

# Correlations between Changes in Study Habits and Academic Results in Junior High School Students—A Longitudinal Survey at a Private Junior High School

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## Abstract

Correlations between changes in study habits and academic results in Japanese junior high school students were investigated through a longitudinal survey. Participants were students enrolled in a private junior high school (N = 170). A questionnaire was conducted twice a year for three years. Moreover, results of regular exams and mock exams were collected. The results indicated a high correlation between scores of subject study habits and academic results. Furthermore, the results of cluster analysis indicated that patterns of changes in learning motivation were classified into four types, and academic records were low in the declining type and considerably declining type. Based on the results above, it is considered effective to detect changes in study habits of each student in early stages through regularly evaluating study habits quantitatively, for improving students' academic skills.

## Keywords

Learning Motivation, Study Habits, Entrance Examinations, Adolescence, Junior High School, Longitude Survey, Academic Results, Transitional Period

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## 1. Introduction

Many changes occur in the transitional period from childhood to adolescence. Especially, changes in the environment when moving from elementary school to

junior high school, as well as physical and mental changes in individuals are important changes. These different changes tend to cause problems in students. In the US, it has been indicated that 25% of children cannot participate in the education system or cannot move into the labor force because of maladaptation in adolescence. Delinquency, drug abuse, early pregnancy, and school maladaptation, among others are factors leading to maladaptation (Dryfoos, 1990). These problems in adolescence might affect their long-term outlooks such as finding employment and family formation. That is, life during junior high school days could have a significant effect on a person's future life. Eccles (1996) researched from a preventive perspective to solve these problems, focusing on the condition in which 15% - 30% of young people in the US leave junior high school, and reported that experiences in the school systems aggravated these problems. She analyzed characteristics of the education environment of the junior high school and indicated the necessity for improvement.

Students in Japan also have problems during the transitional period from elementary school to junior high school. The number of students refusing to attend school was 27,581 in elementary school and 98,428 in junior high school (Ministry of Education, Culture, Sports, Science and Technology, 2016a). Students that start refusing to attend school are three and a half times larger than those in elementary school. Regarding learning aspects, the motivation for learning and learning activities significantly decreases during three years of junior high school. According to the National Assessment of Academic Ability, learning motivation in the third-grade junior high school students is significantly lower, compared to that in the sixth-grade elementary school students (Ministry of Education, Culture, Sports, Science and Technology, 2016b). Okado et al. (2017) reported a decline in study habits in students of a private junior high school, especially a considerable decline during the first year. It is obvious that many students in Japan have problems during the transitional period from elementary school to junior high school, as well as during the three years of junior high school.

One of the main aims of junior high school education is improving academic results. It is important to provide education by understanding students' study habits, which is one of the factors in improving their academic records. Academic achievements are made through the accumulation of daily study habits. However, there are few scales that can be easily used in schools to evaluate daily study habits. Furthermore, correlations between study habits and academic results have not been clarified to date. To solve these issues, Okado et al. (2017) developed a scale for measuring study habits of junior high school students in a questionnaire survey. Using this scale, junior high school students' study habits, including home study habits and subject study habits, can be evaluated. However, their study was based on a cross-sectional survey, and longitudinal findings have not been obtained. The present study conducted a longitudinal survey on study habits using their scale, investigated correlations between study habits and academic results, with the aim of utilizing these results in school education.

## 2. Methods

### 2.1. Participants and Survey Period

Participants were students that had entered a private junior high school in April 2014, excluding absentees and students that had moved-out ( $N = 170$ , 84 boys and 86 girls). The school that the students are attending is of an above average level of academic results in Japan. There are students from low to high levels of academic results in this school. As this school is a private school, the students typically come from homes of average or above average Japanese household income.

The surveys were implemented twice a year (spring and fall), from 2014 to 2016, in total six times.

