A Study of the Relationship between Multiple Intelligences & Grammatical Errors

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Abstract

The purposes of the study were : 1) to make surveys on grammatical errors and multiple intelligences of Chinese EFL learners; 2) to explore the possible relationship between grammatical errors and multiple intelligences; 3) to make a comparison between two groups of the learners about the number of errors after receiving two different kinds of instruction – the control group following undifferentiated instruction ignoring the subjects' conditions of multiple intelligences, and the experiment group receiving instruction catering to each subject's composition of multiple intelligences. The subjects were 74 first year students of English major at Guangzhou Automobile College, China, all enrolled in 2009, belonging to two classes, which was randomly designated as one control group and one experimental group. The method used in the study was quantitative. The study was conducted through data collection by administering of questionnaire, writing task, and error correction test to all the subjects. Then it was followed with data analysis by examination of frequency distributions of multiple intelligences and grammatical errors, bivariate correlation between the multiple intelligences and grammatical errors, and independent-samples t test on the two groups of subjects. The study found that among the Chinese EFL learners: 1) the most frequently made grammatical errors was the incorrect usage of lexical verbs; 2) the obvious intelligence displayed in strength was intrapersonal intelligence; 3) the most obvious correlation was a negative one found between visual intelligence and article errors; 4) the experimental group obtaining multiple intelligences based instruction performed better in error correction than the control group which followed undifferentiated instruction.

Keywords: Chinese EFL learners; grammatical errors; multiple intelligences

Introduction

Many studies on error analysis and treatment have been conducted since 1960s. However, it still deserves further investigation in light of various situations and perspectives such as a study from the perspective of the learners' multiple intelligences. It is out of question that a large number of sources have been confirmed to be attributive to EFL learners' errors according to the past research. For example, Richards (1971) cites four

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major causes of errors: (1) overgeneralization, (2) ignorance of rule restrictions, (3) incomplete application of rules, and (4) false concepts hypothesized. Later in his 1974 paper, he identifies six sources of errors, namely, (1) interference, (2) overgeneralization, (3) performance errors, (4) markers of transitional competence, (5) strategies of communication and assimilation and (6) teacher-induced errors. According to Brown (2000), there are four sources of errors: A. Interlingual transfer; B. Intralingual transfer; C. Context of learning; D. Communication strategies. However, few of studies investigated the function of multiple intelligences in error making until now. Intuitively, we have a faith that smarter people make fewer errors. Extended from this common sense, the researcher tried to investigate their relationship when the smartness was broken down in multiple intelligences, and errors were specified as grammatical errors. Recently, there is an uptrend in the application of multiple intelligences theory into the study of foreign language learning and teaching. For example, Mahdavy (2008) finds among the multiple intelligences, only linguistic intelligence contributes to listening proficiency. Moreover, Loredana and Aneliz (2011) use interactive multiple intelligences tasks to support the EFL learners, ending with good pedagogical results.

Put forward by Gardner (1983), that human intelligence is not some static reality fixed at birth and measured well by standardized testing. Instead, it is a dynamic, ever-growing reality in one's life through several different intelligences. The multiple intelligences (MI) theory is an important contribution to cognitive science and constitutes a learner-centered philosophy that is "an increasingly popular approach to characterizing the ways in which learners are unique and to developing instruction to respond to this uniqueness (Richards & Rodgers, 2001: 123)."

Specifically, in line with Gardner (1999), the definitions of the nine separate intelligences are as follows:

(1) Verbal (Linguistic) Intelligence: Sensitivity to the meaning of words, grammar rules and the function of language to persuade, remember, convey information and reflect upon language.

(2) Logical-Mathematical Intelligence: Ability to see relationships between objects and solve problems, as in calculus and engineering.

(3) Visual (Spatial) Intelligence: Ability to perceive and mimic objects in different forms or contexts, as in miming or impressionist painting.

(4) Musical Intelligence: Ability to hear tones, rhythms and musical patterns, pitch and timbre.

(5) Bodily-Kinesthetic Intelligence: Using the body, perceptual and motor systems in the brain to solve a problem, a well‐honed sense of timing, an ability to anticipate what is coming next, an overall smoothness of performance.

(6) Interpersonal Intelligence: Sensitivity to the actions, moods and feelings of others, the ability to establish person to person relationships and to read the intentions and desires of others.

