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ABSTRACT

This paper is a report on the introduction of *concept mapping* into Japanese university reading courses (during a half-year period) in order to teach students a new (for them) method of learning. Making concept maps involves the use of many cognitive skills, for example, identifying information as interrelated concepts and evaluating and synthesizing this information. Because concept maps graphically present a reader's interpretation of the concepts and interrelationships contained within a reading, they can be quickly evaluated by instructors at any time during the mapping exercise and more individualized help can be provided.

In order to foster a sense of community and, thus, learning within the classroom, the concept mapping exercises were conducted in pairs. These pairs, after completing their map, then compared maps with another pair. The pairs, themselves, changed for every reading/mapping exercise.

Keywords: *cognitive process, community of practice, concept map, L2 reading, semantic map, schemata*

INTRODUCTION

Students

All of the students involved in this study were enrolled in the

Department of American • British • Canadian Studies (Language and Cultures) of the Faculty of Humanities in Hokkai Gakuen University. Two of the three courses were in the day program, Reading 1 and Reading Enshu 1 (2nd year), and one course was in the evening program, Reading 1. As this department's goal is to provide students with the skills needed to use English communicatively in an increasingly internationalized world, virtually all of them were taking EFL (English as a Foreign Language) reading and writing as well as speaking and listening courses.

EFL Reading Course

The required textbooks were rather standard with narrative, descriptive and expository readings presented with prereading activities that included questions aimed at stimulating student schemata concerning the reading theme and postreading questions based on reading comprehension and lexical items in context. In addition to producing concept maps that visually represent the information contained in the reading (detailed later in the paper), the students were assigned, as homework after completion of the maps, and subsequently tested on the textbooks' comprehension questions. The other required text in these courses was a monolingual English dictionary; the in-class and homework exercises and quizzes were aimed at exposing students to some of the various ways of using standard English dictionaries. Since the courses in the Reading Enshu sequence carry twice the graduation credits of those in the Reading sequence, the Reading Enshu 1 students were also required to write journal entries for five (each half year) graded-level ESL readers (vocabulary-controlled short novels) of their own choice to be read outside of class.

BACKGROUND

Reading as a Learned Cognitive Skill

Certainly, everyone would agree that reading is a skill that is consciously learned. The question then concerns the way or ways to best approach the teaching/learning of reading. As pointed out by Professor Jerome Bruner (psychology, New York University), a difference exists between *learning about* [something, for example, reading] and *learning to be* [something, e.g., a reader]; *learning about* implies simply acquiring information, whereas *learning to be* necessitates being able to do some task (Brown, 2000). In addition, philosopher Gilbert Ryle (1949) wrote the seemingly obvious statement that *learning about* [something], that is, the accumulation of information [about something], cannot, by itself, lead to knowing *how* [to do something]. He claimed that learning *how* requires *practice*, and that practicing leads to *learning to be* [something].

Digressing somewhat, although virtually all the research cited was conducted by English speakers with English as the target language, the concepts and methodology presented are applicable to both L1 (native language) and L2 (second language) environments; the actual language used for instruction may be irrelevant (see Okano 1994 for advantages of using L1 while teaching L2 reading/vocabulary). As an example of this universality, researchers have found that even with non-alphabetic language groups, e.g., Japanese and Chinese, readers use reading strategies similar to native English readers when reading in their own language (Field, 1985).

In this paper, *learning about* and *learning to be* are taken as the act of acquiring information from written sources (text) and the act of reading with comprehension, respectively. While these two acts may

be difficult to define with complete clarity, they can at least be understood by way of analogy with one's own L1 reading experience.   The questions that remain pertain to the meaning of *practice* and to its implementation in the reading classroom.

If learning to read in either L1 or L2 can be thought as involving similar cognitive skills as learning L1 vocabulary, then, perhaps, the research by two educational psychologists, Miller and Gildea (1987) would be informative.   They came to the not surprising conclusion that everyday conversation (and reading) results in a truly amazing ability to recognize and use a vast vocabulary, whereas trying to learn vocabulary from the definitions and sentences in a dictionary is much slower and not very successful; that is, learning vocabulary in a highly contextualized, social environment is highly effective.

