

A Research on Sustainable and Effective Use of ICT in Chinese Secondary Education

—Case of Middle Schools in Lanzhou, Gansu—

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Abstract

Due to the differences in regional economic development, utilizing of ICT in education of each city has gotten to different stages. Lanzhou is a provincial capital but located in the northwest China where has the lowest regional GDP in China. It could be a pilot city in northwest region as well as a typically original city in China. However, there is few empirical research on how the influence of COVID-19 pandemic has changed ICT in education in cities like Lanzhou. This research aims to find out whether and how a better education has been realized by using ICT methods sustainably and effectively in current Lanzhou. Furthermore, we try to grasp the current state of ICT in Chinese secondary education. The methods of this research will include participant observation, questionnaire investigation and depth interviews, then use mix methods to analyze the data. This paper collected and organized data published by official accounts, which proves that a widespread distance learning has brought a big improvement to the use of ICT in Lanzhou's middle school since COVID-19 pandemic. Meanwhile, it is proved that teachers have also become more aware of the importance of the ICT in Education.

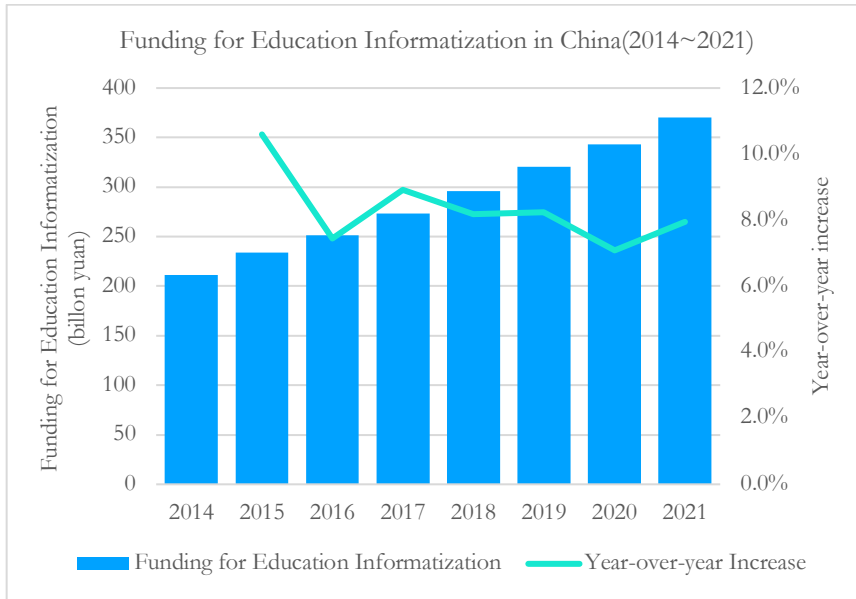
Keywords: Educational innovation, Education Informatization, Educational technology, ICT in education, Secondary education

Introduction

“Education Informatization 1.0” was advocated from 2001, and “Education Informatization 2.0” was advocated from 2017 in China. According to the National Bureau of Statistics of China, education funding in China has been increasing for 19 years from 2001, reached 5017.81 billion yuan in 2019, which increased even about 11 times from 2001(413.77 billion yuan). In June 2011, the Ministry of Education issued the “Ten-Year Development Plan for Education Informatization (2011-2020) (Draft for Comment)”, which stated that “Each regional government should allocate no less than 8% of education funding for Education Informatization.” Moreover, the proportion of national fiscal expenditure on education is generally not less than 4% of GDP. Owing to these policies, results show that funding for Education Informatization continues to increase, which had reached 370.4 billion yuan in 2021, with an increase of 8.0% year-over-year (Figure 1).

Figure 1

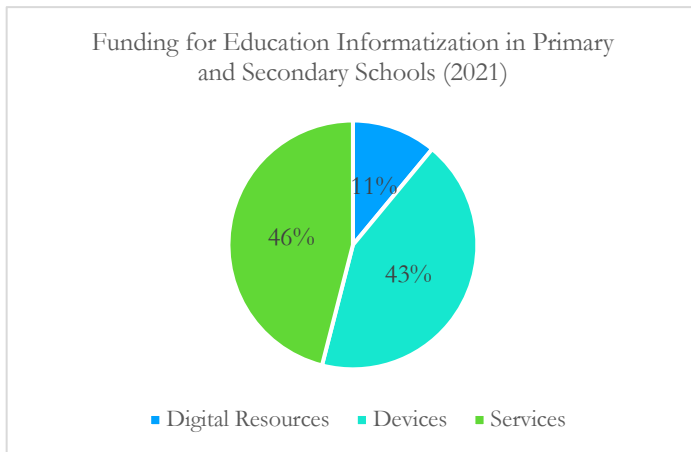
Funding for Education Informatization in China (2014~2021)



According to the Iresearch (2022), the spending for Education Informatization in primary and secondary schools in 2021, reached 163.4 billion, with a year-on-year increase of 9.1%. This part of spending is almost come from government financial allocation (over 90%). Furthermore, categorized results were presented in the pie chart (Figure 2).

Figure 2

Funding for Education Informatization in primary and secondary schools (2021)



However, due to the differences in regional economic development, utilizing of ICT in education of each city has gotten to different stages. Lanzhou is provincial capital of Gansu, but it is located in the northwest China where has the lowest regional GDP in China. Meanwhile, Lanzhou has become a Second-tier City of China in recent years. It could be a pilot city in northwest region as well as a typically original city in China. In addition, because of COVID-19 pandemic, distance learning with ICT devices has become popular. There is few empirical research on how the influence of COVID-19 pandemic has changed ICT in education in cities like Lanzhou.

This research aims to find out whether and how a better education has been realized by using ICT methods sustainably and effectively in current Lanzhou. Then we try to grasp the current state of ICT in Chinese secondary education.

Methods

Based on the knowledge of the obstacles and inadequacies of teaching with ICT already identified by previous studies, we will develop a questionnaire for students, teachers, and school administrators.

This research will conduct the following methods.

(i) Literature review

We will collect and organize published research findings and data through official accounts related to ICT in education, then analyze them.

(ii) Participant observation

We will classify ICT devices of the selected schools and total the quantity of them.

We will observe and record the routing of classes. If possible, we will set a video camera in the classroom to take videos of children's reaction, teachers' lecture, and materials on the screen of ICT device during the class.

(iii) Questionnaire investigation

We will prepare a questionnaire for students mainly about their impressions of class with utilizations of ICT. