

Proceeding Paper

Applying a Multivariate Simultaneous Linear Regression Model to Analyze the Mediating Effect of English Leisure Activities on English Learning Motivation and Learning Effectiveness [†]

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Abstract: The purpose of this study was to investigate the relationships between English learning motivation, English leisure activities, and the English learning effect on elementary school children by using a linear regression model. The collected data were analyzed with descriptive statistics, multivariate simultaneous linear regression, and mediation tests. The result showed that elementary students lack parental involvement in English learning. Regular parental support leads to better learning outcomes. English leisure activities are crucial for improving motivation and effectiveness. Schools and parents should prioritize English skills through daily learning and leisure activities to incrementally improve English ability and positively impact learning.

Keywords: English leisure activities; English learning strategy; English teaching; linear regression model



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1. Introduction

Under globalization, English has become the figurative language of internationalization. It is the driving force for every country to pursue economic growth and leap to the international stage. Mastering fluent English is similar to holding a golden ticket to enter the village. Therefore, the direction of talent training for international students becomes internationalized, and the development direction of Chinese students is presented as a compulsory subject for examinations. It tends to move international education towards internationalization [1]. Using the linear regression model, the course of individual leisure behaviors is verified as it is a commonly used form of empirical science. The model has been used for the study of consumer mobile payment behavior [2], cultural and creative hotel accommodation behavior [3], tourist revisit behavior [4], and travel website ordering behavior [5]. Taiwanese teachers use English activities to integrate English in their teaching to make the curriculum diverse and educational. Teachers try to incorporate the concept of leisure education into the curriculum through the use of English activities to help students develop in a variety of ways. Such teaching activities have good results in the short term. However, most researchers suggest extending the research period or offering opportunities for students to develop an intrinsic and spontaneous interest in English learning to examine the maintenance of students' learning effectiveness [6–10].

Chen [11] believed that teaching with passion inspired motivation to learn English, and an ideal English learning environment is the key to learning. The English learning outcomes of Taiwanese students are evaluated by four English competencies: listening, speaking, reading, and writing. Although the short-term results of paper tests are mostly positive, long-term and practical applications have not shown satisfactory results [6–10]. Therefore, English leisure activities that integrate leisure education and English activities may become mainstream education in the future. Therefore, this study aims to understand the relationship between primary school children's English leisure activities and learning effectiveness through various English activities and assessment methods.

2. Literature Review

2.1. English Learning Motivation

Brophy [12] believes that motivation refers to students' subjective experiences, especially what made students willing to participate in classroom activities and their reasons for doing so. Based on the literature review and discussion, he defines "English learning motivation" as any behavior and thinking that promotes acquiring, retaining, and retrieving knowledge to learn English. It is determined by students' internal and external interactive environmental factors [13].

2.2. English Leisure Activities

Kelly [14] defines leisure as a free and selective activity that is mainly based on leisure. Leisure is often included in formal education, whether formal or informal. Leisure is a learning activity that balances learners' physical and mental learning [15]. Based on the literature review and discussion, we define "English leisure activities" as English activities that students are exposed to daily. These activities help students achieve the goals of leisure, relaxation, and learning [16].

2.3. English Learning Effectiveness

Wang [17] pointed out that students are a principal part of education, and the success or failure of education depends on students' learning effectiveness. Therefore, before analyzing the term "learning effectiveness", we must take into account the direct and indirect learning effectiveness of students and pay attention to the learning effectiveness dimensions of students' cognitive, emotional, and motor skills. Based on the literature review and discussion, we define "English learning effectiveness" as the performance of students' cognition, affection, and skills improvement in English listening, speaking, reading, and writing after English-related activities and courses in or out of school.

2.4. Learning Motivation, Leisure Activities, and Learning Effectiveness of English

According to the research of Hung [13], English learning motivation and learning strategies of elementary school children were tested through multivariate stepwise regression. It was found that English learning motivation and strategies were positively correlated, and the higher the motivation, the more English learning strategies were used.

