The Influence of Family Paper Books and Electronic Devices on Students’ Scientific Achievements: Based on PISA2015 China (B-J-S-G) Data
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Introduction

With the rapid development of science and technology, the study of the relationship between students’ academic achievement and family paper books and electronic devices has attracted more and more scholars’ attention. Along with PISA2015 result which mainly measures students’ scientific achievement, this research aims at examining the following hypothesis: There is a correlation between the scientific achievements of Chinese middle school students and the conditions of their family paper books and electronic devices.

Methods

This study attempts to respond to the impact of Chinese middle school students’ family paper books and electronic devices on the scientific achievement of middle school students, and explores the impact between the types and quantity of family books and electronic devices.

Independent variables

- The types and quantity of paper books
- The types and quantity of electronic devices

Dependent variables

PISA 2015 scientific average score

Samples

PISA 2015 data from four provinces (cities) - Beijing, Shanghai, Jiangsu, and Guangdong in China, the valid sample was 9359.

Data Analysis and Results

Statistical test of the types of family books and the impact of students’ scientific achievement: Pearson product-moment correlation \( r = 0.373, P < 0.001. \) The types of family books (≤6) has a significant correlation with the student’s scientific achievement: \( y = 423.555 + 23.198x. \)

The level value of the original variable is re-set, through the F-test (ANOVA) on the low, medium and high level of family books quantity and the scientific achievements of students, the results show that the level effect of family books is extremely significant.

One-Way ANOVO statistical analysis of the scientific achievements of family students with low, medium and high levels of family books quantity. The results show that \( F(2,9779) = 404.487, P < 0.001. \) There are extremely significant differences in the scientific achievements of students. After the multiple analysis comparison test shows that there are significant differences between the scientific achievements of students with three different levels of family books quantity. That is, the high-level book quantity of students has the best scientific achievement, the middle level is the second, and the low level is the worst.

According to the same method, there is a significant correlation between family electronic device types and students’ scientific achievements, and there are significant differences in the scientific achievements of students with three different levels of electronic devices. Students whose family have the low-level (0-7) of electronic devices quantity get the best score in science, the middle level (8) get the second, the highest level (9-15) get the worst.

Conclusion and discuss

This paper starts focus on the type and quantity of family paper books and electronic devices, and studies its influence on students’ scientific achievements.

In conclusion, the more types and quantity of middle school students’ family books, the better the students’ scientific achievements; the more types of electronic device (within five kinds), the better the students’ scientific achievements, but based on certain kinds of electronic devices, the more the quantity, the worse the students’ scientific achievements. To a certain extent, it reflects the influence of different family resources on students’ scientific achievements, also inspires us to pay more attention to paper books and appropriately control the quantity of electronic devices for the scientific study of middle school students.

Based on this, the following researches are proposed for the future:

- Whether there is an intermediary or adjustment variable between the independent and dependent variables;
- Compare the situation of different countries, explore differences and the generalization of conclusions.

References

PISA 2015 Database
https://www.oecd.org/pisa/data/2015database/