, ability to synthesize the facts given in a text and understand the relationships between them.

The traditional approach to reading instruction has been so-called grammar and translation, where the main focus was complete comprehension. In this tradition, the reader was relatively well-trained in vocabulary and grammar, but undertrained in other reading skills (e.g. reading strategies and contextual knowledge). Another relevant point here is that there is now available a wide variety of computer-assisted language programs that aim at training the reader to acquire automaticity in low-level linguistic skills, but none for the training of other high-level reading skills. With these available on the market, one can practice *kana*, *kanji*, *kanji* compounds, verb conjugation, and sentence formation, but a more comprehensive material for reading has been absent. It is clear that any computer-assisted language instruction program that aspires to contribute to foreign language reading must recognize these two areas of difficulty in foreign language reading and take note of the fact that computer-assisted language instruction material is sorely needed in areas other than simply training in basic linguistic skills. We shall examine how possible solutions to these problems are implemented in the instruction material of *UWJ.*

Syllabus and Course Design of Interactive Japanese: Understanding Written Japanese[2]

The courseware is designed in an integrated syllabus on three proficiency levels: beginning, intermediate, and advanced. This is based roughly upon the number of hours of formal language instruction the reader has received. Each level, or 'course,' consists of ten lessons (a total of thirty lessons). Each lesson typically embodies six texts. *UWJ* identifies ten text genres and one to six lessons are assigned to each genre, depending upon the probable frequency of encounter by the reader with the text type. Since text genres seem to have only a weak hierarchical structure (Lee and Musumeci 1988), their distribution is slightly skewed so that less proficient readers are more

frequently exposed to texts requiring less linguistic knowledge. This means that in a lesson, the reader will encounter six texts in one text genre.

For each lesson, *UWJ* incorporates six reading strategies (skimming, scanning, critical reading, summary writing , complete comprehension, and task-oriented reading). The reader of a typical lesson will read five texts in one genre type, and is then asked to adopt a different reading strategy for each one. The ensuing comprehension question accompanying each text checks the reader's comprehension through questions that are appropriate for that particular reading strategy. The last of these six texts is a module for self-test, and contains a text used for evaluation.[3] In this section, the reader is asked to make use of all the reading skills practiced in the section. The organization of a Reading Comprehension module is shown in Figure 1 on the next page.[4]

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Figure 1. Typical lesson flow of *Understanding Written Japanese*

Efforts were made to assure that the texts in the beginning level of *UWJ* would be as close as possible to those texts that are written by native speakers whose primary purpose is communicating with a fellow Japanese. The texts for the intermediate and advanced levels will contain authentic texts almost entirely. Since the relevance of the topic to the reader is a significant factor in reading proficiency, *UWJ* offers a wide variety of topics in a plethora of subjects areas. In *UWJ*'s thirty lessons, about 200 texts will be incorporated.

The lessons are organized by text genres and reading strategy is a major organizational feature within a lesson. By encouraging the student to read texts in a particular text genre using a variety of reading strategies, *UWJ* aims to provide the opportunity to acquire high-level processing skills. Each lesson is a HyperCard stack and is built around an organizational metaphor of a book. Thus, as shown on Fig. 1, the reader typically begins on the **Instructions** page, then proceeds on to the **Objectives** page, followed by the **Text** page, and so on. Just like a book, however, the reader has the freedom to go to any 'page' in the lesson.

Offering Assistance in Linguistic Skills

As may be recalled, one of the areas of potential deficiency for foreign language readers is language skills and reading strategies. As a natural result of the pedagogical approach to reading, that it is a 'psychological guessing game,' the software assumes *in principle* that the reader has a tenuous grasp of grammatical structures that appear in any given text. The software encourages the reader to infer the meaning of an unknown word from the context and explore different avenues to reach reading comprehension by using a battery of help. In order to achieve this type of flexibility, the *UWJ* material is committed to a network form (i.e., HyperCard stack). There are two types of assistance dispensed to the reader in the lesson. One is obtained directly from the text. On any screen in which Japanese text appears, help of virtually all types is directly accessible from the text. Another is the type accessed through a menu-bar, by clicking on a label, such as **Reference**, **Info**, etc.

