

Different Evaluations of Reading Support System between Foreign Students and Japanese Teachers

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This research aimed to study the different attitudes and preferences between foreign students and Japanese language teachers in using a reading support e-Learning system. In experiments, 20 language teachers and 22 foreign students used reading e-Learning content on LMS Server (WebClass) and answered a 33-item questionnaire that investigated four factors (e-Contents Effectiveness, Relevance between Modules, Difficulty of New Modules and Positive Perception of Traditional Exercises). Results revealed that foreign students show a positive attitude toward new tasks and explanation with graphics on e-Learning system. They also approved of ordinary language tasks (vocabulary and grammar), that were implemented in Module 1 and Module 2. On the contrary, Japanese teachers indicated difficulty and inadequacy of textual information in new tasks and explanations on e-Learning. They also showed a negative attitude toward ordinary language tasks

Keywords: CALL, WBT, Japanese language education, usability, academic reading

Introduction

In recent years in Japan, there has been a rapid increase in numbers of foreign students studying at science and technology graduate schools. These students have already completed some academic courses in their major fields, but do not have language ability sufficient for academic life in Japan. In order to integrate such students into their language environment, language institutes and international student centers provide intensive language courses and arrange tutoring programs. For foreign students at science and technology universities, however, there is little time to enroll in regular Japanese language courses or to utilize available language learning opportunities. Kano and Murata's (1994) survey shows that some foreign students do not attain sufficient language proficiency and cannot understand daily conversation even though they have lived in Japan for several years. Note that these students have lost important opportunities to discuss their academic subjects with their colleagues and teaching faculty during their lectures and seminars.

To solve these problems, many universities and institutions have developed e-Learning systems that are free and open to all users (Tera et al., 1996; Kitamura et al., 1999; Kawanura & Kitamura, 2000; Nishina, 2000). Foreign readers use these e-Learning systems as

supplementary materials for class activities or for individual study of extra-curricular subjects. Although these web-based systems are attractive at first glance, they do not keep the learner's interest. This is because almost all of these systems have been designed by technological researchers in an attempt to apply the techniques of natural language processing to foreign language instruction. As a result, validity of these systems has not been supported by language learning theories and foreign language pedagogical practices, and has run contrary to accepted meaning-based approaches (Widdowson, 1978).

Although a large number of instructional theories and practices have presented essential knowledge for academic reading comprehension, there is little agreement as to the methodology for designing and implementing actual e-Learning units. Thus, this study aims to consider specific practice guidelines that are research-based and were implemented in educational settings (Foshay et al., 2003). We attempted to investigate effectiveness of implementing language learning/teaching strategic modules, which have been regarded as important factors for language testing and instruction (Bachman, 1990). One second but important measure of success of e-Learning use in language classrooms is whether it is acceptable to those who use it. Our e-Learning evaluation survey attempted to precisely investigate the different attitudes and preferences between foreign students and Japanese language teachers during their practical use of reading e-Learning systems.

This article has basically three sections. The first section describes the e-Learning courseware designs, which were implemented by combining four different strategic learning modules on LMS Server (WebClass). The second section outlines the survey used to investigate the evaluations of 20 language teachers and 22 foreign students who used reading e-Learning courseware. The third section examines the results of the survey, and discusses the design for system development. Finally, the article closed with conclusion and future work

Courseware Design

Kato et al. (2002) proposed a Language Learning Framework for academic reading comprehension. Our proposed system includes functions that teach both the grammatical and rhetorical features typical of academic writing by providing four language learning modules: lexical, grammatical, information-transfer, and contextual modules as shown in Figure 1.

The purpose of this framework is to propose a general guideline for Japanese language learning through use of experimental and theoretical data to identify information relevant to academic reading comprehension. The framework shown in Figure 1, based on the experimental and theoretical researches (Kato et.al. 2002, 2004), presents knowledge essential for learning strategies.