### 2.2. Survey Contents and Implementation Methods

The Scale of Study Habits composed of seven items (Okado et al., 2017) was used. The scale consists of two subscales: home study habit scores and subject study habit scores. The former includes the following items: preparation, review, and learning plans among others and the latter include: notebooks, the motivation for lessons, and homework.

The questions of former are “Are you reviewing the subject of the class?” “Are you preparing for classes?” “Are you planning a daily study plan?” and “Are you using the syllabus?” The questions of latter are “Are you taking notes in class?” “Are you concentrating on the class?” and “Are you doing your homework?”

Participants were required to respond using a four-point scale. Moreover, deviation scores of regular exams (English, math, and Japanese) and mock exams (English, math, Japanese, science, and social studies) were collected. The survey was implemented in each class where participants were enrolled. The questionnaire was distributed by classroom teachers and collected after responses were completed. The procedure was common to all classes.

### 2.3. Procedures of Analysis

The scores of study habits were compared among survey periods using an analysis of variance. Moreover, correlations between the results of regular exams, mock exams, as well as improvements in academic results (the difference between the scores in the in the 3<sup>rd</sup>-grade fall that is predicted based on the scores in the 1<sup>st</sup>-grade spring and the actual scores) and scores of study habits were examined. Furthermore, cluster analysis was conducted, and students were classified into four types. SPSS 20.0 was used for data analysis.

## 3. Results

### 3.1. Scores of Study Habits and Academic Results

**Table 1** shows the mean values of study habits scores in each period. A one-way ANOVA was conducted on the scores of home study habits, with the period (six

**Table 1.** The mean values of study habits scores in each period.

	The scores of home study habits	The scores of subject study habits
1 <sup>st</sup> -grade spring	2.75 ± 0.67	3.50 ± 0.38
fall	2.35 ± 0.56	3.24 ± 0.48
2 <sup>nd</sup> -grade spring	2.21 ± 0.62	3.26 ± 0.51
fall	2.13 ± 0.60	3.11 ± 0.59
3 <sup>rd</sup> -grade spring	2.06 ± 0.58	3.15 ± 0.54
fall	2.13 ± 0.58	3.20 ± 0.54

Mean ± standard deviation.

**Table 2.** The relationships between the results of mock exams and regular exams in the 3<sup>rd</sup>-grade fall.

regular exams	mock exams in 3 <sup>rd</sup> -grade fall
	<i>R</i>
1 <sup>st</sup> -grade spring	0.810**
fall	0.844**
2 <sup>nd</sup> -grade spring	0.841**
fall	0.878**
3 <sup>rd</sup> -grade spring	0.857**
fall	0.853**

\*\* $p < 0.01$ .

levels) as a within-subjects factor. The results indicated a significant main effect ( $F(5, 775) = 74.7$ ,  $p < 0.01$ ). Next, multiple comparisons were conducted, which indicated that the score in the 1<sup>st</sup>-grade spring term was the highest and more significant, compared to the other five periods. The score in the 1<sup>st</sup>-grade fall was significantly higher, compared to other four periods (spring and fall in the 2<sup>nd</sup> grade, spring, and fall in the 3<sup>rd</sup> grade). The score in the 2<sup>nd</sup>-grade spring was significantly higher, compared to the score in the 3<sup>rd</sup>-grade spring.

A significant main effect was also indicated regarding the scores of subject study habits ( $F(5, 780) = 32.1$ ,  $p < 0.01$ ). The results of multiple comparisons indicated that the score in the 1<sup>st</sup>-grade spring was highest, compared to other five periods. The score in the 1<sup>st</sup>-grade fall was significantly higher than the 2<sup>nd</sup>-grade fall. The score in the 2<sup>nd</sup>-grade spring was significantly higher, compared to the scores in the 2<sup>nd</sup>-grade fall and the 3<sup>rd</sup>-grade spring.

Aiming to clarify relationships between the results of mock exams and regular exams in the 3<sup>rd</sup>-grade fall, a correlation coefficient and a coefficient of determination were calculated depending on the period (Table 2). There were significant positive correlations between them in all the periods.

