

Error Coding and Error Analysis:for A Better Teaching Method

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University students in Japan often make errors when they write essays in English. These errors can be classified into some categories such as morphological, lexical, syntactic, and mechanical one. They also tend to either dismiss the teachers' correction or repeat their errors several times in the essays resubmitted. This is also true for our students at the "Global Literacy" class in the Theme College called "International Communication", at Waseda University. The purpose of this thesis is to examine the effectiveness of error coding for enhancing students' skill to compose essay writing in English.

In the first place, we examined the validity of the coding scheme in the preceding research. Next, we examined the influence of error coding and course syllabus on the transition of the number of errors, and readability level, based on the data corrected from the students in this theme college.

1. Introduction

According to Nakano et al. (2001), learner errors have been considered as indispensable for their learning. Under this premise, error analysis has been carried out in the field of ESL in order to identify the causes of learner errors and to obtain information on common difficulties in language learning. The error analysis on writing, especially on writing through a computer, is still a hot topic. Many researchers have improved systematic models to analyse the errors on computer.

Following these researches, Nakano et al. have researched the effects of error coding with an error-coding scheme, which consists of seventeen categories. From next chapter, we surveyed the results of that research and set a research question. Moreover, we examined the data in order to answer the research question.

2. Preceding Research: Nakano et al. (2001)

2.1. Subjects, Method and Coding Scheme

The subjects were 20 freshmen enrolled in College of International Communication, "Global Literacy" class at Waseda University. They were required to follow the task-based English Lessons in this College: To write and send an essay

by e-mail after reading an article or listening to a lecture in the class. Overall, there were e-mail exchanges between one student and the teacher or the teaching assistant three times per essay. After receiving the essay the student sent for the first time, the teacher or the teaching assistant just marked errors in the essay according to the seventeen error categories of our coding scheme below, without giving any correct answers and then sent it back to the student. Then the students corrected their errors based on the code and sent back the self-corrected version for the second time. The students and the teachers or teaching assistants reiterated the procedure twice. After the teacher or teaching assistant received the third-version of student's essay, he/she sent it back to the student with correct answers and some comments about the essay.

Our coding scheme with their marking and typical examples is listed in Table 1.

1) don't understand (?[])	Sentence or phrase that does not make sense.	eg) ?[don't dare to]
2) incoherent (?[])	Almost same mistake with 1)	?[English, they won't be able to learn high technology]
3) missing ()	Drop out the needed word	some factors of boom
4) not necessary ()	Put the word that is not needed	understand (with)
5) rearranged ([])	Manage to make sense, but need to arrange the phrases to understand easily	[what I ask for is that I want them to]
6) reworded (RW)	Need to change the word	this test is used as an entrance <u>test</u>
7) wrong agreement (AGR)	Mistake of agreement of number	the opportunities <u>was</u> a few
8) wrong comparative (WC)	Mistake of the form of noun that is used for comparative phrase	it is <u>more</u> happy
9) wrong determiner (DET)	Mistake of using determiner	<u>the</u> senses of values
10) wrong form (WF)	Mistake of the form of words	was <u>happen</u>
11) wrong number (NUM)	Mistake about the number	These <u>textbooks</u> companies
12) wrong part of speech (POS)	Sentence or phrase that is ungrammatical	<u>McDonald. Because they</u>
13) wrong punctuation (PUN)	Mistake of putting period or comma	But, no matter how
14) wrong sentence order (ORD)	Unnatural sentence order	<u>First of all,</u>
15) wrong spelling (SPE)	Mistake of spelling	<u>tecnology</u>
16) wrong tense (WT)	Mistake of tense	<u>had</u> happened
17) wrong word order (WO)	Mistake of word order	Will <u>be not</u> in

**The phrase "Part of Speech" is used with special meaning in this list, not as the original meaning as a technical term of grammar.*

Table 1. Seventeen Error Types with Typical Examples and Codes

2.2. Data

The data were taken from seven kinds of essays. The first five essays were written after lectures held by guest speakers, whereas, the rests were written based on the reading of articles with the help of the teacher or teaching assistants, and their essays were revised at home by themselves.