Hypothesis 1: *Elementary school children's English learning motivation significantly impacts English leisure activities.*

Wang [18] found that English learning motivation has a significant positive correlation with English learning effectiveness. Lin and Chen [19] pointed out that students' learning motivation through e-learning positively impacts learning outcomes.

Hypothesis 2: *Elementary school children's English learning motivation significantly impacts English learning effectiveness.*

An experimental study on secondary school students pointed out that using multimedia English songs to integrate secondary school English grammar into teaching improved students' learning effectiveness [7]. An experimental study on elementary school children pointed out that after receiving English song learning, the students made significant progress in oral reading flow, and most students had a positive attitude towards English song practice and singing. Listening to the melody builds vital interest rather than entering teaching at the beginning, and the selection of songs should be in line with the student's level [8].

Hypothesis 3: *Elementary school children's English leisure activities significantly impact English learning effectiveness.*

An experimental study on elementary school children pointed out that teaching English picture books had a significant effect on improving the overall performance of students' English ability and the overall performance of children's learning motivation with a sense of identity and a positive learning attitude [9].

Hypothesis 4: *Elementary school children's English leisure activities have a mediating relationship effect on learning motivation and English learning effectiveness.*

3. Research Method and Procedure

We adopted a cluster sampling method to conduct a questionnaire survey as the primary research method to collect relevant information. The research subjects were fifth and sixth-grade elementary school students in Taiwan in 2016. The schools were classified according to the school type of the Ministry of Education: large, medium, and small schools. The number of classes was calculated according to the proportion of the school type; then, the number of students was selected according to the number of classes.

The pre-test questionnaires were collected from 1 March 2016 to 15 March 2016. The questionnaires were collected after expert validity confirmed the questionnaire's item summarization and question clarity. The number of questionnaires issued was 245, the number of valid samples recovered was 234, and the recovery rate of valid samples was 95.5%. The formal questionnaire of this study was implemented from 1 April 2016 to 30 April 2016, and the estimated number of official questionnaires was 960. The number of questionnaires issued was 817, the number of valid samples recovered was 757, and the recovery rate of valid samples was 92.7%.

The questionnaire contained four parts. The first part was the personal information of elementary school children. The second part was the English learning motivation scale which was subdivided into four dimensions: "value", "expectancy", "affective", and "executive volition". The third part—the English leisure activity scale—was divided into two types: "static" and "dynamic", and the fourth part—the English learning effectiveness scale—was divided into three dimensions: "cognition", "affective", and "skill". Except for the first part, the basic personal information, the rest of the scales were calculated by using a Likert five-point scale. Five professional scholars tested the validity of this research questionnaire. After the items were revised according to expert opinions, it became the pre-test questionnaire for this research. In this study, SPSS was used for the statistical analyses.

Through factor analysis, the Bartlett's sphericity test results showed that the scale of this study was significant. The KMO value of each scale was 0.923 (English learning motivation), 0.794 (English leisure activities), and 0.908 (English learning effectiveness). In addition, after analysis of the "English learning motivation" scale, the CR value of the 20th question did not meet the testing standards and was deleted from the official questionnaire. All data were analyzed for reliability and validity, descriptive statistics, multivariate simultaneous regression analysis, and mediating effect.

4. Result and Discussion

4.1. Descriptive Statistics

The subjects were females (48.5%) and males (51.5%) in the fifth grade (50.9%) and the sixth grade (49.1%). Most students had no person to speak English to (69%) in their families, while other students had other people to speak English to (20.5%) or their mother (11.4%) or father (8.1%). Most of the students started to learn English in kindergarten (67.1%) and at home (9.1%), and 27.5% had not learned English. Most students had no English tutoring after school (36.1%), while other students had three to four years (21.9%), five years and above (21.5%), and one to two years (20.5%). The majority were male in the fifth grade, had no person to speak English to, and started to learn English in kindergarten.