Examples of Learning To Be

Professor Okano in a paper on L2 vocabulary acquisition through reading previously published in this journal described the "knowledge of how to drive a car" and the "knowledge of how to use a foreign language" as "different types of procedural knowledge" (*learning to be* in this paper), with *procedural knowledge* being a result of the proceduralization of *declarative knowledge* (*learning about* in this paper).

> "The repetition of recall and the repetition of practicing will eventually make the operation automatic; the operation of driving can be carried out without being consciously recalled in verbal forms.   This is the way in which the procedural knowledge of driving is generated from the declarative knowledge [i.e., mainly verbalized information about how cars are used as well as additional background information concerning the social status of cars and driving].   It is the transformation of declarative knowledge

into a procedure. This transformation is called procedural-ization."

Concerning the learning of a foreign language, Professor Okano continues,

"[The declarative knowledge is,]... [i]n addition to the linguistic knowledge, i.e., the knowledge of syntax and semantics as well as the knowledge of vocabulary and idioms plus the knowledge of their use,... [the] extralingual types of knowledge of the world connected with the content of linguistic expressions and the con-texts of situation.... As with EFL in general, the teaching and learning of vocabulary has to start with the declarative knowledge and end with the complete proceduralization of that knowledge." (Okano, 1994)

Effect of Society and Necessity on Learning

Since it cannot be denied that both of the above examples of *learning how* are comparable in so far as they are both tasks that have to be consciously learned, why is it that people can successfully learn to drive as adults, while learning a 2nd language remains elusive? Perhaps it would be helpful to broaden the comparison by taking into considera-tion the *social aspects* of learning, i.e., "Social groups provide the resources for their members to learn," and the *demand driven* nature (necessity) of learning.

"People learn in response to need. When people cannot see the need for what's being taught, they ignore it, reject it, or fail to assimilate it in any meaningful way. Conversely,... if the resources for learning are available, people learn effectively and quickly." (Brown, 2000)

It is difficult to imagine anyone alive in an industrialized country

at the beginning of the 21st century that hadn't spent a great part of their lives in a motorized road vehicle of some sort prior to learning how to drive. As for me, growing up in public transportation-limited Los Angeles in the 1950s, it would have been socially inconceivable to not get a driver's license at the earliest possible date. Of course, this was not the case for those living in densely populated metropolitan areas such as New York City and Tokyo, where owning a car is not such a necessity but a luxury bordering on liability. Similarly (to Los Angeles) in Japan, given the popularity of *driving* as a leisure activity, second only to *dining out on special occasions* (Japan Almanac 2000), it is not surprising that a great number of people endure the expense and time required to obtain a license to drive, regardless of whether they can realistically expect to be driving regularly. Comparing the above social environment with that of foreign language learning in both the United States and Japan is informative.

As for the US, learning a foreign language has never been a high priority, either officially or on an individual level. Although most students have spent some time in a foreign language course, they are generally not required to demonstrate a high level of competency for most advanced university degrees or, as a matter of fact, for most jobs. Of course, with the increasing internationalization of English as a means of communication, it can be argued that learning a foreign language, an extremely difficult task under any circumstance, is made more so for native speakers of English because of limited incentives, i. e., rewards, as well as a lack of a clear choice as to which foreign language to choose. The same certainly cannot be said for the situation in Japan.

Effect of Resources for Learning

From the Japanese government to Japanese industry, there is a clear and consistent message about the necessity of learning a foreign language, emphasizing English, in an increasingly internationalized world. Since there is no denying the need to learn a foreign language, then, perhaps, the unavailability of the *resources for learning* can begin to explain the lack of success for EFL programs in general as well as in Japan. Professor Okano has effectively covered many of the obstructive aspects of language education in Japan, including observations and criticism from Natsume Soseki, Jerry O'Sullivan, and F. E. Anderson. Briefly, these include lack of a holistic view in EFL teaching (Natsume Soseki, as noted by Okano, 1994), English not taught as a means of communication (communicative teaching) (O'Sullivan, 1992), and a lack of communication between teacher and student as well among students, themselves (F. Anderson, 1993; Reinelt, 1987). Certainly, these observations would be difficult to deny, especially by anyone who has witnessed typical EFL classes in progress.