2.3. Results

Based on the seventeen coding scheme, the students made correct modifications in 850 out of 1,166 cases after the first-mail exchange, as in Table 2. This indicates that 73% of initial errors were corrected. However, it is reasonable to assume that one-time correction was not sufficient since 205 errors were further corrected after the second e-mail exchange. It should be noted that the number of errors after each e-mail exchange include newly made errors that the students made on the process of revising their errors.

Correction Time	The First	The Second	The Third
Number of Errors	1166	316	111

Table 2. The Total Number of Errors in Essay Writing in Global Literacy Class (2001)

When we examine the data from a viewpoint of the frequency in each type, the number of errors in each error type at three stages was also decreased overtime, as Figure 1.

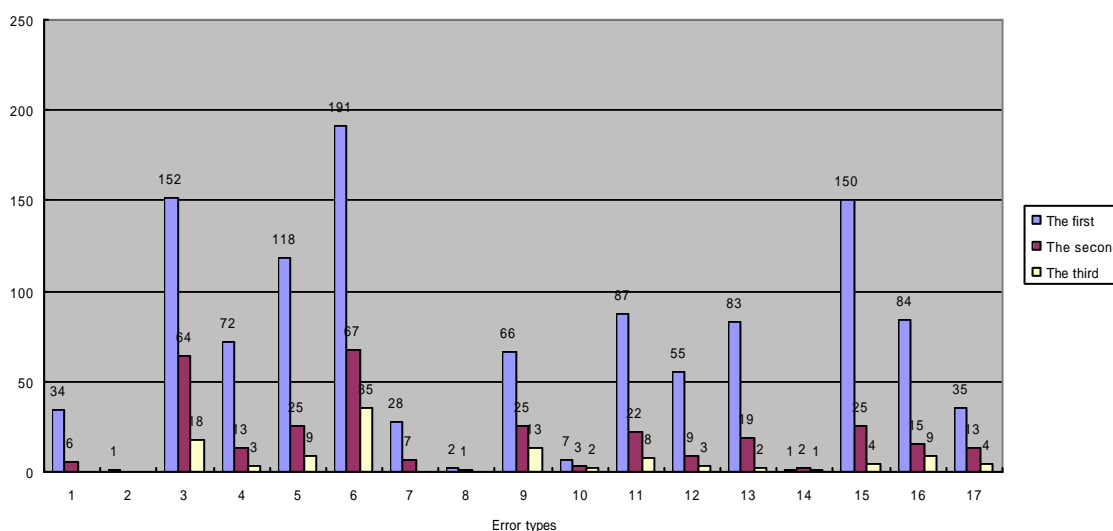


Figure 2. The Numbers of Errors per Error Types in Each Correction in Global Literacy (2001)

2.4. Conclusion of the Preceding Research

Judging from these results, we are able to conclude that the seventeen coding scheme was successful in decreasing the number of overall errors. This indicated that this method enhanced students' awareness of errors and lead to the correct modification in most of the cases. Moreover, in order to improve the reliability of our coding scheme, we should examine it with the points of view that Ferris (2002) proposed. We examined it in next section.

2.5. Validity of Error Coding: Ferris (2002) Theory

2.5.1. Direction to examine

Before going to the method of examining the data, we should examine the validity of the seventeen coding scheme which we used in the preceding research.

Let us begin to consider the importance of error coding and teacher's feedback for those errors in the field of ESL. According to Ferris(2002), well-constructed error feedback, especially when combined with judiciously delivered strategy training and grammar minilessons, is not only highly valued by students but may also be of great benefit to their development as writers and to their overall second language acquisition. As it noted, the point is that whether the error coding and its feedback is well constructed or not. In order to examine this, Ferris suggested some points.

- 1) Which errors should be corrected?
- 2) When should error feedback be provided?
- 3) How should teachers give error feedback?