4.2. Multivariate Simultaneous Regression

In the regression analyses, the factors of English learning motivation were used as independent variables while English leisure activities was used as a dependent variable. The results of multiple simultaneous regression analyses of elementary school children’s English learning motivation on English leisure activities showed four factors of English learning motivation as “value”, “expectancy”, “affective”, and “executive volition”. Moreover, the explanatory power of the four factors of the learning activity value was 30.7%, and the simplified VIF of the four factors were 3.499, 3.201, 2.344, and 1.784, in order. The VIF value was less than 5, indicating that there was no apparent linear relationship between the four factors (Table 1).

$$\text{English Leisure Activities} = 0.177 \times \text{value} + 0.180 \times \text{expectancy} + 0.346 \times \text{affective} + (-0.139) \times \text{executive volition} \tag{1}$$

Table 1. Regression analysis result of English leaning motivation on English learning effectiveness.

Factor	B	S.E.	T	β	VIF
Value	0.176	0.056	3.127 *	0.177	3.499
Expectancy	0.189	0.057	3.313 *	0.180	3.201
Affective	0.332	0.045	7.450 *	0.346	2.344
Executive volition	−0.14	0.041	−3.425 *	−0.139	1.784
R ² 0.307					

* $p < 0.05$.

With English learning motivation as the independent variable and English learning effectiveness as the dependent variable, the multivariate simultaneous regression analysis results are shown in Table 2. “Value”, “expectancy”, and “affective” reached a significant level. Furthermore, the three factors of English learning motivation explained the overall explanatory power of English leisure activities up to 69.2%, and the VIF values of the three factors were 3.499, 3.201, and 2.344, in order. The VIF value of less than 5 indicated no apparent linear relationship between the three factors. The standardized regression equation is as follows.

$$\text{English learning effectiveness} = 0.248 \times \text{value} + 0.274 \times \text{expectancy} + 0.385 \times \text{affective} \tag{2}$$

With English leisure activities as independent variables and English learning effectiveness as dependent variables, the results of multiple simultaneous regression analyses are shown in Table 3. The “static” relationship between English leisure activities and “dynamic” two factors reached a significant level. Furthermore, the two factors explained the overall explanatory power of English learning affect up to 39.9%, and the VIF value of the two factors was 1.908. The VIF value was less than 5, indicating no apparent linear relationship between the two factors. The standardized regression equation is as follows.

$$\text{English learning effectiveness} = 0.344 \times \text{static} + 0.343 \times \text{dynamic} \tag{3}$$

Table 2. Regression analysis of English learning motivation on English learning effectiveness.

Factor	B	S.E.	T	β	VIF
Value	0.262	0.040	6.550 *	0.248	3.499
Expectancy	0.306	0.040	7.562 *	0.274	3.201
Affective	0.392	0.032	12.439 *	0.385	2.344
Executive volition	0.21	0.021	0.716	0.019	1.784
R^2 0.692					

* $p < 0.05$.**Table 3.** Regression on Analysis of English Leisure Activities on The English Learning Effectiveness.

Factor	B	S.E.	T	β	VIF
Static	0.314	0.036	8.824 *	0.344	1.908
Dynamic	0.359	0.041	8.782 *	0.343	1.908
R^2 0.399					

* $p < 0.05$.

4.3. Mediating Effect

According to the concept and test procedure of the mediating effect [20], we analyzed the mediating effect on English leisure activities, learning motivation, and learning effect. The mediating effect test is shown in Table 4.

Table 4. Mediating effect of English leisure activities on learning motivation and learning effectiveness.

Condition	IV	DV	Coef.	β	T
Condition 1	English learning motivation	English learning effectiveness	b1	0.821	39.447 *
Condition 2	English learning motivation	English leisure activities	b2	0.515	16.525 *
Condition 3	English leisure activities	English learning effectiveness	b3	0.284	12.895 *
Condition 4	English learning motivation	English learning effectiveness	b'1	0.674	30.676 *

* $p < 0.05$.