To receive help from any part of the text, the reader clicks with a mouse the part of the text about which the reader has a question. Figure 2 shows how help information is accessed from an unknown part of a text. This example simulates the case in which the reader does not know the meaning of a *kanji* compound for 'fruit.' When the mouse is clicked on this word, a menu listing all help categories pops up, and the reader makes an

appropriate selection. When the **Word Meaning** is selected, the meaning of the *kanji* compound appears on the bottom of the screen, along with the pronunciation and its part of speech. The word is highlighted to show the pertinent word in the text.

In this manner, other types of information are easily accessible to the reader. As shown in the pop-up menu in Figure 2, the categories of available information are **Word Meaning**, **Phrase Meaning**, **Clause Meaning**, **Sentence Meaning**, and **Segmentation**, which shows how a sentence divides into discrete words; **Reading**, which shows pronunciation; **Syntax**, which shows the dependency structure of a sentence in a graphic form; and **Culture**, discussed below. We shall refer to the help items available from the pop-up menu as **Text Functions**. When the meaning of a word can be inferred from the context, the word meaning is not immediately given when requested. The system prompts for the reader's guess instead.

This type of interaction with the computer does not train the reader to attain automaticity in low-level linguistic skills, but merely eliminates the tedium of locating relevant information in reference materials. This is as it should be. As pointed out before, *UWJ* does not aim to offer training to attain competence in low-level linguistic skills, but hopes to offer exercises in other areas.

Another type of assistance, which we shall refer to as **Menu-bar Functions**, is dispensed through clicking on the menu-bar for the type of assistance the reader wishes to receive. In order to gain access to on-line dictionaries, for instance, one clicks on **References** on the menu-bar and then selects the dictionary he wishes to use. There are two dictionaries: Kanji-English and Japanese-English, which are available from any reading in the courseware. The *kanji* dictionary is the first electronic version of Andrew Nelson's *Japanese-English Character Dictionary*, with additional features, such as sophisticated search functions.[5]

The Japanese-English dictionary contains, aside from normal types of information, amenities, such as search functions, that are not found in non-electronic dictionaries. Digitized images on some dictionary pages are used to illustrate certain lexical items as an aid to enriching a reader's knowledge of Japan.[6]

Other **Menu-bar Functions** include navigational assistance within the stack under **Go**; printing commands under **Options**; and contextual information under **Info**, which we shall discuss below. We have demonstrated that *UWJ* offers a wide array of help to accommodate the reader's needs encountered in solving the linguistic aspects of reading comprehension.

Information for Contextualization of a Text

The other element which was identified as a potential area is a lack of contextual information. This has traditionally been the area neglected in reading instruction. *UWJ* offers comprehensive assistance aimed toward offsetting this imbalance.

In a typical lesson, information for better contextualization is dispensed at the very beginning. The objectives on the **Objectives** page is written so that the reader gains an advance organizer or a conceptual framework for the following text. It is usually accompanied by a picture related to the topic of the upcoming reading. From the **Objectives** screen, the reader can read information about the upcoming text. This is accomplished by selecting a **Menu-bar Function** labeled **Info**. There are three types of information available from **Info**: by selecting **Cultural Notes**, one receives a very general background of information that helps to create a framework of knowledge in order to understand the upcoming text. Two other types of information accessible from **Info** are: **Grammatical Points**, which is a list of grammatical points contained in the upcoming reading, and **Reading Skills**, which describes the type of reading skills for which the upcoming reading is designed to practice. Figure 3 shows an example of the type of information available from **Info** from the menu-bar. The text is a recipe for *sukiyaki*.