### 3.2. Correlations between Academic Results and Study Habits Scores

Table 3 shows correlation coefficients between regular exams scores as well as

**Table 3.** The correlation coefficients between regular exam scores and study habits scores.

	regular exams scores in 3 <sup>rd</sup> -grade fall		residuals in 3 <sup>rd</sup> -grade fall	
	The scores of home study habits	The scores of subject study habits	The scores of home study habits	The scores of subject study habits
1 <sup>st</sup> -grade spring	0.055	0.169*	0.052	0.001
fall	0.023	0.387**	-0.005	0.080
2 <sup>nd</sup> -grade spring	0.050	0.364**	-0.003	0.061
fall	0.068	0.376**	0.035	0.195*
3 <sup>rd</sup> -grade spring	0.064	0.388**	0.111	0.249**
fall	0.154*	0.397**	0.162*	0.240**

\* $p < 0.05$ , \*\* $p < 0.01$ .

**Table 4.** The correlation coefficients between mock exam scores and study habits scores.

	mock exams scores in 3 <sup>rd</sup> -grade fall		residuals in 3 <sup>rd</sup> -grade fall	
	The scores of home study habits	The scores of subject study habits	The scores of home study habits	The scores of subject study habits
1 <sup>st</sup> -grade spring	0.066	0.168*	0.017	0.004
fall	0.156*	0.416**	0.093	0.077
2 <sup>nd</sup> -grade spring	0.149	0.366**	0.024	-0.008
fall	0.103	0.400**	0.080	0.114
3 <sup>rd</sup> -grade spring	0.124	0.387**	0.025	0.084
fall	0.152	0.369**	0.094	0.137

\* $p < 0.05$ , \*\* $p < 0.01$ .

residuals in the 3<sup>rd</sup>-grade fall term and study habits scores. A significant positive correlation for home study habits was shown only in the fall term of 3<sup>rd</sup> grade for both exam scores and residuals. Moreover, a significant positive correlation was shown for subject study habits in all the period, whereas a significant positive correlation was shown after the 2<sup>nd</sup>-grade fall in residual scores.

**Table 4** shows correlation coefficients between mock exam scores and residuals in the fall of 3<sup>rd</sup> grade and study habits scores. It can be seen that a significant positive correlation in home study habits scores with raw scores can be observed only in the 1<sup>st</sup> grade of the fall term. Moreover, a significant positive correlation can be seen in subject study habits and raw scores for all periods, whereas there were no significant correlations with residual scores.

### 3.3. Correlation Analysis on Changes between the Periods and Regular/Mock Exams

**Table 5** shows correlation coefficients between changes in study habits and academic results. A significant correlation was not seen for home study habits, whereas a significant positive correlation was observed for subject study habits. Results of mock and regular exams indicated a significant positive correlation

**Table 5.** The correlation coefficients between changes in study habits and academic results.

differences	The scores of home study habits		The scores of subject study habits	
	regular exam scores in 3 <sup>rd</sup> -grade fall	residuals in 3 <sup>rd</sup> -grade fall	regular exam scores in 3 <sup>rd</sup> -grade fall	residuals in 3 <sup>rd</sup> -grade fall
1 <sup>st</sup> -grade spring and fall	-0.061	-0.084	0.252**	0.085
1 <sup>st</sup> -grade fall and 2 <sup>nd</sup> -grade spring	0.090	0.041	0.012	-0.016
2 <sup>st</sup> -grade spring and fall	0.018	0.043	0.075	0.198*
2 <sup>st</sup> -grade fall and 3 <sup>nd</sup> -grade spring	-0.009	0.096	-0.036	0.050
3 <sup>st</sup> -grade spring and fall	0.055	0.017	-0.024	-0.024

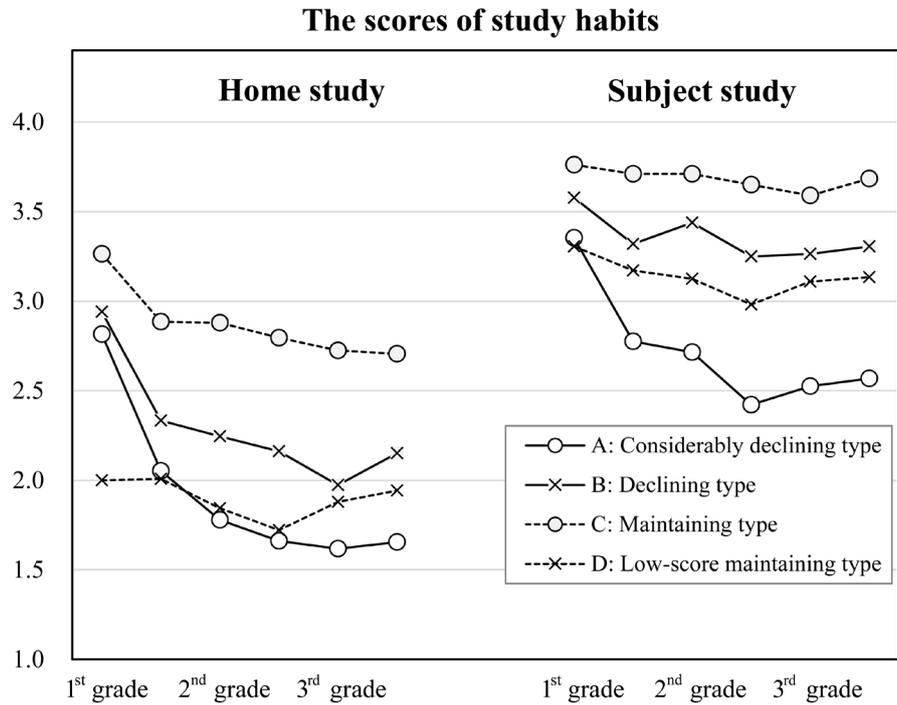
differences	The scores of home study habits		The scores of subject study habits	
	mock exam scores in 3 <sup>rd</sup> -grade fall	residuals in 3 <sup>rd</sup> -grade fall	mock exam scores in 3 <sup>rd</sup> -grade fall	residuals in 3 <sup>rd</sup> -grade fall
1 <sup>st</sup> -grade spring and fall	0.060	0.060	0.288**	0.100
1 <sup>st</sup> -grade fall and 2 <sup>nd</sup> -grade spring	0.051	-0.071	-0.025	-0.100
2 <sup>st</sup> -grade spring and fall	-0.067	0.065	0.111	0.160*
2 <sup>st</sup> -grade fall and 3 <sup>nd</sup> -grade spring	0.019	-0.075	-0.076	-0.058
3 <sup>st</sup> -grade spring and fall	0.042	0.089	-0.026	0.070

\* $p < 0.05$ , \*\* $p < 0.01$ .

with differences in study habits between spring and fall terms of the 1<sup>st</sup> grade. Residuals indicated a significant positive correlation with differences in study habits between the spring and fall terms in the 2<sup>nd</sup> grade.

### 3.4. Classification of Students

Participants were classified based on the scores of study habits during the six periods by using cluster analysis (Squared Euclidian distance, Ward's method). It was judged as valid to classify them into four groups, based on dendrogram. **Figure 1** shows the mean values of the scores of study habits for the four groups in each period. In the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> groups, the score of home study habits in the 1<sup>st</sup>-grade spring was relatively high. In the 1<sup>st</sup> group, it considerably declined after the 1<sup>st</sup>-grade fall. This trend was also shown in the 2<sup>nd</sup> group, though the decline rate was smaller. Regarding the 3<sup>rd</sup> group, it showed high scores in all the periods, though they declined after the 1<sup>st</sup>-grade fall. Therefore, the 1<sup>st</sup> group was named "considerably declining type," the 2<sup>nd</sup> group was named "declining type," whereas the 3<sup>rd</sup> group was named "maintaining type." In the 4<sup>th</sup> group, the score of home study habits in the 1<sup>st</sup>-grade spring was low and did not show considerable changes later. Therefore, the 4<sup>th</sup> group was named "low-score maintaining type." The number of students in each group was as follows: 1<sup>st</sup> group = 34, the