How then can EFL classes be made more effective in terms of producing users of English as a means of communication? Before delving deeper into the cognitive aspects of *learning to be*, it is instructive to think of language as more than simply a skill to be learned.

> "Language... is a social artifact, and as people learn their way into it, they are simultaneously inserting themselves into a variety of complex, interwoven social systems." (Brown, 2000)

If this is true, then it follows that language learning has to be related to people's social and cognitive development. This development, of course, is being unconsciously influenced, in terms of interpretation, judgment, and understanding, by what individuals already are, i. e., the sum of their previous experiences and knowledge. This back-

ground knowledge carried around by individuals has been labeled their schemata (see Okano 1994 and Suenaga 1993 for references to Japanese university EFL courses). Also important are the implications of the particular social system within which individuals interact.

Communities of Practice and Learning

For the purposes of this paper, the social system in the above quote can be thought of as encompassing people in similar situations, e.g., occupations, hobbies, physical states, or even a classroom, with access to similar resources. Lave and Wenger (1993) identify people that share common knowledge and do similar things in similar ways as *communities of practice*. They assert that members of *communities of practice* are developing a social identity, and that this developing identity shapes what they learn and how they come to accumulate knowledge and information. This implies that even in the information gathering stage, this developing identity along with whom they are, i.e., their schemata, influences what information they notice, that is, what they are *learning about*, and what they ultimately learn.

Ideally, in an environment where the sharing of information and its meaning is encouraged, these *communities of practice* exhibit some interesting characteristics such as the members forming

"social networks along which information about that practice can both travel rapidly and be assimilated readily.... reciprocity is strong. People are able to affect one another and the group as a whole directly. Changes can propagate easily. Coordination is tight. Ideas and knowledge may be distributed across the group, not held individually. These groups can allow for highly productive and creative work to develop collaboratively." (Brown, 2000)

Unfortunately, this type of environment is uncommon in Japanese

university classrooms, as documented above by F. Anderson and Reinelt.

Assimilation Theory in Learning

In the cognitive learning theory of Ausubel (1978), learning results when new knowledge is assimilated into the existing *concept propositional frameworks*, i.e., the schemata, of a learner. Ausubel contrasts *meaningful learning* with *rote learning*, where, with the former, learners actively participate by relating new information to that which is relevant in their own schemata, while, with the latter, learners simply memorize new information without it necessarily having to interact with pertinent parts of their schemata. More succinctly, for *meaningful learning* to occur, the following three conditions are necessary:

• The new information should be conceptually clear to learners.

• The new information should be presented with language and examples as well as any other supplementary information that may be necessary in order for it to be relatable to their schemata.

• Learners must actively participate by attempting to incorporate the new information into their schemata.

CLASSROOM APPLICATIONS

Assimilation Theory: Drawings and Concepts

When applying assimilation theory to reading classrooms, it is informative to refer to studies concerning cognitive skills such as the relationship between people's memory, i.e., information stored in the form of schemata, and information processing. For example, Potter and Faulconer (1975) found in a study comparing the speed at which

objects could be categorized that people were faster categorizing drawings than written names of the same objects, even though more time was needed to name the objects using the drawings than to just read aloud the written names. This result implies that people are able, with the use of drawings, to access conceptual information, i.e., abstract and nonverbal representations of ideas, without having to explicitly access verbal information.

> "...information concerning stimuli and events is tied in part to the particular modality in which information is initially processed. In other words, the processing systems that analyze information also participate in and influence the representation of that information." (Squire, 1987)

Results such as this have long been used in terms of semantic mapping techniques for vocabulary acquisition and reading and writing programs (Okano; Suenaga; Sinatra, 1984; D. D. Johnson, 1986). One of the primary factors that enables semantic mapping to help students is the use of a graphical representation of knowledge to access their *abstract* and *nonverbal representations of ideas* described above.