(7) Intrapersonal Intelligence: Ability to understand and define inner feelings, as in poetry and therapy, and the ability to reflect upon one's own thoughts, feelings and sense of self.

(8) Naturalist Intelligence: Be attached strongly to the outside world or to animals, enjoy outdoor activities, and notice patterns and things from nature easily.

(9) Existential Intelligence: Enjoy thinking and questioning, curious about life, and exhibit the proclivity to pose and ponder questions about life, death and ultimate realities.

Given such rich connotations contained in the multiple intelligences, it is natural for the researcher to pose and ponder the corollary that there might be pertinence between multiple intelligences and grammatical errors. Subjectively, this association is not a miracle in that we human beings are born with curiosity and impulsion to explore the unknown world. The eminent physicist Zeilinger (2011:82) says, "We would not have our civilization if people weren't curious about things. To me this is the most important driving force in science." The present research started as a result of curiosity over why many EFL learners, in particular, Chinese EFL learners, following the normal curriculum have little improvement in language accuracy in writing, as well as an impulsion to solve the problem. Objectively, intelligence and education existed for a long time in the form of two faces of a coin. Educational achievement has always been evaluated in terms of personal intelligence. Especially when Alfred Binet developed a kind to intelligence test called IQ (intelligence quotient) test to predict academic performance in the early twentieth century, this evaluation became systematic and scientific. The new developed multiple intelligences theory and its applications in education including error analysis and error treatment followed the previous tradition.

Specifically, there are three ways of describing errors as shown in figure 1. The linguistic way put forward by Chamot (1978) is suitable for this study though it is considered to be difficult to provide a satisfactory description of learners' L2 development by quantifying the types of errors they make (Ellis, 1994). An alternative to linguistic description of errors is to use a surface strategy taxonomy in light of Dulay, Burt and Karshen (1982) by means of such operations as omissions, additions, misinformation and misorderings. According to Murrow (2005), the operations in the surface strategy taxonomy was renamed as missing, superfluous, incorrect and misplaced, and put to use in the present study. The renaming make the operations sound more objective in the perspective of the reader. The third way of describing proposed by Corder (1974), who distinguishes three types of errors according to their systematicity, concerns more on how learners learn an L2. The systematicity way did not enter the study as it involves identification of the EFL learners' awareness of the existence of a particular rule, which is opaque and tricky to the researcher except the learners themselves. As a result, this study adopted the linguistic way combined with surface strategy taxonomy to describe errors made by the EFL learners, because these two ways are more direct and easier to use in coding grammatical errors.
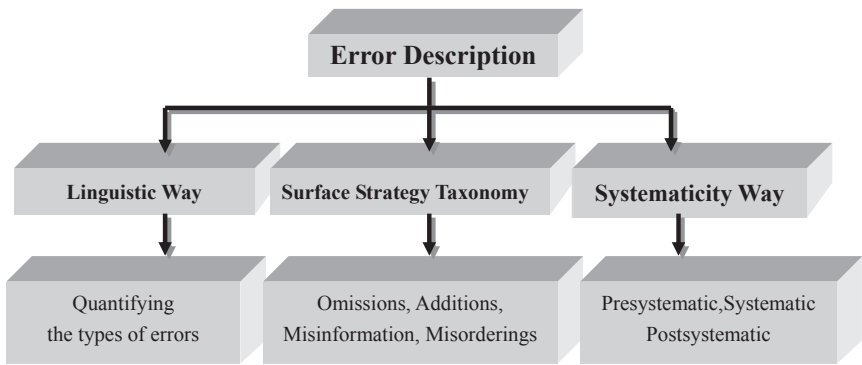

Figure 1 Error Description

In short, the paper tried to answer four questions: (1) What kinds of errors do the EFL learners frequently make? (2) What are the characteristics of multiple intelligences of the EFL learners? (3) Is there any relationship between the EFL learners' multiple intelligences and the types of errors they make? (4) Is there any

difference in error-correction between the two groups of EFL learners after they have received two different kinds of instruction?