On the **Instructions** pages, which follows **Objectives**, the same information (namely, **Cultural Notes**, **Grammatical Points**, and **Reading Skills**) is readily available from a **Menu-bar Function** labeled **Info**. On the next page, the **Text** screen, more help is provided to further help contextualize the text. **Culture** help, mentioned earlier, needs to be elaborated upon here. Like other help items, this particular help is accessed by clicking the mouse on any part of a sentence that is considered to be loaded with cultural information. When this help item is chosen, the system presents specific information which will help contextualize the sentence, thereby facilitating an understanding of the cultural implications behind it. Thus, the information acquired in this way provides a piece of cultural information that is directly relevant to comprehension of a sentence, ultimately resulting in comprehension of the full semantic import of the sentence. As an example, Figure 4 on the next page shows a case in which the reader accessed cultural information on the sentence which was high-lighted from the pop-up menu and obtained by clicking on a part of

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Figure 2. Accessing Information from Text

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Figure 3. General Cultural Information Accessed from the Menu-Bar

this sentence. The system offers information at the bottom of the screen explaining that many foods are associated with certain seasons in Japan. This information is especially crucial for a reader, who is unfamiliar with the Japanese culture, to understand why the author speaks with such disdain of vegetables and fruit marketed in supermarkets year-round.

On the **Text** screen, the reader still retains access to **Grammatical Points**, **Reading Skills**, and **Cultural Notes** through **Info** in the menu-bar. On this page, the reader may receive additional information, such as more specific background information about the text. The specific background information is obtained from the same **Info** and selecting **About This Text**, and it orients the reader in some specifics of texts, such as the main character, setting of the story, and the general story line.

The reader, while reading, can access the information about the organization of a text from the **Info** on the menu-bar and then selecting **Text Outline**. This option gives the reader a graphic representation of how the text at hand is organized. If information about the text genre is desired, such information is also available by choosing **Info** on the menu-bar and then selecting **About This Genre** from the menu. It offers a prose description of important aspects of the text genre.

A text is further contextualized maximally by simulating real-life situations whenever possible and presenting it to the reader via audio and visual cues. The texts are also contextualized using visual and audio cues. Particularly illustrative of this is a type of reading called task-oriented reading. Two examples from a series of illustrations below pertain to a lesson containing a recipe for *sukiyaki*, a popular Japanese beef dish. The reader is asked to read the recipe, making use of the usual help (such as the help from the pop-up menu from the text, reference works, help available from **Info**, etc.). The reader is then asked to apply the knowledge of the recipe by participating in a simulated cooking of *sukiyaki*. As Figure 5 and Figure 6 show, the reader must purchase necessary ingredients for the dish, make preparations such as making the *dashi* soup stock, etc. This type of interaction checks the understanding of the text without resorting to the conventional approach to evaluation. To be noted here is the abundance of visual cues, contributing to further contextualization of the text.

We have seen, thus far, that an enormous amount of non-linguistic information is made accessible to the reader. Each type of help was targeted to address a specific area of possible deficiency in foreign language reading.

Conclusion

The general approach to reading, as implemented in computer-assisted instructional form, is pedagogically sound and is applicable to software for other languages. *UWJ* offers assistance in two crucial areas where weakness in reading skills of a foreign language exists. To recapitulate, in the area of linguistic and reading skills, the system offers information on any unknown part of the text, whether the type of information sought be morphological, phonological, semantic, or syntactic. It also offers assistance in segmentation of a sentence. In regard to reading skills, the system encourages the reader to become aware of text genres and to vary an approach to reading a text by determining the purpose for reading it. This is done intrinsically in the overall design of the text by organizing the lessons structured in terms of text genre and by offering a recommended reading strategy for each text.

Secondly, as seen in detail above, contextualization of the reading material is accomplished through presenting a variety of information in textual, visual, and audio forms. **Objectives** and **Instructions** pages contain detailed information to assist the reader to become acquainted with reading through a study of pictures, cultural information, text background, reading skills, text outline, and information on a specific text genre. Within the **Text** screen, contextualization is further enhanced by providing the reader additional access to sentence-specific cultural information. Certainly visual image is an indispensable part of supplying the reader with rich authentic acculturation information. *UWJ* is designed to offer a multi-faceted approach, providing the reader with as much contextualization information as possible in different types and generality. Coupled with these two types of assistance to enhance reading, *UWJ* will serve a useful purpose in training the reader of Japanese to become a more competent reader. We are confident that this material will become a benchmark for interactive computer-assisted language instruction for reading improvement.