First, we summarised the opinion of Ferris for each question, and next, we examined our way of error coding comparing with his opinion in each following section.

2.5.2. Which errors should be corrected?

Many advocates of error correction warn against attempting to mark *all* student errors because of the very real risk of exhausting teachers and overwhelming students. According to Ferris, there have been some suggestions about error coding and its feedback on teaching English writing. 1) It would be most effective when it focuses on *patterns of error* 2) teachers need to distinguish in their own minds and in their marking strategies *between errors and stylistic differences*. Since ESL writing teachers are usually either native speakers of English or highly proficient non-native

speakers, as readers they are likely to be sensitive not only to morphological, lexical, syntactic, and mechanical errors but also to wording that could be improved or wording or phrasing that is not exactly wrong but is not precisely the way a native speaker might say it, either.

Then, in endeavouring to mark papers judiciously and selectively, how do teachers go about selecting which errors to mark? To answer this question, Ferris set up several stages.

< Stage1 > Understand the types of errors that are most common to ESL writers.

In considering the list of students' error, it is important to recognise several issues. First, errors made by student represent different types of their linguistic knowledge. As you see in Table 1, the errors marked in this large corpus were spread across morphological, lexical, syntactic, and mechanical categories.

< Stage2 > Understand that different students may make distinct types of errors.

Ferris noticed that a danger with lists of "common" ESL errors, such as that in Table 1, may be overgeneralised to all students, and showed teachers three points to consider.

- 1) Students' English language learning background
- 2) The influence of specific L1s
- 3) Difference in L2 proficiency

< Stage3 > Understand the need to prioritise error feedback for individual students.

Once teachers know, in general, what types of errors their students might make, they will need to make some decisions about which errors to mark. Teachers can consider several criteria in making decision.

Following these three stages, we considered the validity of our seventeen coding scheme with the data of students in global literacy 2002 class. First, following stage 1, we examined the categories of our coding scheme. Figure 2 shows the numbers of error in essays composed by the students in global literacy 2002 class. As you see this figure, there are some errors that are not categorised in any types of our seventeen coding scheme. Table 3 shows the result of classifying those errors into some types. Judging from these results, we were obliged to revise our coding scheme, adding some categories: Preposition (mistake of use of preposition, marked with **PREP**), Pronoun (mistake of use of pronoun, marked with **PRON**), and Possessive (mistake of use of possessive, marked with **POSS**). Therefore, our coding scheme has to have 20 types of error in total.