Methodology

The present research adopted a quantitative approach. Specifically, research questions one and two involve descriptive operations such as frequency and percentage. Research question three is engaged with correlation operations. There are many kinds of correlation, but this study will use Pearson correlation, because Pearson method should be used only when each variable is quantitative in nature (Gupta, 1999). In question three, two sets of variables, multiple intelligences and grammatical errors, were transformed into numbers before they were put into Pearson correlation analysis. But not all correlations of the two variables will be taken into account. According to Cohen et al. (2002), correlation may refer to any statistically significant relationship between two random variables or two sets of data. Only those that are statically significant, specifically, the sig. value of the correlation is smaller than 0.05 will be discussed. Research question four entails a pre-test and post - test process which is a quasi-experimental design applied to the nonequivalent groups (two intact classes but the subjects being non-randomized in this case) in essence. The pre-test is a process that measures the difference of the two groups before intervention, whereas the post-test is the process that identifies the distinction of the two groups after the intervention. The dependent variable, which is the grammatical error of the EFL learners, was measured both before and after the treatment or intervention, which is independent variable, as depicted below:

$$NR—O—X\ 1—O$$
$$NR—O—X\ 2—O$$

NR stands for non-randomization.

O   stands for observation.

X_1 and X_2 stand for different interventions.

The simplest method to compare the mean score of the two groups is independent-samples t test. Specifically, only when the sig. value of Levene's test for equal variances assumed in the output of independent–samples t test is less than 0.05, the two groups are considered to be significant different (Gupta, 1999).

Subjects

Constrained by the educational setting and with no intention to universalize the present discoveries, the researcher adopted the non-probable or purposive sampling, intended to provide reference to and pin hope for future study. The subjects included in the present study came from Guangzhou Automobile College of China. Seventy-four first-year English majors were chosen to participate in the study. They were belonging to 2 classes. In order to keep students' gender and English level balanced, the student administration divided them into two classes roughly even but not exactly equal. By drawing lots, class 1 bearing 38 students was designated as experimental group, and class 2 having 36 students was specified as control group. They were all enrolled in 2009, and the researcher was their incumbent English teacher.

Instruments

There were three instruments - writing task, questionnaire, and error correction test. The data collected through three instruments were finally coded into numbers for statistical analysis. For example, the writing task was designed to collect numbers of errors. Though nominal measures were used in marking errors, the quantity of the errors was expressed in a number. Similarly, the questionnaire measured intelligences in numbers, and the error correction test measured errors corrected in numbers. So in essence all the three instruments used a ratio scale of measurement represented by continuous numbers.

The first instrument, the writing task, employed in the study is a controlled composition, which has following requirements:

1) Topic: Learn by Yourself or with a Teacher?

2) Tips: Some people think that they can learn better by themselves than with a teacher. Others think that it is always better to have a teacher. Which do you prefer? Use specific reasons to develop your essay.

3) Length: Around 120 words.

4) Time: 60 minutes.

In accordance with the actual situation of the EFL learners' writing, each error found in the subjects' writing was dually identified as linguistic errors and surface errors simultaneously. The linguistic errors are broken down into 10 types, i.e. errors of auxiliary verb, lexical verb, noun, adjective, adverb, conjunction, article, pronouns preposition, and punctuation symbol (According to Crystal (2003), a lexical verb is a

member of an open class of verbs that includes all verbs except auxiliary verbs. Lexical verbs typically express action, state, or other predicate meaning. In contrast, auxiliary verbs express grammatical meaning). The surface errors are categorized into 4 classes: missing errors, superfluous errors, incorrect errors, and misplaced errors. The error was marked on the examination paper with the acronyms of denomination of both the linguistic error (i.e. the error identified in linguistic way) and the surface error (i.e. the error matched to surface strategy taxonomy) as shown in the appendix where the subjects' writing samples are attached. Table 1 below shows acronyms for the errors.

Table 1: Acronyms for Errors

Linguistic Category	Surface Strategy Taxonomy			
	Missing	Superfluous	Incorrect	Misplaced
Auxiliary Verbs	AVMS	AVS	AVI	AVMP
Lexical Verbs	LVMS	LVS	LVI	LVMP
Nouns	NMS	NS	NI	NMSP
Adjectives	AdjMS	AdjS	AdjI	AdjMSP
Adverbs	AdvM	AdvS	AdvI	AdvMSP
Conjunctions	ConjMS	ConjS	ConjI	ConjMSP
Articles	ArtMS	ArtS	ArtI	ArtMSP
Pronouns	PronMS	PronS	PronI	PronMSP
Prepositions	PrepMS	PrepS	PrepI	PrepMSP
Punctuation Symbols	PSMS	PSS	PSI	PSMSP

The second instrument is a survey questionnaire. The questionnaire introduced into the study is in English, developed from McKenzie (1999). In order to reduce ambiguity, the English versioned questionnaire was translated into a Chinese one by the researcher and double-checked by the peer researchers – Mr. Wang, a Ph.D student of English of SUT - before it was administrated to the Chinese students. The questionnaire and its Chinese version are attached in the appendix.