Structure of e-Learning Courseware

Our proposed system has functions that lead students to learn both the grammatical and rhetorical features typical to academic writing, and selects relevant tactics to activate the students' comprehension of textual and graphical information, based on "language Learning

Framework.” In our courseware, the following four strategic modules were developed: (a) Lexical module, (b) Grammatical module, (c) Information-transfer module, and (d) Contextual module (Fig. 2).

The lexical (Fig. 3) and grammatical modules (Fig. 4) were designed to promote better understanding of linguistic features in academic texts. These practices mainly focused on identifying and recognizing word meanings and grammatical forms. On the contrary, the information-transfer module (graphic module, Fig. 5) was also designed to synthesize related texts and graphics, which require readers to discover how information in the charts and diagrams supplemented and explicated the texts. The contextual module (Fig. 6) was intended to promote interpretation of related sentences and finding the main idea of whole texts.

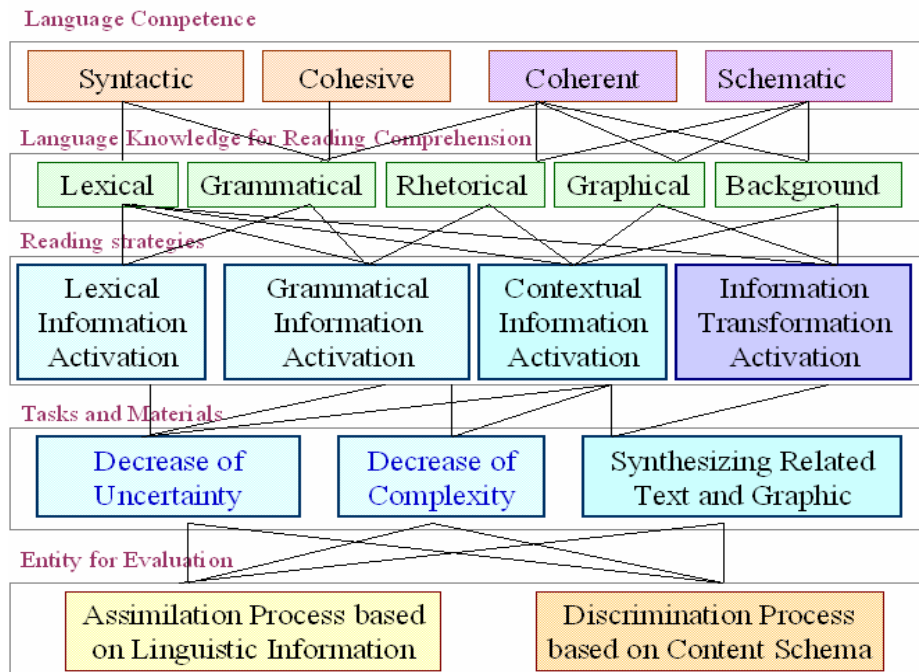


Figure 1. Language Learning Framework for Academic Reading Comprehension