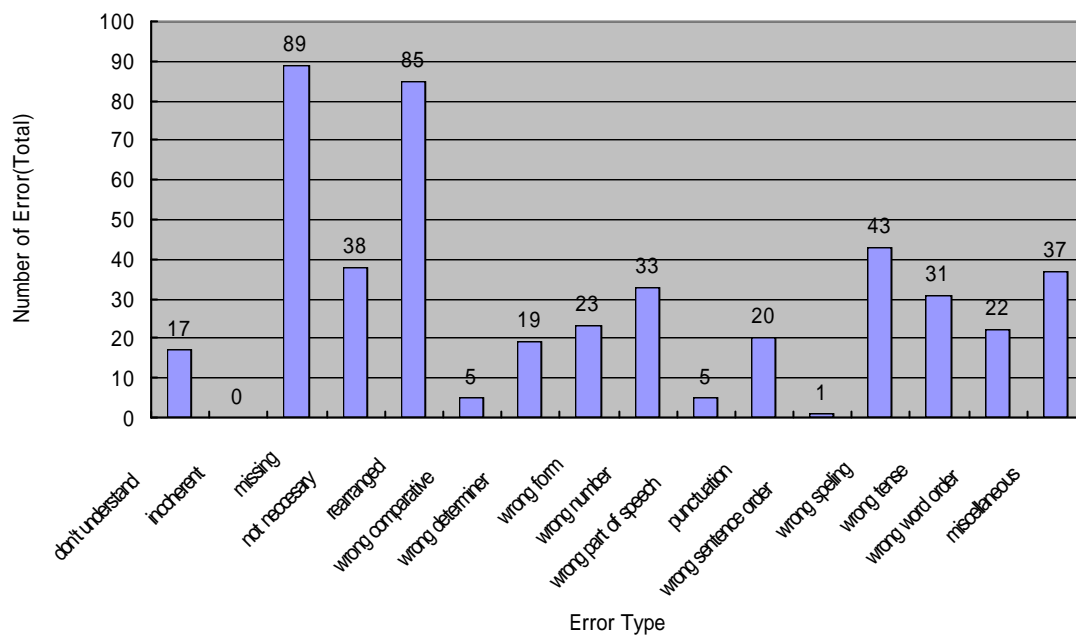


Figure 2. The Numbers of Errors per Error Types in Total In Global Literacy (2002)

Type of Error	Preposition (PREP)	Pronoun (PRON)	Possessive (POSS)
Number (Total=37)	18	10	9

Table 3. Classification of Miscellaneous Errors in Error Correction from Global Literacy (2002)

Next, following stage 2, we examined the each type of our coding scheme in order to reject the danger of overgeneralization. We asked students their English learning background with questionnaires and examined correlation with their making errors. In these experiments, some types of Errors were excluded. “Wrong Spelling (SPE)” and “Wrong Punctuation (PUN)” were excluded because they were judged as problems of using keyboard. “Missing()”, “Not Necessary()”, and “Rearranged()” were also excluded from these experiments since the types of these coding cover many types of errors.

The scores of correlation coefficient were shown below, at Table4. Judging from the results, we are able to say that Ferris’ statement is true as for the correlation between the number of errors and students’ self-impression of weakness for grammar. However, we cannot judge from the result of this experiment whether there is a correlation between teachers’ advices they ever got and the number of errors they made.

Opponent of Correlation	df	r-value	p

Teachers' Advice for Weakness	15	0.473499	0.007692
Students' Feeling for Their Weakness	16	0.667671*	0.003558

**=p < .01 *=p < .05

Table 4. Correlation between Number of Errors and Students' Grammar Knowledge Background

2.5.3. When & How Error Feedback Be Provided?

In the previous section, we considered the types of error that we should correct from students' essays and as a result, we revised our coding scheme, and then totally became twenty types that reflect students' weakness of grammar knowledge of English. As a next step, Ferris showed when and how Error Feedback would be provided for students based on the suggestion for error coding. In this section, we considered these points, comparing our way with Ferris' proposition.

First, Ferris noted that many L1 and L2 composition theorists strongly believe that premature attention to error may short-circuit students' ability to think, compose and revise their content. However, she also mentioned the opposite argument that L2 student writers are both willing and be able to benefit from simultaneous feedback on content and form on the same draft (e.g., Ashwell 2000; Fathman and Whalley 1990; Ferris 1995b, 1997). The basic thought of their argument is that by refusing to provide such feedback until very last draft, teachers can severely limit their opportunity for needed input. This is the most important point for teachers to consider when they provide error feedback to their students. Following the argument about the timing of error correction, Ferris mentioned the way of feedback, considering it important to take a balance of opportunity of students' self-consideration, revision and opportunity of input.

To examine the way of feedback, Ferris showed five options to consider, however, we can summarise them into three big options.

- 1) Direct versus Indirect Feedback
- 2) Error Location versus Error Identification with Codes, Symbols, and Comments
- 3) Larger versus Smaller Categories of Errors

As for the categories, we have mentioned in the previous section, therefore, we considered first two options here.