From Semantic Mapping to Concept Mapping

The semantic mapping techniques mentioned in the references above attempt to assist learning by helping students contextualize new information by graphically referencing it to knowledge in their schemata; concept mapping takes this further by introducing the idea of interconnecting *concepts* to produce *propositions*. Here, a concept is taken as a *regularity in events or objects* observed by an individual and represented by some symbol, usually a language label, and propositions are defined as being formed of two or more concepts connected by words designating their relationship: e.g., the concepts of *snow* and *cold*

connected by *is*, defining the relationship, to form the semantic unit *snow is cold*. (Novak and Gowin, 1984)

Concept Mapping: Enhancement of Learning and Memory

Thus, just as a semantic map uses hierarchical connections to help contextualize information for a learner, a concept map clarifies the paths that interconnect the meaning of concepts contained within propositions. As the map becomes more fully developed, it serves as a summary of the *learning to be* that is taking place. This process of *learning to be* shown in a learner's concept map can be related to several principles in Ausubel's cognitive theory of continuous meaning-ful learning.

1) The cognitive structure of concepts and propositions is hierar-chically organized.

2) Concepts undergo *progressive differentiation*, i.e., concepts con-tinue to develop greater meaning as new relationships, or propo-sitions, are formed.

3) Learning is enhanced when concepts undergo *integrative reconcil-iation*, i.e., new relationships are found to exist among related concepts and/or propositions.

Besides enhancing learning, the concept maps created by the learner have also been found to improve the retention of new informa-tion by helping to transfer it from working memory, i.e., short-term memory, to long-term memory (Novak, 1990). This result is not sur-prising in the light of neurobiological theories that postulate a system-atic sequence of interactions between working memory and long-term memory in order to accommodate new information into a growing body of structured knowledge, i.e., a person's schemata (O. R. Anderson, 1992). The importance of this systematic interaction between working

and long-term memory is further emphasized by the limit of about seven *items* that can be retained in working, or short-term, memory (Miller, 1956).

CLASSROOM PROCEDURE

Concept Mapping: Japanese University Reading Courses

In order to encourage both the development of a *community of practice* (from Lave and Wenger) as well as the development of *meaningful learning* (from Ausubel), the students in the reading courses formed pairs after being introduced to the current reading with prereading activities. In addition, after completing the concept map of the reading, the pairs compared their map with that of another pair and made any necessary modifications. Although the pairs remained together until the concept mapping exercise was completed, different pairings were required in subsequent readings in order to foster a *community of practice* that encompassed the entire class by diffusing the learning that was occurring.