Figure 2. Construction of Reading Strategic Modules

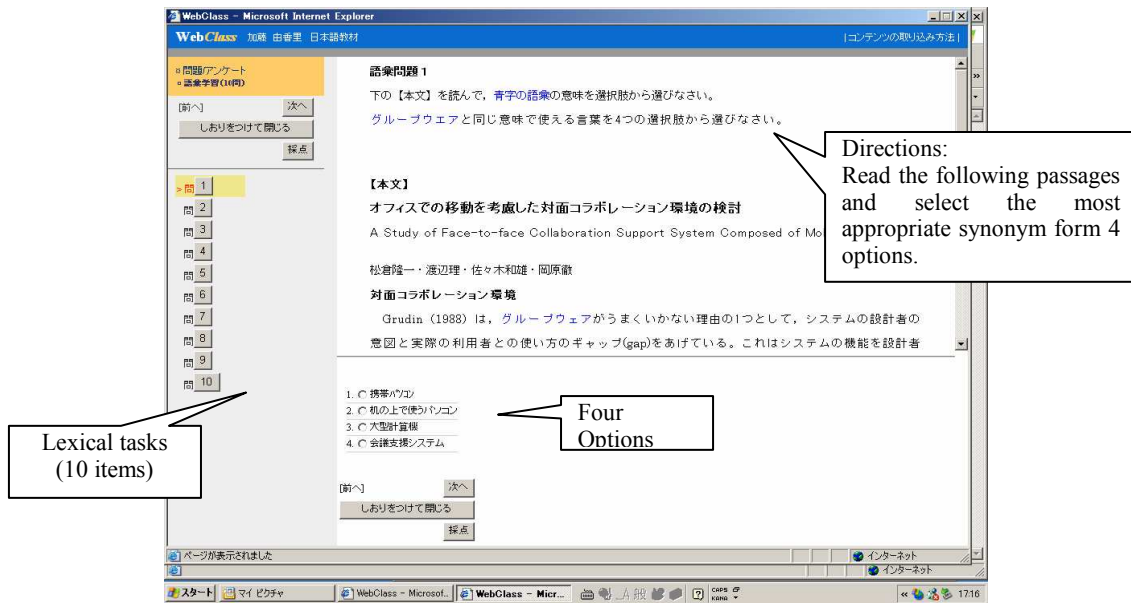


Figure 3. Lexical Modules

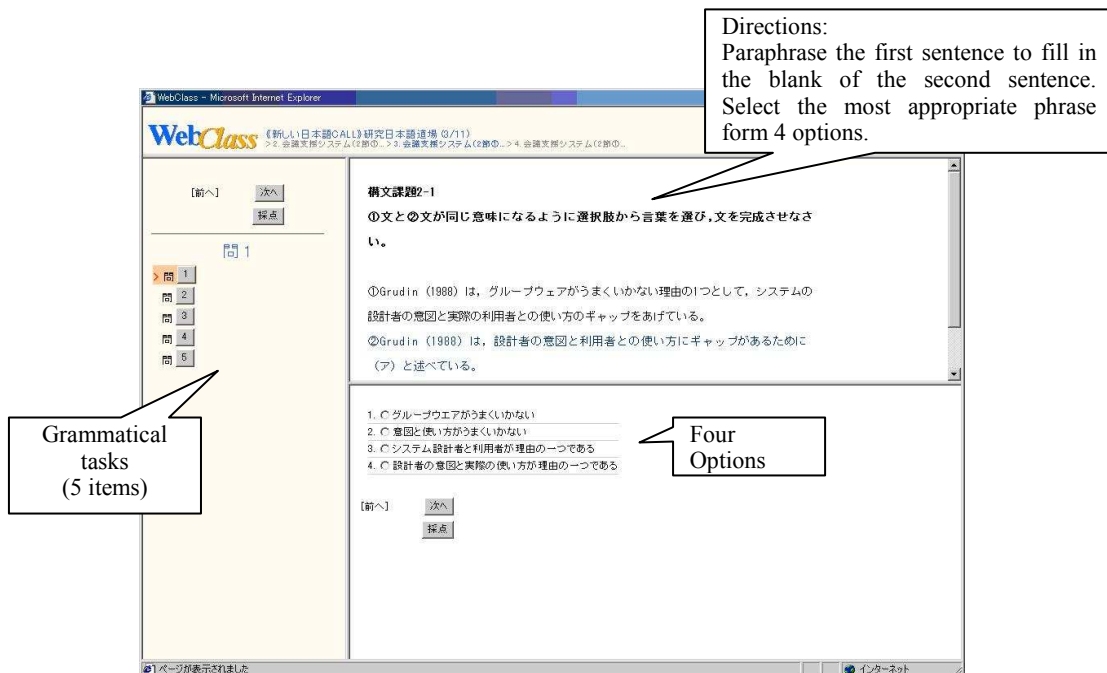


Figure 4. Grammatical Modules

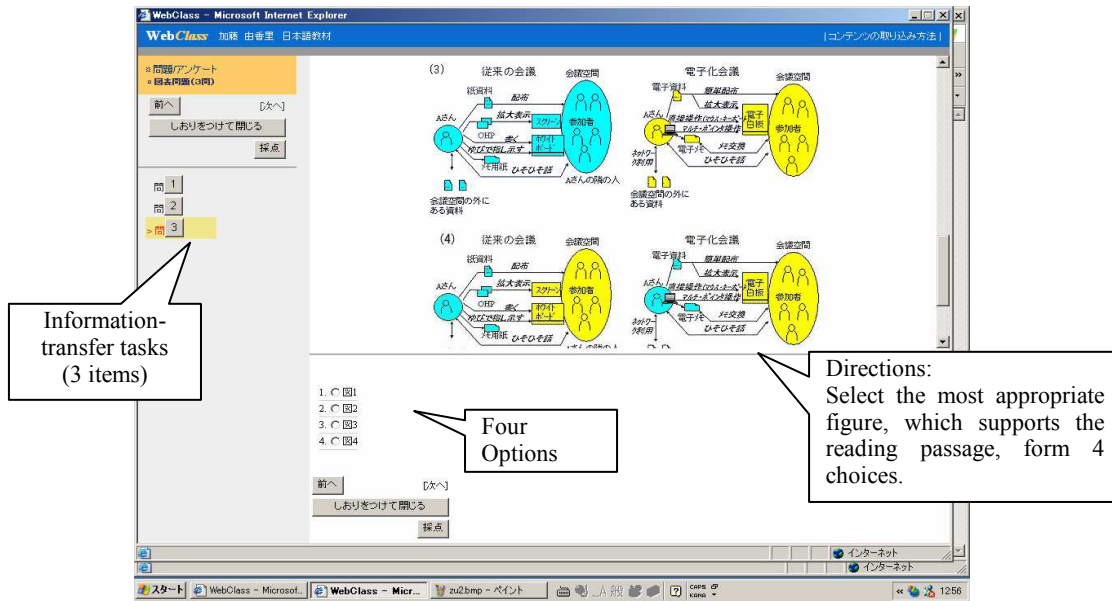


Figure 5. Information-Transfer Modules

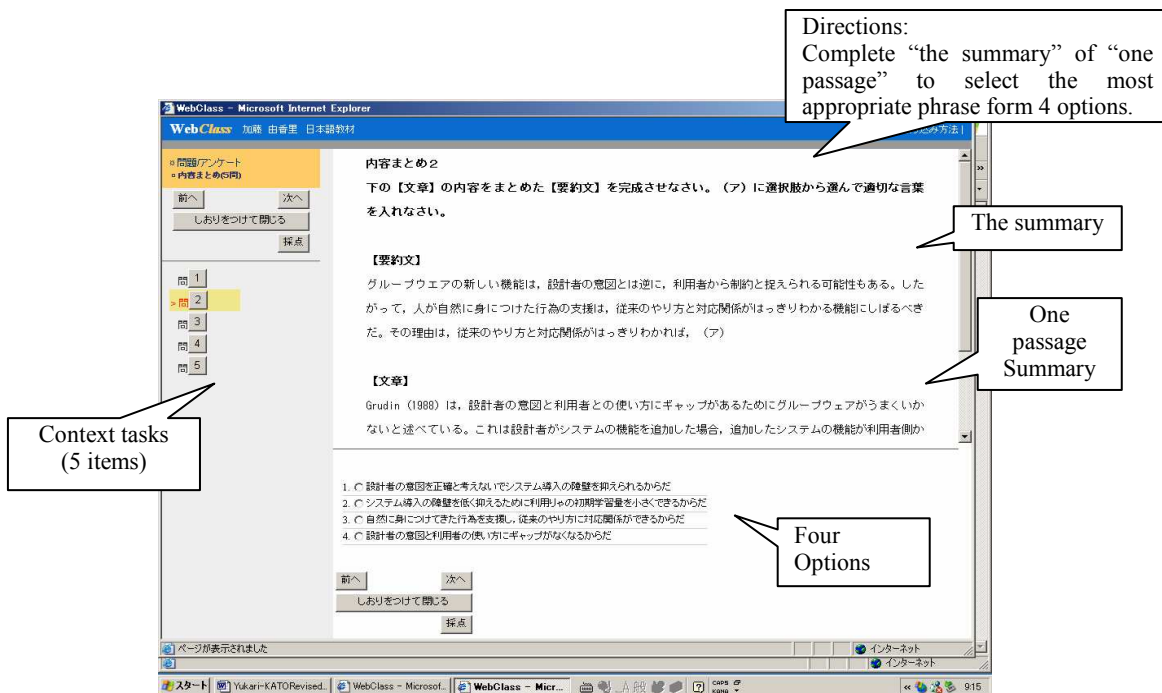


Figure 6. Contextual Modules

Materials

We selected an article published in a Japanese journal of information processing (Matsukura et al., 1999). The article describes advantages and disadvantages of a new meeting support system in comparison to previous meeting styles. A diagram was used to show similarities and differences between the new meeting support system and previous meeting styles. This article has also been used in prior research concerning the effects of graphical information on reading comprehension (Kato et al., 2002; 2003).

Evaluation Survey for e-Learning Courseware

Research Questions

This research utilized a questionnaire to examine foreign students' preferences about e-learning courseware and compared them with those of university Japanese language teachers. The research questions were:

1. How do foreign students' preferences differ from Japanese language teachers' preferences?