Although *Interactive Japanese: Understanding Written Japanese* is the most sophisticated of computer-assisted language learning materials for developing reading skills in any language, it suggests a question that requires further examination. All of the help is self-initiated and available in abundance in all conceivable types. Thus the amount of help and timing for obtaining help is determined by the reader. This simulates a real-life reading environment in Ih reading takes place. It can be argued, however, that very nature of the software Ih enables it to be exploratory and non-linear is a liability in terms of the balance between a student's control vs. system's control of the learning paths. *UWJ* assumes that a user of the system has the expertise to select the type of appropriate help at pedagogically effective times. It may be argued that this

expectation is too much a burden on the user, since the most appropriate learning paths are not *a priori* apparent. A longitudinal examination of a usage pattern of this material will provide an insight into the answer to this question.

Notes

1. Support for developing this program was provided by the Nippon Television Network Cultural Society through a research and development grant to the University of Pittsburgh. Their assistance is gratefully acknowledged here. An earlier version of this paper entitled "Use of Image for Japanese CAI Software for Developing Reading Skills" and the demonstration of the software were presented at the International Conference on Cross-Cultural Communication in San Antonio, Texas, in 1989. This paper contains the description of the commercial version of the beginning level of *Interactive Japanese: Understanding Written Japanese* and supersedes the description in Nara 1990.

   Interactive Japanese: Understanding Written Japanese is Id in a Hypercard environment on the Apple Macintosh family of computers with 2MB of RAM and space for 20MB in the hard disk. The operating system is KanjiTalk v. 6.07 — a system software designed to allow interaction in the Japanese script, while running many Macintosh application programs. Other than a Macintosh computer, mouse, keyboards, and optional printer, no peripheral equipment is necessary to run the courseware. Although the current version of *UWJ* does not employ a video disk, the use of video images in future implementations for providing para-linguistic information is currently under discussion. A CD-ROM version of the software is now being Id.
2. Specific description and features of the software pertain to the beginning course of *Interactive Japanese: Understanding Written Japanese*, v. 1.
3. It is not quite accurate to say the the evaluation module is the last one since the choice of text to study within a lesson is entirely up to the reader. In fact, although there is recommended order in the way texts are meant to be read, the material is organized as a network data base, almost totally lacking in linearity in a typical HyperCard stack manner.
4. Although Figure 1 shows a single instructional path for a lesson, the system presents a different type of interaction for each reading strategy, particularly in the Text page. For instance, text for skimming has a time limit, a text for complete comprehension has a question and answer session, etc. For task oriented-reading, a path branches of from the Text page to move to a task module. The reader has the freedom to move back and forth between the Text page and the task module. The instructional path shown in Figure 1 is a typical one but it is by no means the only one, Ie the reader is free to move about from one lesson page to any other.

5. Andrew Nelson's Japanese-English dictionary implemented for the beginning level of *Interactive Japanese: Understanding Written Japanese* contains the definitions and usage examples for 1,850 kanji, corresponding to the traditional *tooyoo kanji* list. The version for the intermediate *UWJ* will contain approximately 4,000 kanji, and the advanced level, 5,446 kanji or the entirety of Nelson's.
6. The on-line Japanese-English dictionary contains the definitions of all the words Ih appear in the texts. For the beginning level *UWJ*, the total number of definitions is about 4,000. The intermediate and advanced levels of *UWJ* are estimated to contain 8,000 and 1,000 words respectively.

References

Baker, Linda., and Ann L. Brown
1984 "Metacognitive Skills and Reading," in *Handbook of Reading Research*, David C. Person (ed.), New York: Longman. pp. 353-94.