**Figure 1.** The mean values of the scores of study habits.

**Table 6.** The exam scores in 3<sup>rd</sup>-grade fall.

Scores in 3 <sup>rd</sup> -grade fall	A: Considerably declining type	B: Declining type	C: Maintaining type	D: Low-score maintaining type	multiple comparison
regular exam	45.8 ± 9.4	50.6 ± 8.3	53.1 ± 11.0	51.7 ± 8.0	A < B < D < C
mock exam	45.8 ± 9.6	49.0 ± 9.1	54.3 ± 10.8	51.7 ± 9.5	A < B < D < C

2<sup>nd</sup> group = 48, the 3<sup>rd</sup> group = 39, and the 4<sup>th</sup> group = 35. One student was excluded because of a missing value.

A one-way ANOVA was conducted to examine correlations between the above four types and academic results, with academic results in the 3<sup>rd</sup> fall grade as the objective variables and four types as within-subject factors (Table 6). The results indicated a significant main effect in regular exams ( $F(3, 152) = 4.23, p < 0.01$ ) and mock exams ( $F(3, 151) = 5.12, p < 0.01$ ). Results of multiple comparisons indicated that the maintaining type had the highest scores in both regular and mock exams, which was more significant than in the considerably declining type. The low-score maintaining type indicated higher scores compared to the considerably declining and declining types. The declining type indicated higher scores compared to the considerably declining type.

## 4. Discussion

### 4.1. Analysis of Conditions in Junior High School Students Using the Study Habits Scale

The analysis of longitudinal survey results conducted during three years indicated the following trends. Both home study and subject study habits declined

significantly between the spring and fall terms of the 1<sup>st</sup> grade and kept declining from the spring term of 1<sup>st</sup> grade until the spring term of 3<sup>rd</sup> grade, and then was maintained or improved between the spring and fall terms of the 3<sup>rd</sup> grade. These trends were also seen in the cross-sectional survey conducted with junior high school students (Okado et al., 2017). Therefore, they can be regarded as characteristics common to junior high school students.

First, factors for the significant decline from the spring to fall in the 1<sup>st</sup> grade were examined. One of the factors would be a transition from elementary school to junior high school. Especially, the change from the classroom teacher system to the subject-based teacher system might be a significant factor. It is more difficult for teachers to understand students' conditions in the subject-based teacher system, compared to the classroom teacher system, in which one classroom teacher is involved in the overall school life of students. Moreover, it is more difficult for parents to have close communication with teachers in the subject-based teacher system. In the classroom teacher system, a student and a teacher, and a teacher and a parent can communicate on a one-to-one basis, and share information. On the other hand, in the subject-based teacher system, many teachers must share information about a student, and the students and parents need to communicate with different teachers. However, it is difficult to have close communication with many teachers, and consequently, teachers', parents' and students' understanding would decrease. Students' learning motivation is considered to be rather high when entering junior high school because the content of each subject is clear. Then, relatively specialized learning is begun as well as English lessons, and the regular examination system is introduced in Japanese junior high schools. However, learning motivation and study habits are not always directly reflected on the results of regular tests. Therefore, it is rather difficult for students to feel the effect of their motivation and study habits on test results, and their motivation might decline in a learning apathy.