2. What learning strategic modules do foreign students and Japanese language teachers believe are important in e-Learning courseware?

Subjects

The research subjects were 22 foreign students studying in public and private universities in Japan. Participants in this experiment were Chinese undergraduate students, including both high-intermediate and advanced learners of Japanese. Most participants had already received 1-2 years of formal language instruction in Japan, but some were not yet able to pass the first level of the Japanese Proficiency Test. Most teachers are familiar with word processing, e-mail, or web browsing. Some of them use electric bilingual dictionaries for language learning. However, they have never studied with Computer-Assisted Language Learning Systems (CALL) or Web-Based Systems through Internet.

Twenty Japanese language teachers, who teach Japanese language to foreign students at universities and language institutions in Japan, also collaborated in this study. All teachers were native Japanese speakers. Lengths of teaching experience ranged from five to 15 years. Most teachers are familiar with word processing, e-mail, or web browsing. Almost all teachers have used multimedia tools such as audio tapes, video tapes, and CD-ROM for language teaching. Additionally, some of them make use of a word processor in writing classes. All most all teachers have never developed Computer-Assisted Language Learning Systems (CALL) or Web-Based Systems through Internet. Few teachers have made their own web sites.

Questionnaires and Data Collection Procedures

The same questionnaire was used for both foreign students and Japanese language teachers.

Individual questions were designed to investigate users' subjective preference toward e-Learning systems (function, relevance, achievement, and motivation) in comparison to previous research (Obayashi et al. 2002; Dansuwan et al. 2001; Suzuki 2002). In the survey, subjects individually used the web-based courseware on the Learning Management System (WebClass; <http://conery.ai.is.uec.ac.jp>). Each subject read the reading passages with strategic tasks and completed the assimilative and discriminative tests on the Web. After using the e-Learning courseware for one hour, they were asked to read the 33 questionnaire items and indicate their reaction by choosing a number from 1 (disagree) to 4 (strongly agree). The access logs and answers to questionnaires were recorded on the WebClass server.