RESULTS AND DISCUSSION

As should have been easily predicted, the biggest challenges facing the students centered on *meaningful learning*; not that the students were unwilling, but that they lacked knowledge about the meaning of concepts. This is clearly shown in the first maps produced by students A & C and B & D, shown in Figs. 1 and 2, respectively; many of the connected items are, in fact, propositions, i.e., semantically connected concepts (readings from Smith and Mare, "Issues for Today"). This was not surprising because of the importance placed on first introduc-
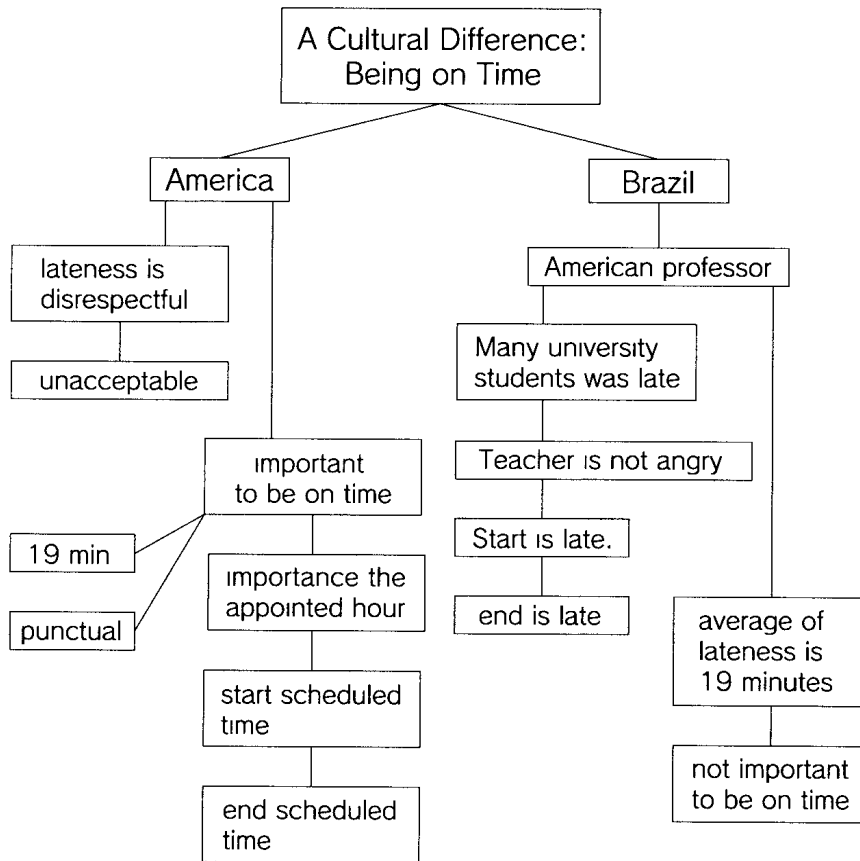
Fig.1   Concept Map *A Cultural Difference: Being on Time* students A & C
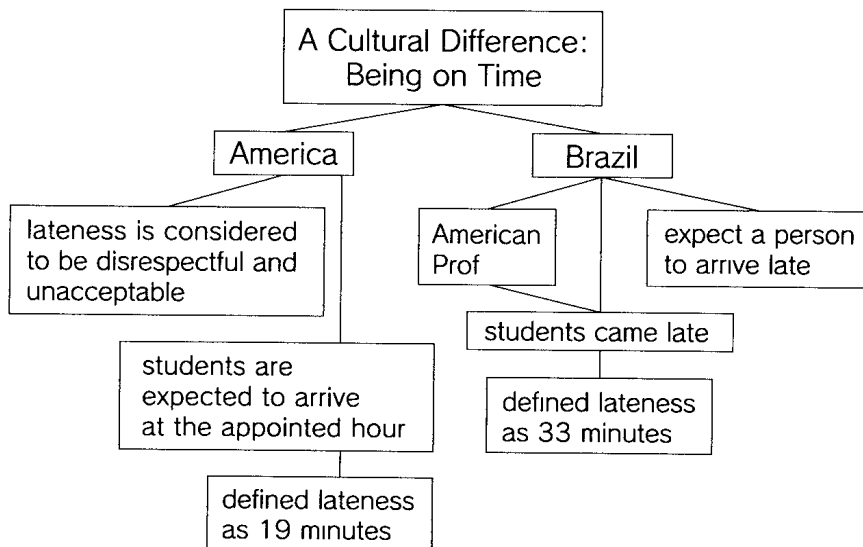