Barnett, Marva A.
1988 "Reading through Context: How Real and Perceived Strategy Use Affects L2 Comprehension," *The Modern Language Journal* 72.150-62.

Bernhardt, Elizabeth Buchter
1984 "Toward an Informational Processing Perspective in Foreign Language Reading," *The Modern Language Journal* 68.322-31.

Bransford, John D. and Barry S. Stein and Tommie Shelton
1984 "Learning from a Perspective of the Comprehender," in *Reading in a Foreign Language*, J. Charles Alderson and A. H. Urquhart (eds.), New York: Longman. pp. 28-44.

Carrell, Patricia L.
1984 "Schema Theory and ESL Reading: Classroom Implications and Applications," *The Modern Language Journal* 68.332-33.

Carrell, Patricia L., and Joan C. Eisterhold
1987 "Toward a Realization of Psycholinguistic Principles in the ESL Reading Class," in *Methodology in TESOL*, M. H. Long and J. C. Richards (eds.), New York: Newbury House Publishers. pp. 218-32.

Cheng, Patricia W.
1985 "Restructuring versus Automaticity: Alternative Accounts of Skill Acquisition," *Psychological Review* 92.214-23.

Coady, James
1979 "A Psycholinguistic Model of the ESL Reader," in *Reading in a Second Language*, R. Mackay, B. Barkman, and R. R. Jordan (eds.), Rowley, Massachusetts: Newbury House Publishers. pp. 5-12.

Goodman, Kenneth S.
1967 "Reading: A Psycholinguistic Guessing Game," *Journal of the Reading Specialist* 6.126-35.
Hall, MaryAnn, and Christopher J. Ramig
1978 *Linguistic Foundations for Reading*. Columbus, Ohio: Charles E. Merrill Publishing Co.
Kennedy, Alan
1984 *The Psychology of Reading*. London and New York: Methuen Co.
Krashen, Stephen. and Tracy Terrell
1983 *The Natural Approach: Language Acquisition in the Classroom*. New York: Pergamon Press.
Lee, James F. and Diane Musumeci
1988 "On Hierarchies of Reading Skills and Text Types," *The Modern Language Journal* 72.173-87.
Nara, Hiroshi
1990 "Developing CAI Material for Improving Reading Skills in Japanese," *Literary and Linguistic Computing* 5.139-44.
Pichert, J. W. and Richard C. Alderson
1977 "Taking Different Perspectives on a Story," *Journal of Educational Psychology* 69.309-15.
Richards, Jack C.
1985 *The Context of Language Teaching.* Cambridge: Cambridge University Press.
Schank, Roger C.
1972 "Conceptual Dependency: A Theory of Natural Language Understanding," *Cognitive Psychology* 3.552-631.
1982 *Reading and Understanding: Teaching from the Perspective of Artificial Intelligence*. Hillsdale, New Jersey: Lawrence Earlbaum Associates.
Schank, Roger C. and Robert Abelson
1977 Script Plans Goals and Understanding: An Inquiry into Human Knowledge Structure. Hillsdale, New Jersey: Lawrence Earlbaum Associates, Publishers.
Schneider, W. and R. M. Shiffrin
1977 "Controlled and Automatic Human Information-Processing I: Detection, Search, and Attention," *Psychological Review* 84.1-66.
Shiffrin, R. M. and W. Schneider
1977 "Controlled and Automatic Human Information-Processing I: Perceptual Learning, Automatic Attending and a General Theory," *Psychological Review* 84.127-90.
Steffersen, Margaret S., and Chitra Joag-Dev

1984 "Cultural Knowledge and Reading," in *Reading in a Foreign Language,* J. Charles Alderson and A. H. Urquhart (eds.), New York: Longman. pp. 48-61.

Widdowson, H. G.

1984 *Explorations in Applied Linguistics II*. Oxford: Oxford University Press.

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Figure 4. Specific Cultural Information Accessed from Text

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Figure 5. Visual Contextualization in Task-oriented Reading I

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Figure 6. Visual Contextualization in Task-oriented Reading II