The questionnaire consists of 9 sections, each of which contains 10 pieces of short statements. Each section corresponds to a particular intelligence. The subjects

were required to complete each section by placing a "1" next to each statement they felt accurately described them, and leaving the statement they did not identify with blank. Then they were asked to total the column in each section. Finally the total of each section was multiplied by 10 to facilitate statistical operation. So each surveyed subject ended up with a table as follows that characterizes his/her various intelligences. The higher the score is, the stronger the intelligence is.

Table 2: Table of Multiple Intelligences

Section	Intelligences	Total Score	Total Score×10
1	Naturalist		
2	Musical		
3	Logical		
4	Existential		
5	Interpersonal		
6	Kinesthetic		
7	Verbal		
8	Intrapersonal		
9	Visual		

The third instrument is an error correction test. The error correction test comprised 50 sentences, all of which were extracted and adapted from the EFL learners' writing, and each of which contained at least one error which had been instructed differently in both control group and experimental group prior to the test. The score of error correction was decided by the number of the errors corrected. The learners would gain 0.5 score by successfully correcting one error. The samples of error correction test are also attached in the appendix for reference.

Procedures

Generally speaking, to draw out errors, the writing task, employed in the study for both the control group and the experimental group, was a controlled composition. After the writing task, the subjects were expected to answer the closed-ended questionnaire to procure numeric data on the distribution of the EFL learners'

multiple intelligences. Finally, all the subjects of the experimental and control group attended the error correction test in the wake of different instruction.

It is worth mentioning that the writing task as an instrument to elicit errors for investigation was embedded in a mid-term examination among other examination items. The mid-term exam consists of three parts: reading comprehension, vocabulary knowledge, and writing task. The total exam time is 180 minutes, within which 60 minutes was specified for the writing of a given topic with required word number. The intention of the single blinded maneuvering was to prevent the subjects from knowing of the experiment, and prevent them from putting extra efforts on the task consciously, and thus keep the data unbiased. Again, provided enough time to write with the congruous topic and limited with the definite word number, the subjects were led to production of authentic and valid data. For the same reason, the error correction test is not an individual test but a component of another examination.

Referring to Puchta and Rinvolucri (2005), the researcher designed two kinds of instruction - undifferentiated instruction and MI based instruction – for the control group and the experiment group respectively. Specifically, in class two, all the grammatical errors found in the compositions were listed, analyzed and explained one by one, coupled with related grammatical knowledge introduction and followed by an excise that the student who made a particular error is required to correct it by him/herself and than cite an example containing the grammatical knowledge he/she has just learned in written form. In class one, all the instruction process is the same as in class two except the demand that an error made by a particular student was required to be corrected and exemplified by him/her in a way that suitable to his/her strength in some aspect of the multiple intelligences. For example, if a student who shows the strength in musical intelligence, he/she would be demanded to create orally, either on his/her own or mimicking a model prepared by the researcher, a rhythmic or rhymed verse containing the grammar knowledge that he/she was taught to reinforce the new acquired knowledge. Such personalized instruction for each student of the experiment group carried out only once. On average each student was allocated 2 minutes to be instructed plus 3 minutes to rehearse. The experiment group consisted of 36 students, thus altogether 180 minutes or about four classes were spent.

