Improving Academic Performance through Tablet Learning PC: A Case Study of Chinese Migrant Children

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Abstract: Migrant children in China's cities are usually poor in family education environment and academic performance. In this study, a pair of 10-year-old and 8-year-old migrant children were selected as the experimental subjects for a one-semester extracurricular academic self-tutoring through tablet learning PC; as a result, their final exam scores in Chinese, English and mathematics have been improved by 30-70%, and their class ranks have upgraded from the bottom to the middle level, which were praised by teachers and other students, and their self-confidence and enthusiasm have been greatly enhanced. Finally, they plan to become excellent students in the class in the next semester. This study provides an economical and convenient way to improve the confidence of study and achievement of Chinese migrant children, and provides enlightenment and reference for the family education of disadvantaged children.

1. Introduction

With the development of economy, China's developed cities have developed a large number of primary and secondary schools in recent years, which provide free kindergarten and compulsory education to many rural children who come to these cities with their parents. These children are migrant children in China, and in some coastal cities, the number of the 3-14-year-old migrant children is more than half of the total number of children [1]. Most of the parents of migrant children are blue-collar workers with junior high school education, and their income is not high. Although they work arduously, they have no ability and time to provide good family education and academic guidance for their children. These migrant children often spend a lot of time watching cartoons and playing video games after school and their learning habits and academic performance are not ideal. Most of them rank low in their classes, and many of them fail to enter high school, let alone go to university [2]. Therefore, many urban white-collar families do not welcome migrant children, and white-collar parents think that the learning environment and education quality of public schools and kindergartens which accept a large number of migrant children are not good for their children's development. Furthermore, they prefer to give up the free compulsory education and let their children go to expensive private schools [3].

In this context, improving the learning performance of migrant children can not only improve their status of study and employment, but also improve their relationship with local students in cities, which is a social significance and urgent task in China [4-5]. Researchers believe that the key to improve this unfavorable situation is to find an economical and convenient way to make up the lack of family education for migrant children and effectively improve their academic performance. It may be a better option for migrant children to apply tablet learning PC extracurricular self-tutoring mode, but the effectiveness needs to be proved through experiments. Therefore, this study conducted the following experiments.

Tablet learning PC is a kind of professional computer with the development of artificial intelligence in recent years. It has a large number of high-quality reading materials and synchronous tutoring courseware for primary and secondary schools. It can realize homework tutoring, bilingual picture book audio reading, singing nursery rhyme, encyclopedia question and answer, scan and enhance the real picture book function. It also has the function of using time setting, browsing

content memory protection, and can be used for controlling children's browsing content and using time, protecting eyesight and partly replacing parents' company, which can solve the problem that parents have no time and ability to accompany and tutor their children [6]. And the market price is not high, depending on the function of the brand, most of them cost $100-300, which can be accepted by Chinese low-income families.

2. Experimental design

2.1 Purpose of the experiment

A small-scale experiment was carried out to verify the effectiveness of this method in six months.

2.2 Subjects

Hangzhou, China is a city with rapid economic development. More than half of the primary students in many public primary schools in Hangzhou are migrant children. In L primary school, a pair of ordinary migrant children's siblings were randomly selected as the experimental subjects. The elder sister was in Grade 5 at the age of 10, and the younger brother was in Grade 3 at the age of 8. Their academic ranks were all low in the class. Their parents only had junior high school education and blue-collar workers, who were busy with work, often worked overtime, and seldom cared about tutoring their children's studies. The primary school has little homework, and the children usually watched cartoons and played video games at home, where were almost no extracurricular books for them to read. Their grandmother, who is almost illiterate, takes care of them. With the consent of the children and their parents, the researchers provided the children with a 10-inch tablet learning PC for free, and carried out a five-month extracurricular self-tutoring experiment.

2.3 Experimental contents and methods

The tablet learning PC has built-in teaching courseware of famous teachers of various subjects in primary school, synchronous tutoring exercises and answers for key and difficult points, and more than 300 bilingual / English audio graded picture books. The researcher instructed the children to reduce the time of watching TV and playing games after class every day. Using the tablet learning PC courseware, they review Chinese, mathematics and English courses and complete their homework. At the same time, they read a bilingual picture book in the way of role-play. The whole time for review, homework and reading are controlled within 2 hours, and their grandma is responsible for the supervision. The researchers visited the children's home once a week to find out the learning situation of the children, and repeatedly told them to use the tablet for half an hour and have a rest for 10 minutes to protect their eyesight. If they have questions, researchers can also answer them at any time through Wechat.