Fig.2   Concept Map *A Cultural Difference: Being on Time* students B & D

ing the hierarchical representation of information. Since the students were having to undergo a transition from a rote-learning environment to a situation where they would be working together while learning
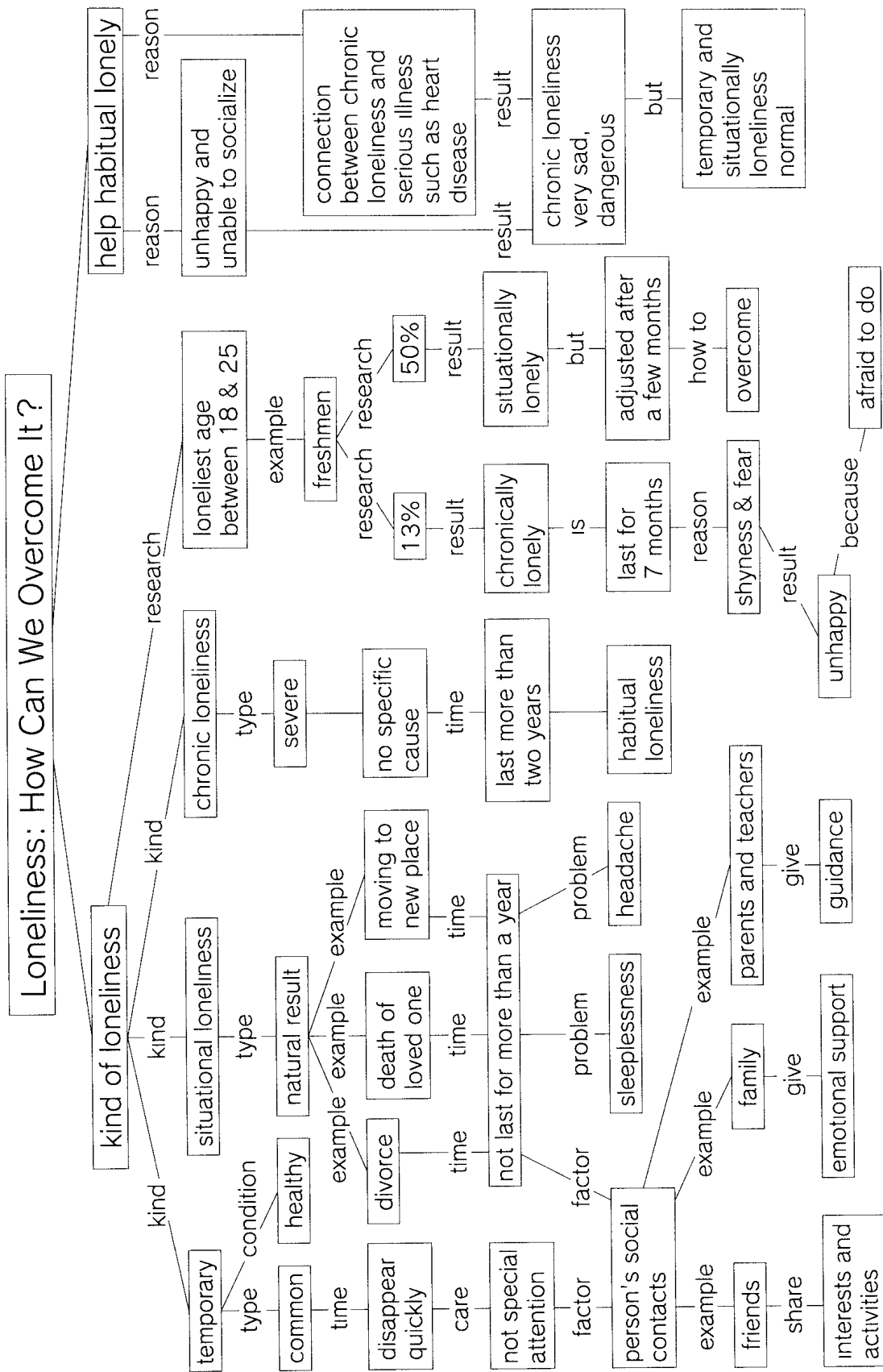
Fig.3 Concept Map, Loneliness: How Can We Overcome It?; students A & B.

another way of reading, the introduction of how to distill paragraphs and sentences into concepts interconnected semantically was delayed until the third mapping exercise. However, *concepts* were not entirely ignored; there was some effort expended during the first two reading map exercises on getting students to look beyond copying whole sentences, clauses, and phrases to discover more precisely where meaning lay.

The concept map of the fourth (and last) reading, shown in Fig. 3, was jointly created by students A and B. While it cannot be denied that reading four contains concepts in greater numbers and complexity than reading one, the richness of details contained in the concept map of Fig. 3 clearly shows that the ability of students to identify concepts and propositions had advanced markedly: reading 1), a (half) narrative article describing the differences in cultural attitudes regarding time (in particular, lateness) held by Brazilian and US university students; reading 2), an expository article on some aspects of loneliness.

CONCLUSION

Although some obvious problems remain, in particular, the concepts linked to chronic/habitual loneliness and the presence of *string* maps, i.e., linear (non-branching) strings of concepts, Fig. 3 shows that a considerable amount of *learning to be* a reader had taken place over the course of reading and creating four concept maps. Overall, the students demonstrated an ability to use the cognitive skills of identifying concepts and propositions and hierarchically mapping them during the half year of instruction (Spring 2001). Notably, the most encouraging result of all was their show of willingness (and, in many cases, eagerness) to work together and with the instructor, even without the

incentive of a grade (the concept map exercises were not graded).

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