Results

We conducted item analysis to investigate the discriminative power of the 33 questions and deleted the six items that showed weak correlations to other items on the questionnaires. The number of factors extracted in this study was determined by comparing the screen plot to factors with an eigen value greater than 1.0. Then 27 items were submitted to factor analysis by using principal component analysis and varimax rotation was conducted. Table 1 shows the items loaded by each factor. Deleted items (items that loaded at less than .55 or complex factors) are shown in italics (Items 9, 13, 18, and 24).

The first factor included ten items that loaded on 24.25 % of the variance. We labeled this factor "e-Content Effectiveness." Representative items were Item 5: "The size of fonts and graphic in the Feedback part are easy to read," Item 3: "The contents of text are realistic" and Item 31: "All exercises of 4 different Modules are helpful to answer the summary." These items indicate adequacy of e-Contents functions that were implemented in the system.

Factor 2 consisted of seven items that loaded on 15.00 % of the variance. This factor was labeled "Relevance between Modules" and included Item 10: "Vocabulary Quizzes of Module 1 are helpful to answer the multiple-choice questions" and Item 14: "Vocabulary Quizzes of Module 1 are helpful to study Contextual exercises of Module 4." Especially, this factor seems to evaluate the function of Vocabulary Quizzes in Module 1 with regard to the Reading Comprehension Test (multiple-choice questions and summary).

Four items loading on the third factor accounted for 9.12 % of the variance. All four items show negative attitude towards new strategic modules: Graphic Exercises of Module 3 and Context Exercises of Module 4. Graphic Exercises of Module 3 were also designed to synthesize related texts and graphics, which require readers to discover how information in the charts and diagrams supplemented and explicated the texts. Context Exercises of Module 4 were intended to promote interpretation of related sentences and finding the main idea of whole texts. So, these strategic modules required not only that participants understood specific details such as vocabulary and sentence structure, but that they also understood the relationships among different sources or ideas. Representative items were Item 22: "Graphic Exercises of Module 3 are difficult" and Item 27: "Context Exercises of Module 4 are not easy to understand."

Table 1. Items Arranged According to Factor

Items	Factor Loadings			
	Factor 1	Factor 2	Factor 3	Factor 4
Q5 The size of fonts and graphic in the Feedback part are easy to read	0.833	-0.145	-0.074	-0.054
Q3 The contents of text are realistic	0.826	0.380	0.168	0.032
Q21 Graphic Exercises in Module 3 are helpful to study Context Exercises in Module 4	0.810	0.132	-0.231	0.158
Q7 The feedback to Learners' answers are appropriate	0.792	0.440	0.080	-0.103
Q1 The size of fonts and graphic in the text part are easy to read	0.763	0.251	0.125	0.091
Q31 All exercises of 4 different Modules are helpful to answer the summary.	0.747	0.345	-0.110	0.284
Q15 Graphic Exercises of Module 3 are adequate to answer the summary	0.746	0.275	0.121	-0.269
Q20 Graphic Exercises of Module 3 are helpful to answer the summary	0.660	0.145	-0.143	0.279
Q4 The length of text and questions are appropriate	0.635	0.175	-0.064	0.069
Q17 Grammar Exercises of Module 2 are helpful to study Graphic Exercises of Module 3	0.624	0.039	-0.309	0.24
Q9 <i>Vocabulary Quizzes are too easy</i>	0.596	-0.187	0.165	0.448
Q18 <i>Grammar Exercises of Module 2 are helpful to study Context Exercises of Module 4</i>	0.679	0.475	-0.188	0.184
Q30 All exercises of 4 different Modules are helpful to answer the multiple-choice questions	0.189	0.815	-0.068	0.265
Q10 Vocabulary Quizzes of Module 1 are helpful to answer the multiple-choice questions	0.006	0.742	0.394	0.039
Q14 Vocabulary Quizzes of Module 1 are helpful to study Contextual exercises of Module 4	-0.134	0.665	0.264	0.123
Q32 All exercises of 4 different Modules are helpful to practice academic reading comprehension	0.385	0.624	-0.214	0.125
Q11 Vocabulary Quizzes of Module 1 are helpful to answer the summary	0.360	0.623	0.106	-0.028
Q2 The content of text and questions are appropriate	0.331	0.612	-0.067	0.095
Q12 Vocabulary Quizzes of Module 1 are helpful to study Grammatical exercises of Module 4	0.382	0.611	-0.044	-0.033
Q13 <i>Vocabulary Quizzes of Module 1 are helpful to study Graphical exercises of Module 3</i>	0.548	0.559	0.316	0.028
Q22 Graphic Exercises of Module 3 are difficult	-0.008	0.101	0.853	-0.072
Q23 Graphic Exercises of Module 3 are not easy to understand	-0.386	-0.035	0.803	0.123
Q27 Context Exercises of Module 4 are not easy to understand	0.218	-0.050	0.657	0.130
Q26 Context Exercises of Module 4 are difficult	0.087	0.314	0.562	-0.315
Q28 Vocabulary Quizzes and Grammar Exercises are adequate to answer multiple-choice questions	0.451	0.421	0.062	0.752
Q29 Vocabulary Quizzes and Grammar Exercises are adequate to answer the summary	0.189	0.163	0.198	0.643
Q24 <i>Contextual exercises of Module 4 are helpful to answer the multiple-choice questions</i>	0.413	0.208	-0.107	0.498
Rotation Sums of Squared Loadings:	7.52	4.65	2.82	2.07
Contribution rate (%)	24.25	15.00	9.12	6.68