Let us start to consider the first option. As often said by previous researchers, indirect feedback is more superior to direct feedback in teaching writing. Indirect feedback, it is claimed, forces students to be more reflective and analytical about their errors than if they simply transcribed teacher corrections (direct feedback) into the next draft of their papers. Since students required by indirect

feedback to take more responsibility for their errors, they are likely to learn more from the process; to acquire the troublesome structures; and to make long-term progress in finding, correcting, and eventually avoiding errors. On the other hand, it is argued that direct feedback has two advantages. First, though it is unclear whether direct correction has a long-term effect on students' accuracy, producing well-formed correction at least gives students input for acquisition, and more importantly, it makes them aware from the early stages of the need to edit and correct their work. In addition, from teachers' point of view, direct correction may be appropriate if the teacher desires to give feedback about an error but wishes the student to primarily focus his or her attention on some other pattern of error. However, it has a danger that the teacher, in providing the correction rather than guiding the writer to do his or her own editing, will misinterpret the students' original intent about what he or she wanted to say.

Another decision teachers need to make in marking students papers is whether to simply locate the presence of an error (by circling it, highlighting it, or putting a checkmark in the margin) or to identify the types of errors that have been made, using symbols, codes, or comments(see Table 1).

Based on these options, we considered the way of ours. The main purpose of our error correction was not only to make students being aware of their errors but also to make students have ability to self-repair their errors by themselves and produce the correct sentences. In order to achieve this purpose, we put the priority on the way that forces students to repair their errors by themselves rather than input the grammar knowledge to them from teachers. Therefore, we gave students feedback for their errors after each draft was accomplished. Moreover, as for the way of feedback, we adopted indirect feedback with coding scheme for the first two drafts with some verbal comments(explanations) for some of their errors. Then, for the final draft, we gave the direct feedback with comments, giving consideration the results of students' self-repair. In sum, we adopted both (direct and indirect) ways with bringing their advantages into full play.

2.5.4. Conclusion of validity

In previous sections, we examined the validity of our coding scheme from not only the results of experiment but also theoretical point of view, following Ferris' theory, and we got the conclusion as follows:

- 1) We set up the coding scheme with twenty error types, which represent students' grammar knowledge.

- 2) We corrected students' errors after each draft was completed. This is appropriate to enhance students' ability to self-repair and compose English sentences. The need of input was treated by means of error feedback.
- 3) We combined the several ways of feedback that were appropriate for each draft, especially, on the very last draft, we considered the importance of input and adopt it.

In conclusion, we are able to decide that our way of error coding was pertinent with satisfying the needs Ferris mentioned. Therefore, it was actually proven the usefulness of our coding scheme not only experimentally but also theoretically. We proceeded our research using this error-coding scheme.

3.0 Method

3.1. Research Question

We surveyed the preceding research so far in the last chapter. Based on the conclusion of that research, we can set up the follow-up studies as research question: Can we really say that error coding with seventeen coding schemes is useful not only for raising the students' awareness of errors but also to improve their ability to compose sentences in essay writing in English?

3.2. Subjects

The subjects were the 20 freshmen enrolled in "Global Literacy 2001" class and 19 students from various grades enrolled in "Global Literacy 2002" class. Students in both classes were required to follow the task-based English Lessons in these classes.

3.3. Method

We corrected the data from both classes with the same method as the preceding research. The differences between the two groups were as follows.

- 1) the constituents of the group; all of them were freshmen in the class 2001, whereas, the various grades of students in the class 2002.
- 2) the number of times of their composing essays; as for the students in the class 2001, they were to write an essay three times per one topic in the first semester, that is, at least one essay per week. Whereas, the students in the class 2002 were due to write an essay three times only about one topic within the same term. The topic was about the articles from newspapers or magazines in the Golden Week, national Bank Holidays in Japan. The students in class 2002, however, wrote the

brief summary about the articles for class every week, but they were not submitted to the teacher or teaching assistant.

- 3) the course syllabus; these classes consisted of various kinds of activities. Group discussion, class discussion with foreigners, presentation, e-mail exchanges and text chat with foreign students via computer, etc. there were two big differences between course syllabuses of two classes. In the class 2001, the discussion was only with classmates, whereas, with the foreign students especially at Korea University in the class 2002. Students in the class 2002 had much more opportunities to communicate rather than the students in the class 2001 with foreign students, especially students in Korea University. These communication were held via Internet: e-mail exchanges, text chat, and Cu-SeeMe(chatting with being able to see partner's face).