Apart from the researcher himself, the research team was composed of another

two English teachers –Vernon and Jenny, who are native speakers of English coming from Britain and teaching at the same college with the researcher. Each member of the team played an important role over the study. Before the marking of the EFL learners' writing, the team has reached the agreement on the ways of error classification. During the error marking process, the researcher did the first round, and then Vernon and Jenny double‐checked the marking results, and discussed together whenever any divergence occurs. The same process was applied to the error correction test. The following figure illustrated the research process.
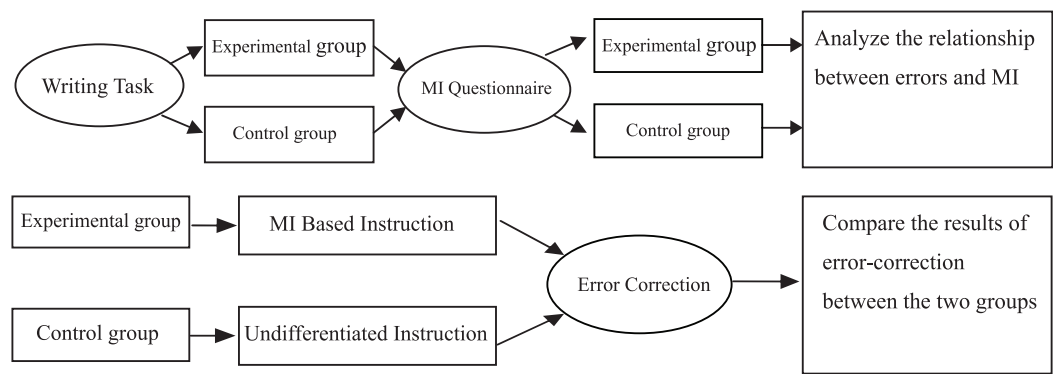

Figure 2 Research Process

In figure 2, circles represent instruments, short rectangles stand for groups, middle rectangles represent intervention, and the biggest rectangles stand for analysis and comparison. The whole process is composed two sub‐processes. The first sub‐process starts from giving writing task to the two groups and ends in analysis of relationship. The second sub‐process begins from two groups receiving different instructions and stops at comparison of results.

Results

Corresponding to the research questions, the study yielded the following findings which are described under each sub-title as follows.

Findings for Question One

The most frequently made grammatical errors were lexical verb errors in the linguistic classification, and the incorrect usage errors in surface strategy taxonomy. The least frequently made errors were adverb errors in the linguistic classification, and the misplaced usage errors in surface strategy taxonomy. The findings related to research question one were shown in Table 3 and Table 4 below.

Table 3: Frequency and Percentage of Linguistic Errors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1=Auxiliary Verb Errors	86	9.1	9.1	9.1
	2=Lexical Verb Errors	188	19.9	19.9	29.1
	3=Noun Errors	154	16.3	16.3	45.4
	4=Adjective Errors	57	6.0	6.0	51.4
	5=Adverb Errors	39	4.1	4.1	55.6
	6=Conjunction Errors	54	5.7	5.7	61.3
	7=Article Errors	74	7.8	7.8	69.1
	8=Pronoun Errors	90	9.5	9.5	78.7
	9=Preposition Errors	95	10.1	10.1	88.8
	10=Punctuation Symbol Errors	106	11.2	11.2	100.0
	Total	**943**	**100.0**	**100.0**	

Table 3 summarized the statistical results of frequency and percentage of linguistic errors made by the EFL learners in their writing. Those linguistic errors totaling 943 were classified into ten categories, each frequency and percentage of which was listed ranging from the adverb error number of 39 or 4.1% to the lexical verb error number 188 or 19.9%.

Table 4: Frequency and Percentage of Surface Errors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1=Missing	233	24.7	24.7	24.7
	2=Superfluous	147	15.6	15.6	40.3
	3=Incorrect	539	57.2	57.2	97.5
	4=Misplaced	24	2.5	2.5	100.0
	Total	**943**	**100.0**	**100.0**	

Similarly, Table 4 numerated frequencies and percentages of surface errors made by the EFL learners in the same writing, which has the identical error number in sum but are sorted in another way. Under such way, the most frequent errors made are incorrect usage, totally 539, occupying more that half of the total which is 57.2%, while the least frequent ones are misplaced usage counted 24 taking 2.5%. In sum, the most frequent errors in linguistic category occurred in the use of lexical verbs, nouns and punctuation marks; the most frequent errors under surface strategy taxonomy are incorrect usage errors.

The errors of lexical verbs were centered around incorrect uses of verb tenses, verb voices, non-finite verb forms, subject-verb agreement, and taking nouns for verbs. Some sentences containing lexical verb errors extracted from the compositions are as follows.