Finally, there were two items included in Factor 4, which was labeled “Positive Perception of Vocabulary Quizzes and Grammar Exercises.” One item, Item 28: “Vocabulary Quizzes and Grammar Exercises are adequate to answer multiple-choice questions,” showed users’ preference for traditional language exercises for reading comprehension. The items of Factor 4 were related to positive perception of exercises of vocabularies and sentence structures of the text.

Differences between Foreign Students and Japanese Language Teachers

To compare the preferences of both foreign students and Japanese language teachers in use of e-Learning courseware, we conducted a t-test on data for the four factors (e-Contents Effectiveness, Relevance between Modules, Difficulty of New Modules and Positive Perception of Traditional Exercises). Means and standard deviations for the four factors are shown in Table 2.

There was no significant difference between foreign students and Japanese language teachers with regard to Factor 2 (Relevance between Modules) and Factor 3 (Difficulty of New Modules). On the other hand, in Factor 1, the mean for foreign students was significantly higher than that of Japanese language teachers, which indicates that foreign students more positively evaluated “e-Content Effectiveness” of e-Learning courseware than Japanese language teachers. Likewise, there was a significant difference between foreign students and Japanese language teachers for Factor 4, which indicates that foreign students prefer traditional language exercises more than Japanese language teachers do.

Table 2. Average Scores and Standard Deviation of the Four Factors

	Factor 1	Factor 2	Factor 3	Factor 4
Foreign Students (N=22)	3.22 (0.47)	3.08 (0.54)	2.82 (0.80)	2.86 (0.73)
Japanese Teachers (N=20)	2.77 (0.67)	2.81 (0.68)	2.68 (0.60)	2.10 (0.31)
<i>t</i>	2.91**	1.37	0.66	4.25**

Note: Factor 1: e-Contents Effectiveness, Factor 2: Relevance between Modules, Factor 3: Difficulty of New Modules, Factor 4: Positive Perception of Traditional Exercises ** $p < 0.01$

Discussion

This study aimed to investigate effectiveness of implementing four strategic modules (lexical, grammatical, information-transfer, contextual) in e-Learning, which have been regarded as important factors for language Learning Framework (Kato 2002, 2004). One second but important measure of success of e-Learning use in language classrooms is whether it is acceptable to those who use it. Our e-Learning evaluation survey attempted to precisely

investigate the different attitudes and preferences between foreign students and Japanese language teachers during their practical use of reading e-Learning systems. The purpose of this research was to propose general guidelines for Japanese language learning through the use of experimental and theoretical data so as to identify information relevant to effective use of e-Learning.