2.4 Evaluation method

The questionnaire and interview outline of children's autonomous learning with tablet learning PC were compiled. Through interviews with parents and school teachers, the learning and living conditions of children before and after the experiment were understood, and the school final examination scores before and after the experiment were compared and analyzed.

3. Experimental results and analysis

Before the experiment, the average daily homework time of the two children was less than 30 minutes, but the accuracy rate was not high, simply around 60-70%. The two children were very happy to know that researcher intended to help them improve their academic performance. They used tablet learning PC to review lessons and read bilingual picture books seriously every day. In addition, they helped each other to learn together, and their grandmother also strictly supervised them. Besides, they also needed homework reference answers in the tutoring courseware. After the

experiment, the correct rate of their homework has been increased to 95%. Meanwhile, their learning and examination situation before and after the experiment have changed greatly, see Table 1-2 for details.

Table 1. The boy's learning and test scores before and after the experiment

Test items	**Before the experiment**	**After the experiment**	**Rate of change** (%)	**Sig** P-value
Average daily time of watching TV and playing video games (minutes)	150	100	-33.33	.000
Average daily homework review time (minutes)	20	50	+150.00	.000
Accuracy of homework (%)	60	95	+58.33	.000
Average time of reading bilingual picture books per day (minutes)	0	30	+100.00	.000
Test scores of Chinese (points)	63	86	+36.51	.000
Test scores of mathematics (points)	71	92	+29.58	.000
Test scores of English (points)	46	81	+76.09	.000
Class ranking (40 students in the class)	39	24	+38.46	.000
Satisfaction of the study mode		Like it very much		

The boy was almost at the bottom of his class in academic performance, especially in English performance. He achieved 46 out of 100 points in the final exam in the last semester. After 5 months of extracurricular tablet tutoring and bilingual picture book reading, his Chinese, math, and English scores increased by 36%, 29%, and 76% respectively, and his total score rose from 39th to 24th in the class.

Through tablet self-tutoring, the sister's Chinese, math and English scores also improved by 36%, 40% and 69% respectively, and her overall score rose from 35th to16th in the class, with greater overall progress.

Through questionnaires and interviews, it is found that during the experiment, the two children reduced 50-70 minutes of time for watching cartoons and playing video games per day, increased 50-70 minutes for tablet self-tutoring and 30 minutes for reading bilingual picture books. They have developed a good habit of autonomous reading and learning, and the correct rate of homework increased to 95%. They achieved excellent results in the final exam for the first time and got good results and got praise from parents and teachers. Meanwhile, their self-confidence and enthusiasm in learning have been greatly enhanced and they are more willing to continue to use tablet reading mode and set their own goals. Now they hope to enter the top 10 of the class in another semester and become excellent students.

Table 2. The girl's learning and test scores before and after the experiment

Test items	**Before the experiment**	**After the experiment**	**Rate of change**(%)	**Sig** P -value
Average daily time of watching TV and playing video games (minutes)	150	80	-46.67	.000
Average daily homework review time (minutes)	30	70	+133.33	.000
Accuracy of homework (%)	70	95	+35.71	.000
Average time of reading bilingual picture books per day (minutes)	0	30	+100.00	.000
Test scores of Chinese (points)	67	91	+35.82	.000
Test scores of mathematics (points)	62	87	+40.32	.000
Test scores of English (points)	55	93	+69.09	.000
Class ranking (41 students in the class)	35	16	+54.29	.000
Satisfaction of the study mode		Like it very much		

4. Conclusion

This experiment shows that this mode of children's autonomous review and reading with tablet learning PC is economical, convenient and effective, which is more suitable for children without parental tutoring. It can help children develop good habits of autonomous reading and learning, improve the accuracy of homework and test scores, and increase self-confidence and enthusiasm in learning. This experiment provides a reference and discussion for the family education of disadvantaged children.

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