1) When we were children, we **don't*** know many things.

(A tense error made by Lai Fangfang)

2) …and your knowledge is **enrich*.**

(A voice error made by Lin Yuanling)

3) **Learn*** with a teacher, we can never feel lonely.

(A non-finite error made by Han Jiaqi)

4) Learning by ourselves **mean*** we will….

(A subject-verb agreement error made by Peng Shaoting)

5) If we want to **success*,** we must study hard by ourselves.

(An error of taking noun for verb made by Xu Siming)

The noun errors mostly appeared in wrong uses of single and plural nouns, and putting verbs and adjectives in the place of nouns, etc. Some examples quoted from the compositions are as follows.

1) Maybe they are good at how to arrange their **times***.

(A plural noun error made by Li Yanghua)

2) I have three **reason*** to stand my opinion.

(A single noun error made by Li Chunrong)

3) I think **learn*** with a teacher is better than by myself.

(An error of taking verb for noun made by Li Huaxiu)

4) We can learn by ourselves in this small **social***.

(An error of taking adverb for noun made by Hao Jing)

Punctuation symbols actually play many grammatical functions that indicate the structure and organization of written language. The most frequent punctuation symbol errors are the incorrect uses of comma and period, which may induce run-on sentences and fragment sentences that are exemplified in the following.

1) We often need learning,* learning make a progress.

(A comma error made by Chen Mengyuan)

2) If we want to get more knowledge. *We must learn by ourselves.

(A period error made by Hao Jing)

3) The most important way of learning something is learning by ourselves, but we can't leave the help of teachers.*Especially in the university.

(A period error made by Ke Dixiao)

Findings for Question Two

The findings corresponding to research question two were that the EFL learners displayed strongest strength in the intrapersonal intelligence, and the weakest in the interpersonal intelligence, as revealed in the sum scores, means and percentages in table 5. The sum scores of nine intelligences were produced by adding together the total scores of each intelligence for each subject in table 2. The means and percentages

of the strength of each intelligence among the nine intelligences were drawn out by running descriptive statistics in SPSS. When we look at the scores and percentages of the nine intelligences, we are taking account of all subjects as a whole.

Table 5: Frequency and Percentage of Multiple Intelligences

MI	Naturalist	Musical	Logical	Existential	Interpersonal	Kinesthetic	Verbal	Intrapersonal	Visual
Sum Score	390	368	374	445	351	396	360	500	364
Mean	5.27	4.97	5.05	6.01	4.74	5.35	4.86	6.76	4.92
%	10.99%	10.37%	10.54%	12.54%	9.89%	11.16%	10.15%	14.09%	10.26%

In table 5, the sum score of intrapersonal intelligence is 500, which is the biggest of all the nine intelligences. The same are true for its mean, which is 6.76, and its percentage, which is 14.09%. Thus, the strongest intelligence displayed among the students is intrapersonal intelligence. Contrasted to the intrapersonal intelligence, the sum score, and its mean and percentage are the smallest comparing with those of other intelligences. So, the weakest intelligence among the students is interpersonal intelligences.

Findings for Question Three

The findings related to research question three were that there existed three kinds of statistically significant correlation between linguistic errors and multiple intelligences as shown in Tables 6, 7, 8, but there was only one such correlation found between surface error and one of the multiple intelligences as displayed in table 9. Those findings come from the analysis of Pearson correlation between MI and linguistic errors as well as correlation between MI and surface errors. But not every kind of error correlates to every intelligence significantly, because correlation would not stand without statistical significance, which is literally decided by the sig. value 0.05.

Table 6: Article Errors' Correlations with Multiple Intelligences

	Multiple Intelligences	Article
Visual	Pearson Correlation	$-.413^{**}$
	Sig. (2-tailed)	.008
Logic	Pearson Correlation	$-.400^{*}$
	Sig. (2-tailed)	.011
Kinesthetic	Pearson Correlation	$-.379^{*}$
	Sig. (2-tailed)	.016
Musical	Pearson Correlation	$-.366^{*}$
	Sig. (2-tailed)	.020
Verbal	Pearson Correlation	$-.364^{*}$
	Sig. (2-tailed)	.021
Existential	Pearson Correlation	$-.358^{*}$
	Sig. (2-tailed)	.023
Naturalist	Pearson Correlation	$-.327^{*}$
	Sig. (2-tailed)	.039

Table 6 is an excerpt of cells coming from the general table of correlation between MI and linguistic errors. The cells constituting table 7 are chosen to display because their sig. values in each pair of correlation are smaller than 0.05. Thus the corresponding correlations in table 7 are statistically significant. Moreover they correlate in opposite direction because the Pearson coefficients are negative. Among the 7 pairs of correlations, visual intelligence correlates with article errors most eminently, since the absolute value of correlational coefficient is the biggest of all, though all the correlations are moderate statistically due to the fact that none of the coefficients is smaller than 0.03.