Next, reasons why study habits keep declining until the 3<sup>rd</sup>-grade fall term were examined. In junior high school, academic skills are evaluated based on the results of regular exams given in each term. Many schools set an "examination period," club activities are not conducted during this period, and supplementary lessons are given. Questions asked in the regular exams are related to the specific range of learning contents, and students might consider short-term as well as quantitative learning as being more effective than long-term and daily study habits. Furthermore, since it is difficult to evaluate study habits, the condition of each student's study habits is not thoroughly assessed, and support systems for preventing its decline have not been established.

Finally, factors related to the recovery and maintenance of study habits between the spring and fall terms in the 3<sup>rd</sup> grade were examined. In this period, students have clear goals, i.e., the high school entrance examinations. It is suggested that setting clear goals might increase learning motivation and improve study habits. In this case, it might be effective to give students in the 1<sup>st</sup> and 2<sup>nd</sup> grades some cues that would lead to success in high school entrance exams, to

prevent the decline in learning motivation and study habits.

#### **4.2. Scales for Measuring Home Study Habits and Subject Study Habits**

It is difficult to evaluate study habits, and it is one of the causes of the decline in junior high school students' study habits. Regular exams are taken for assessing academic skills, although the quantitative evaluation of daily study habits has not been conducted. Consequently, conditions of students are evaluated mainly based on academic abilities, whereas sufficient guidance for study habits is not provided. This study used Junior High School Students' Study Habits Scale (Okado et al., 2017). The results indicated that compared to subject study habits, home study habits had a lower correlation with academic results. However, both subject study habits and home study habits had strong correlations with academic skills in general. This result might have been produced because the evaluation of home study habits was qualitative, and quantitative evaluations such as assessing the learning time at home were not undertaken. Okado's scale is useful for assessing junior high school students' study habits and indicates their trends to a certain extent. Nevertheless, it should be modified to more accurately assess home study habits.

#### **4.3. Correlations between the Results of Regular and Mock Exams as Well as Improvements in Test Results and Study Habits**

Relationships between the results of mock exams in the 3<sup>rd</sup>-grade fall term and the results of regular exams in each grade were examined. The percentage of mock exam results that predicted the results of regular exams was approximately 70%. It is considered that 70% of academic skills are developed through the constant accumulation of learning conducted to prepare for regular exams during the 1<sup>st</sup> and 2<sup>nd</sup> grades. Long-term learning, as well as learning of a certain range of study units, might be effective to a certain extent. It is necessary to take measures to prevent the considerable decline in study habits after entering junior high schools and a constant decline from the 1<sup>st</sup> grade to 3<sup>rd</sup> grade.

Correlations between the results of regular and mock exams in the 3<sup>rd</sup>-grade fall term and study habits were examined. Results indicated a strong correlation between both exams and subject study habits. It is suggested that support for learning using the Study Habits Scale is important for improving academic skills. When examining correlations depending on the period, study habits in the 1<sup>st</sup> grade fall term were strongly correlated with academic results in the 3<sup>rd</sup> year fall term in both regular and mock exams. It is considered that approximately two years might be necessary for study habits to affect academic results. Evaluation of study habits using the scale and development of education programs for preventing the decline of study habits would be required to deal with junior high school students' tendency of showing a significant decline in study habits between the spring and fall term in the 1<sup>st</sup> grade.

Correlations between the improvement in academic results and study habits

were also examined, which indicated a strong correlation between the results of regular and mock exams and study habits after the 2<sup>nd</sup>-grade fall term. It is considered effective to improve study habits between the spring and fall terms in the 2<sup>nd</sup> grade and start preparing for high school entrance exams from the 2<sup>nd</sup>-grade fall term. Junior high school students' study habits declined from the 1<sup>st</sup>-grade spring term to the 3<sup>rd</sup>-grade spring term and improved after that. It is considered effective to develop an educational program in which the time for starting improvements in study habits is changed to the 2<sup>nd</sup>-grade fall term, six months earlier than in the current system. Since the entrance exam is regarded as one of the factors that would improve study habits, making students set a goal of success in the entrance exam during the 2<sup>nd</sup> grade fall term would be effective for improving academic results, and it might be significant to evaluate study habits using the scale in the 2<sup>nd</sup> grade fall term.