4. Results, Data Analysis and Discussion

4.1. Readability Level

In order to examine the effects of error coding, we examined the data from a viewpoint of readability level of students' essays in this section: Mean Length of Utterance(MLU)*, Flesch Kincaid Grade Level(FKL)**. According to Hosomura (2001), readability level typically counts syllabus in words, and words in sentences. Microsoft Word 2000 includes readability statistics as a part of its spell-checking capability. The readability scores will appear after the spell checking. We can see three categories: 1) counts of words, characters, paragraphs and sentences 2) averages of sentences per paragraph, words per sentence, and character per word and 3) readability: passive sentences, Flesch Reading Ease and Flesch Kincaid Grade Level.

*MLU: According to the Concise Oxford of Linguistics, MLU means measure proposed, in studies of children's language, of the average number of grammatical units in what are deemed to be separate "utterances". Taken to be an index of child's linguistics development. The formula of the calculation is total words of utterance/ the number of the utterances.

**FKL: According to the Readability Guidelines of Extension Publications, it rates text on a U.S. grade school level. For example, a score of 8.0 means that an eighth grader can understand the document. For most standard documents, aim for a score of approximately 7.0 to 8.0.

The formula for the FKL is: $(.39 \times ASL) + (11.8 \times ASW) - 15.59$

This score represents the level of complexity of sentences students composed: The higher this score is, the more complex that sentences are. If students write more complex sentence, we are able to judge their ability of composing English sentences would be improved.

ASL: average sentence length (the number of words /(divided by) the number of sentences)

ASW: average number of syllables per word (the number of syllables /the number of words)

By concerning the transitions of these scores, we examined whether error coding would be also useful for improving the students' ability to compose sentences in English writing.

Figure 3 illustrates the transitions of scores of these readability level, and Table 3 shows the result of statistical Ttest of each score of readability level, data were taken from the "Global Literacy 2001" class.

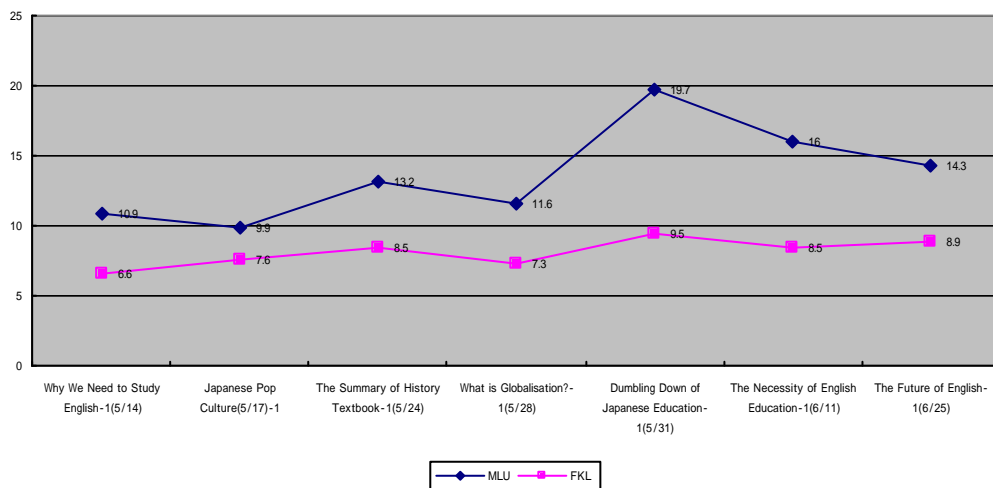


Figure 3. The Transitions of Scores of Readability Level in Global Literacy (2001)

	t-value	Degree of Freedom
MLU	1.51562	9
FKL	2.94162**	9

**=p < .01 * =p < .05

Table 5. Result of t-Test of Improvement of Score of Readability Level in Global Literacy (2001)

We are able to say that there are improvements in the score of FKL. However, as for the score of MLU, there is no significant difference between the score at the beginning and the one at the end of the period. Judging from these results, we may be able to conclude in this section that error coding with our coding scheme is also

quite useful to improve students' ability to compose sentences in English writing. However, there is a room for further investigation about the score of MLU.