Baron and Kenny (1986) [20] proposed that the concept of a mediating effect needed to be confirmed through three regression equations. The equation was tested for whether there was a mediating effect between the independent variable and the dependent variable under the following four conditions.

1. English learning motivation has a significant impact on English learning effectiveness.
2. English learning motivation has a significant impact on English leisure activities.
3. When considering English learning motivation and the influence of English leisure activities on the English learning effect, English leisure activities significantly impact the English learning effect.
4. When considering the influence of English learning motivation and leisure activities on the English learning effect, after controlling for the variable of participation in leisure activities, the influence of the original English learning motivation on the English learning effect is significantly reduced.

If the estimated value of the English learning motivation coefficient does not reach a statistically significant level, the influence disappears, and English leisure activities become a complete mediating variable. If not, English leisure activities are a part of the mediating variables. The above four conditional transformation regression equations are as follows.

- (1) In $Y = b_1X + a_1$, b_1 , estimates must be statistically significant.

- (2) In $Z = b_2X + a_2$, b_2 , estimates must be statistically significant.
- (3) In $Y = b'_1X + b_3Z + a_3$, b_3 estimates must be statistically significant.
- (4) In $Y = b'_1X + b_3Z + a_3$, b'_1 estimates must be statistically significant.

According to the analysis results, English learning motivation greatly influenced the effectiveness of English learning ($b_1 = 0.821$, $t = 39.447$, $p < 0.05$), English learning motivation to English leisure activities ($b_2 = 0.515$, $t = 16.525$, $p < 0.05$), and English leisure activities to English learning effectiveness ($b_3 = 0.284$, $t = 12.895$, $p < 0.05$). Therefore, the first three conditions were met, but English learning motivation significantly affected the English learning effect ($b'_1 = 0.674$, $t = 30.676$, $p < 0.05$). Thus, the complete mediation effect was not accepted. However, b_1 to b'_1 decreased significantly by 0.147. English leisure activities partially mediated between English learning motivation and the learning effect. The estimated values of the standardized coefficients among the variables were aggregated, and the path coefficient diagram is shown in Table 4.

As shown in the path coefficient diagram in Figure 1, the total effect value of English learning motivation on English learning effect is 0.821, the direct effect value of English learning motivation on English leisure activities is 0.515, and the direct effect value of English leisure activities on the English learning effect is 0.284. Therefore, English learning motivation forms an indirect mediating effect on the English learning effect through English leisure activities. The total effect of English learning motivation on English learning effectiveness is 0.821, indicating that each standard deviation unit of English learning motivation has a unit change of 0.821 on English learning effectiveness.

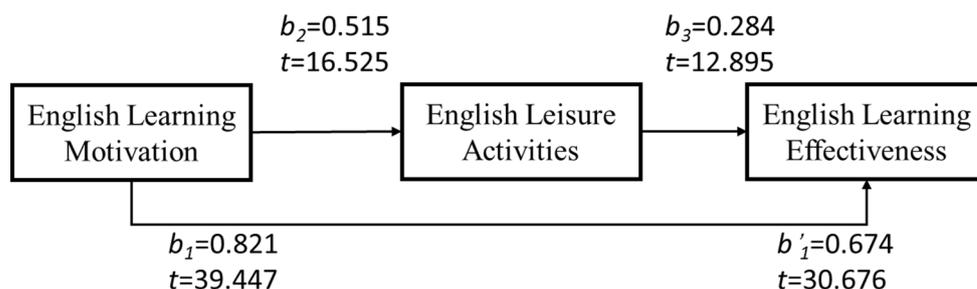


Figure 1. English learning motivation, English learning effectiveness, and English leisure activity path map.

5. Conclusions

Based on the research results, the following conclusions are drawn.