Moreover, correlations between changes in study habits and academic results in the 3<sup>rd</sup>-grade fall were examined, which indicated changes from the spring to fall in the 1<sup>st</sup> grade were highly correlated with the academic results in the 3<sup>rd</sup>-grade fall term. Therefore, it would be important to improve study habits between the spring and fall in the 1<sup>st</sup> grade. Moreover, changes between the 2<sup>nd</sup>-grade spring and fall were highly correlated with improvements in academic results. Study habits were maintained or improved from the spring to fall in the 3<sup>rd</sup> grade. It would be effective to develop an educational program in which this trend is moved to between the spring and fall in the 2<sup>nd</sup> grade. Furthermore, changes between spring and fall in each grade seem to affect academic results as well as their improvement. It is supposed to be significant to maintain or improve study habits between spring and fall. Furthermore, factors that would decline study habits should be examined.

#### 4.4. Patterns of Changes in Study Habits

Based on the above, it was indicated that junior high school students' study habits tended to decline, and support using educational programs would be required. Aiming to examine support measures for each student, students were classified into four groups depending on the patterns of changes in study habits; the considerable declining type (N = 34), declining type (N = 48), maintaining type (N = 39), and low-score maintaining type (N = 35). Academic results in the 3<sup>rd</sup>-grade fall were highest in the maintaining type, followed by the low-score maintaining type, declining type, and considerably declining type, in descending order. It is considered that the score of study habits at the time of entrance is not so important, and to maintain study habits is more important for improving academic results. That is, to prevent a decline in study habits is essential. Since study habits of all the four types tend to decline, it is necessary to provide support for all of them to maintain or improve study habits. Especially, for the declining type and considerably declining type, educational programs should be implemented for assessing their study habits, preventing a decline and improv-

ing them.

Moreover, in the subject-based teacher system that is introduced in junior high school, it is more difficult to understand students' conditions, compared to during elementary school days. Special support should be provided to students that show maladaptation to the system. It is important for teachers and parents to understand each student's conditions in detail. The declining type and considerably declining type students show high scores of study habits when entering junior high school, and the scores gradually decline. These students might not be able to adapt themselves to junior high school systems, and special support should be provided. Moreover, teachers, parents, and students need to share information about students' conditions. It is considered useful to evaluate students' conditions using the study habits scale, classify them into four types, develop educational programs appropriate for each student and provide support.

## 5. Summary and Future Perspectives

Correlations between study habits and academic results were examined. It was indicated that study habits are useful data for evaluating students' adaptation to environmental changes from elementary school to junior high school, and for supporting them to improve academic skills. In the future, intervention analysis should be implemented for maintaining and improving study habits. It is important to examine whether intervention programs could be implemented at junior high schools and would improve study habits, and minutely investigate the effect of improvement in study habits on academic results.

This research was aimed at analyzing practical data. And this research revealed two things. The first is that the study habits tend to decline after entering junior high school, and the second is that there is a strong correlation between study habits and academic results. The former was the result showing the correctness of prediction.

But the latter was not so. Correlations between academic results and study habits have rarely been observed. It was thought that good study habits are desirable, but a strong correlation between learning habits and academic achievement is new knowledge.

In educational settings, this is important information for improving education. That is, not only subject study can improve academic performance, but also educational content to maintain and improve students' study habits, submitting the necessity of improvement of the school system.

Utilizing this scale provides opportunities for improving subject education and the school system, and it is also highly likely to be used as a means of assessing the outcome of subject education and school systems.

In addition, even when a teacher interviews students, using the materials on study habits together with academic results will give a perspective and opportunity to improve students' learning situation. This research shows that there is a possibility of realizing improvement and reform in school education with new

knowledge.

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