Table 7: Preposition Errors' Correlation with Existential Intelligence

		Preposition
Existential	Pearson Correlation	-.283[*]
	Sig. (2-tailed)	.044

Table 7 is another cell from the general table of the correlation between MI and linguistic errors, where the existential intelligence has a significant negative correlation with the preposition error, as the sig value is 0.044.

Table 8: Punctuation Errors' Correlation with Kinesthetic Intelligence

		Punctuation
Kinesthetic	Pearson Correlation	.290[*]
	Sig. (2-tailed)	.041

Table 8 is cognate as the above. Also for the same reason, that we found a significant positive correlation between the kinesthetic intelligence and the punctuation error.

Table 9: Missing Errors' Correlations with Multiple Intelligences

		Missing
Kinesthetic	Pearson Correlation	.309[*]
	Sig. (2-tailed)	.013

Table 9 is a cell that gleaned from the general table of the correlation between MI and surface errors. The relationship between the kinesthetic intelligence and the missing error listed in table was the only correlation being detected significant statistically in view of its sig. value being 0.013. Again, the kinesthetic intelligence correlated with missing error positively.

All in all, among the above ten pairs of correlation, the most obvious correlation is the negative one between the visual intelligence and article errors because the

absolute value of the correlation coefficient of the pair is 0.413, which surpasses all the other statistically significant correlation coefficients. The negative correlation between the visual intelligence and article errors can be interpreted literally as stronger visual intelligence helps reduce article errors. Moreover, the kinesthetic intelligence correlating positively with punctuation symbol errors and word missing errors implies that stronger kinesthetic intelligence contribute to more punctuation symbol and word missing errors. Thus, in brief, there are some relationship between some of multiple intelligences and some language errors.

Findings for Question Four

The finding that answered research question four was that the multiple intelligences based instruction improved the EFL learners' performance of error-correction significantly as attested by the pretest-posttest design.

In the process of pretest, both of the two groups received the same writing task. Through recording of error number of each subject in his/her writing and inputting the data of the error number of each subject with his/her class affiliation into SPSS to do the independent – samples t test (The name lists of error number are attached in the appendix), the researcher found the two groups had no statistically significant difference in terms of error number as shown in Table 10.

Table 10: Independent-Samples T Test of Error Making

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
ERRORS	Equal variances assumed	.072	.789	.412	72	.681	.72	1.737	-2.747	4.179
	Equal variances not assumed			.411	70.019	.682	.72	1.743	-2.759	4.192

Checking the sig. value of Levene's test in table 10, the researcher found it was 0.789 which was higher than 0.05, so the equal variances of the two groups can be assumed. Therefore, we have 95% of confidence to say that the number of errors made by the two groups is equal in the statistical sense. In other words, the grammatical level of the two groups was observed to be the same before any intervention.

In the process of post - test, the two groups were exposed to two different kinds of error treatment for purpose of comparison. After the two kinds of instruction, an error correction test was implemented to the two groups, the results of which were attached in the appendix and summarized in Table 11.

Table 11: Error Correction Score

	Class One Experimental Group	Class Two Control Group	Value Difference between Class One and Class Two
Student Number	36	38	-2
Total Score	1040	992	48
Mean Score	28.89	26.11	2.78

The data in Table 11 were computational results from the records of scores which were collected through an error-correction test conducted to two groups of subjects. Before the test, class two was taken as a control group in which students were treated with the same instruction disregarding the variation of multiple intelligences in each learner, while class one was taken as an experimental group in which students got tailored instruction based on his or her multiple intelligences. The score represents competence of error correction. The higher the score is, the more competent the learner is in dealing the error correction. Table 11 shows class one that was experimented with MI based instruction got higher scores, which is 1040 in total, and 28.89 on average. Table 11 also shows class two earned lower scores, which is 992 in total, and 26.11 on average. Considering that the error number made by the two classes had no statistically significant difference prior to intervention, and all the errors appeared in the error correction test were extracted from their previous writings, the discordance in the test which is 48 in total and 2.78 on average must be

the results of different instructional strategies.