5.1. The Correlation between English Learning Motivation, Leisure Activities, and Learning Effectiveness of Elementary School Children

English learning motivation significantly impacts the English learning effect, and English leisure activities significantly impact the English learning effect. The executive volition factor of English learning motivation harms participation in English leisure activities. The executive volition factor in the item design is more specific and passive for elementary school children to achieve goals. Therefore, if students have more things to complete in their studies, they reduce their participation in English leisure activities. However, whether students have learning motivation is extremely important for participation in English leisure activities and the performance of learning effectiveness. Learning motivation is divided into intrinsic and extrinsic learning motivation. The motivation of students to learn is not biased. Regarding intrinsic or extrinsic motivations, students’ English learning does not require external environmental factors and assistance but needs their expectations and willingness for English learning to have better English learning results.

5.2. Correlation between English Leisure Activities and the English Learning Effectiveness of Elementary School Children

The English leisure activities of elementary school children significantly impact English learning effectiveness, and the relationship between the two variables is positive. If primary school children participate in English-related leisure activities more, there will be a more positive output in learning effectiveness. However, they tend to participate in certain types of activities in the middle grades, and they are less likely to extend their range and participate in many ways. It is believed that the primary purpose of English leisure activities is to improve school children's learning motivation and increase their interest in English learning from activity participation. Therefore, the learning effect becomes better if students try English leisure activities in many ways. At the same time, the English learning of school children is not limited to learning in the classroom. When participating in relevant English leisure activities, they must participate in groups or be led by parents and teachers. Therefore, it is also essential to have an environment for English leisure activities in the company of others. In this case, although parents have little time to accompany and participate, they need to also carefully choose the destination of their children's after-school learning or activities to confirm that the student's English learning has a lasting effect.

5.3. The Mediating Effect of English Leisure Activities on Elementary School Children's English Learning Motivation and Effectiveness

There is a partial intermediary between the English leisure activities of elementary school children and English learning motivation and the learning effect. English learning motivation directly affects the English learning effect. If there is an intervention of English leisure activities, English leisure activities impact the effectiveness of English learning. Therefore, if students' English learning motivation is low, by promoting students' participation in English-related activities, students' learning effectiveness can also be improved. Although English learning in Taiwan is mainly based on books and branches of learning, many institutions have made various changes to make students more interested in English. Schools have also followed this trend. English singing, drama, reading, and other activities are integrated into English teaching, adding a variety of styles to English learning. These are relatively common English learning methods. School children could do various types of activities that schools could provide to find out whether students engage in English-related activities in their daily life. The results also show that students' participation in English leisure activities is lower than expected. The concept of multi-party learning English has yet to be popularized. No matter which unit or individual, those who want students to advance their English skills should understand that learning is not a matter of learning English. It requires long-term efforts and training. Contact through English leisure activities in daily life allows students to have more opportunities to learn English in their spare time so that students can develop their interest in learning. Therefore, English leisure activities are an essential factor for enhancing learning motivation and promoting good learning effectiveness.

6. Recommendation

Based on the research results, suggestions for future research are as follows.

1. It is suggested that follow-up researchers gradually expand the research scope through industry–university cooperation or assist the government with expanding the research object to understand the differences in the English learning status of elementary school children in Taiwan. In the research object, future researchers may try to add subjects from different grades to see whether shorter English learning years impact school children's learning effectiveness.
2. The variables in this study are English learning motivation, English leisure activities, and English learning effectiveness. The verification results showed that English leisure activities had a mediating effect on English learning motivation and learning effectiveness, but the influence coefficient was not high. There are two possible

reasons. First, to cause more than one mediating factor between English learning motivation and English learning effect, researchers can find out the variables that may affect both motivation and effect through a literature review. Second, there are few items in English leisure activities, and there needs to be previous literature to follow the research on English leisure activities. The composition of the items is determined by reference to relevant English strategic activities. To conduct in-depth investigations on this variable through on-the-spot observation of elementary school children's participation in English leisure activities and to help relevant units have more information on the English learning situation of school children when making policies, more detailed content of the items is demanded.

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