4.2. The Influence of the Number of Times to Compose Essays

We have examined the data of "Global Literacy 2001" class in order to prove the effects of error coding so far. In this section, we concerned whether there is an influence of the number of times of composing essays for students' improvement of their writing skill, comparing the data of both classes. Table 6, Figure 4-1 and 4-2 show the improvement of scores of the readability level of their essays. Table 7 shows the results of statistical t-test of scores to know whether these scores are truly different.

	MLU		FKL	
	2001	2002	2001	2002
Beginning of the Course (May)	10.9	9.5	6.6	5.5
End of the Course (July)	14.3	14.8	8.9	7.4
Improvement of Scores	3.4	5.3	2.3	1.9

Table 6. The Average Transitions of the Scores of Readability Level in Students' Essays

	t-Value of MLU	t-Value of FKL	Degree of Freedom
2001	1.51562	2.94162*	9
2002	3.12151**	2.43319*	12

**= $p < .01$ *= $p < .05$

Table 7. The Result of t-Test for Average Score of MLU and FKL

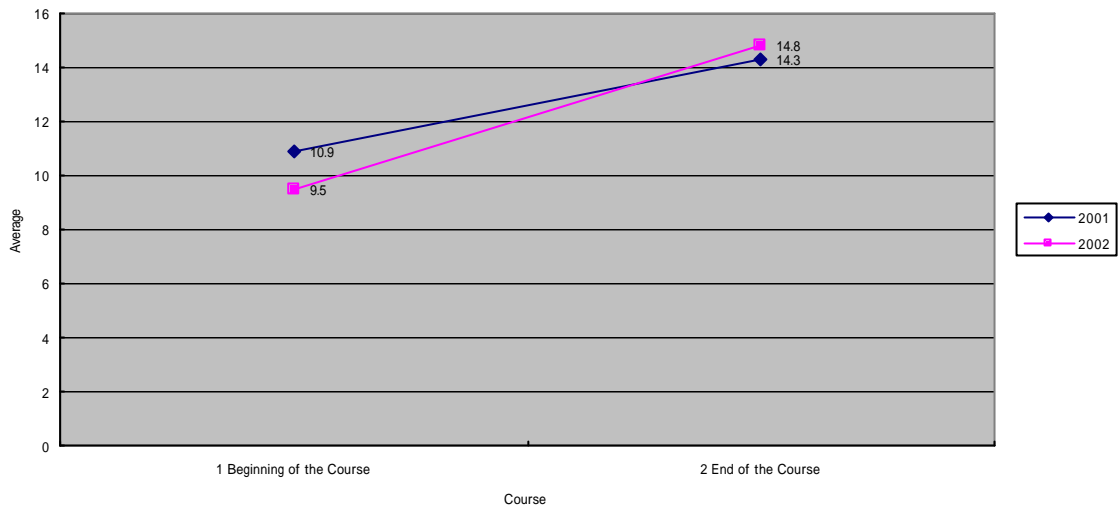


Figure 4-1. The Transitions of the Score of MLU

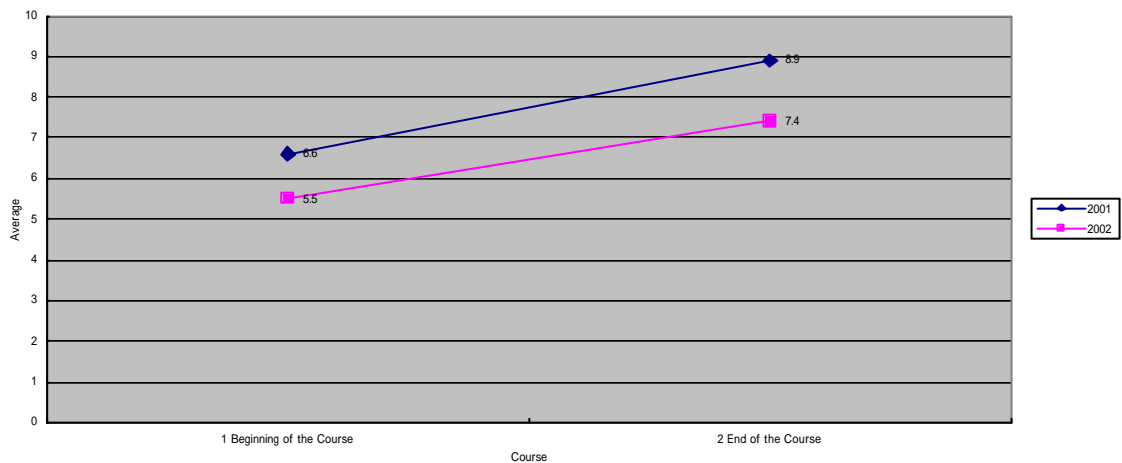


Figure 4-2. The Transitions of the Score of FKL

We considered the results of the experiment. As Table 6 shows, both scores of MLU and FKL in each year seem to have risen, and, as Table 7 shows, as for the scores of FKL, there were statistically differences between the scores in 2001 and 2002. It indicates that Error coding has effectiveness to enhance FKL scores of students' essays. Moreover, as you see in Table6, the score of improvement in 2001 was bigger than in 2002. It means that the more students have opportunities to compose essays, the more their FKL scores rise.

On the other hand, as for the scores of MLU, there was no statistically difference between the scores in 2001. From this result, we cannot conclude error coding have a effect for enhancing students' scores of MLU.

Then, we assumed another theory to prove the effectiveness of error coding for enhancing students' skill of composing English sentences. In this assumption, we dealt the total numbers of words in each essay. If its average score in 2001 are bigger than in 2002 with statistically differences, we will be able to say the same conclusion as the one we concluded for FKL scores. Here is the result of this experiment.