Concerning the first research question, “How do foreign students’ preferences differ from Japanese language teachers’ preferences?” results indicated that means for foreign students were higher than those of Japanese language teachers for all four factors (e-Contents Effectiveness, Relevance between Modules, Difficulty of New Modules and Positive Perception of Traditional Exercises). Especially, users' responses of Factor 1 (e-Contents Effectiveness) showed that foreign students more positively evaluated e-Learning courseware than Japanese language teachers expected.

With regard to the second research question, “What learning strategic modules do foreign students and Japanese language teachers believe are important in e-Learning courseware?” there was no significant difference between foreign students and Japanese language teachers with regard to Factor 2 (Relevance between Modules) and Factor 3 (Difficulty of New Modules). Concerning the preference for above mentioned two Factors 2 and 3, there was no significant difference between foreign students and Japanese language teachers.

On the other hand, the mean for foreign students was significantly higher than that of Japanese language teachers for both Factor 1 (e-Content Effectiveness) and Factor 4 (Positive Perception of Traditional Exercises). This indicated that foreign students had a greater preference for traditional language exercises, especially vocabulary and grammar exercises, than Japanese language teachers expected. These traditional exercises were implemented in Module 1 (Lexical) and Module 2 (Grammatical). We believe that Vocabulary Quizzes in Module 1 Grammar exercises in Module 2 are effective and has the potential to better prepare foreign students for the academic reading at universities and colleges.

Conclusion and Future Work

This research aimed to consider general practice guidelines that were research-based and were implemented in educational settings (Foshay et al., 2003). An important criterion of success for e-Learning in language classrooms is whether it is acceptable to those who use it.

It was found that evaluation of ordinary tasks differed between foreign students and Japanese language teachers. The results of the survey, shown above, indicated that foreign students show positive attitudes toward new tasks and explanation with graphics. They also approve of ordinary language tasks (vocabulary and grammar). On the contrary, Japanese language teachers indicated difficulty and inadequacy of textual information in new tasks. It is reasonable to suggest that reading support e-Learning should include more explanations and additional information about vocabulary and grammar than the prototype version. Additionally, Japanese language teachers showed negative attitudes toward ordinary language tasks. The teachers were particularly pleased with explicitness and validity of instruction during the post-survey

debriefing (Kato, 2005). For example, some teachers reported that multilingual dictionaries and multimedia tools were desirable in dealing with students of various language levels.

The limitations of a single study that used only one content area, one text, and a limited number of participants cannot be ignored. Additional developmental research for e-Learning is required to more fully understand the strengths and limitations of this survey. We started developing a new reading e-Learning system (<http://moodle.elp.tuat.ac.jp/moodle/login/index.php>), which includes more language tasks and multimedia resources (Kato & Akiyama, 2006; Kato, 2006). In order to design and develop language-learning systems efficiently, systematic and consistent evaluation from both learners and teachers is necessary.

In our future studies, we plan to incorporate both developmental and empirical approaches. Since our system framework is, at present, still in its preliminary form, we are continuing to investigate how to implement the functions that were presented in language Learning Framework (Kato 2002, 2004). In order to prepare appropriate materials, we need to investigate how graphical and textual information is activated by the learner's language proficiency and background knowledge. This requires consideration of individual differences in language proficiency and educational backgrounds. The answers lie in experimental research that identifies the delicate relationship between a learner's language proficiency and his or her use of preexisting knowledge for academic reading comprehension. In order to realize experimental conditions and collect data efficiently, cooperation between language teachers and technological specialists is necessary. It is thus appropriate to apply advances in natural language processing and information technology to the development of a language learning system.

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