If we were still not sure whether the difference had been spawned by coincidence, then the independent-samples t test would exclude such a possibility to great extent. Inputting the data of the error correction score of each subject in to SPSS to do the independent – samples t test, and then checking the sig. value of Levene's test in the output table 12, the researcher found it is 0.045 which is lower than 0.05, so we cannot assume equal variances. Therefore, the error correction difference between the MI based instruction and the undifferentiated instruction was not out of coincidence with 95% of confidence. The difference is significant in statistical sense; in other words, the multiple intelligences based instruction did make a difference on the students' performance of error-correction.

Table 12: Independent-Samples T Test of Error Correction

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Score	Equal variances assumed	4.154	.045	1.969	72	.053	2.784	1.413	-.034	5.601
	Equal variances not assumed			1.990	65.283	.051	2.784	1.399	-.010	5.578

Discussion & Conclusion

The findings of the study have multiple implications for language researchers, teachers, and learners. To language researchers, the finding for research question one that the incorrect usage of lexical verbs accounts for the most of errors in their writings confirmed Murrow's investigation of Japanese EFL learners in Chinese context. The possible explanation for the phenomenon could be due to the fact that the Chinese lexical verbs lack variation of tense and aspect like English. Opposite to the lexical verb, the errors related to incorrect usage of adverbs are least frequently made. The reasons for it might be that adverbs are easily built and their positions are relatively fixed in sentences. The finding for research question two was that the strongest

intelligence displayed in the EFL learners was intrapersonal intelligence, but no significant relationship found between the intrapersonal intelligence and any language errors. The prevalence of the intrapersonal intelligence among Chinese EFL learners can be attributed to the influence of cultural heritage and teaching methods. In Confucianism dominated Asian countries like China, introvert personality and self-examination behavior are encouraged. For instance, Chinese people were inculcated from their birth with the famous sayings of Confucius such as "A gentleman finds faults with himself while a base man finds faults with others", "Think twice before acting". Furthermore, the mainstreamed teacher centered approach treats students the same way ignoring variation of intelligences among them. Thus, students who are unduly required to adapt themselves to the instruction by their teachers become more intrapersonal. In contrast with the strongest intrapersonal intelligence, the interpersonal was found to the weakest logically. The finding for research question three was that the most obvious correlation was a negative correlation found between the visual intelligence and article errors. This finding can be explained by the fact that while articles function as spatial indicators in effect, the students who are strong in spatial intelligence must be making less space related errors like article errors. The visual intelligence, according to its definition, is space related intelligence. Thus, the stronger the visual intelligence is, the fewer article errors are. This finding is supplemental to the study by Mahdavy (2008), who finds the linguistic intelligence contributes to listening proficiency. His study shows scores of each intelligence positively correlate with listening scores of both TOEFL and IELTS listening but only linguistic intelligence has a statistically significant correlation with listening. The finding for question four that the MI based instruction improved the EFL learners' performance of error-correction significantly substantiated the claim by Loredana and Aneliz (2011) that application of multiple intelligences supports the EFL education.

    To language teachers and language learners, the findings that indicated the distribution of grammatical errors of the EFL learners can be used as a learning guide to help the language teachers to organize learning materials and the language learners to pay particular attention to their language deficiency. Thus the teachers teach purposefully and learners learn efficiently. The findings that characterize the intelligences composition of the learners enabled the learners to understand

themselves and enhance their self-confidence. The findings that revealed some significant relationships between part of the multiple intelligences and part of grammatical errors contributed to the improvement of teaching strategy to achieve better teaching results. The findings that validated the evident effect in the treatment of grammatical errors offered an alternative to innovate language education.

Further studies are needed to randomize the subjects and expand the selection participants so that the findings are more persuasive. Also, it is desirable to refine the instruments to measure data more accurately. Last but not least, it is the researcher's hope that the future studies should produce better results if they are done both quantitatively and qualitatively.

Acknowledgement

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