	Beginning of the Course (May)	End of the Course (July)	Improvement of the Score
2001	198.25	180	-18.25
2002	235.8	273	37.2

Table 8. Improvement of Total Numbers of Words of Each Essay

	t-Value	Degree of Freedom
2001	0.241148	8
2002	1.2133	5

**=p < .01 *=p < .05

Table 9. The Result of t-Test for Total Numbers of Words in Each Essay

As you see these tables, the result of this experiment was against our assumption. One considerable reason of this result is that the small amount of samples. This point should be examined again in the further research.

As a summary of these experiments, the number of times to compose essays does not affect for the length neither of sentence nor of passage, but affects the level of sentences. This summary indicates the conclusion on this point that the more students compose essays, the more its quality enhance, not its quantity.

5. Conclusion

So far, we tried to survey the previous research, Nakano et al. (2001), and to examine the data of our research in order to discover the effectiveness of error coding for enhancing students' ability of writing of English. The results are as follows:

- 1) Error coding with twenty revised coding scheme (that means indirect feedback), reiterating several times under the same topic, has effectiveness for enhancing students' awareness of errors and lead to the correct modification.
- 2) It is also proven by theoretically and experimentally that error coding has effectiveness for enhancing students' ability of composing English sentences.

3) The number of times to compose English essays affects to enhance the readability level(the complexity of sentences) of its quality; the more often students try to compose essays, the more their essays' readability level improve.

Through the research, it came to the front that we should keep researching on several matters as further researches. First, we should collect much more samples in order to improve the reliability of experiments. Then, we should examine more the influence of error coding for improving students' English writing from the viewpoints of quantity. Moreover, we also should examine more the influence of the difference of the level of difficulty (vocabulary, sentence construction, and topic, etc) of materials, which students would be to read in classes, for the readability level of their essays.

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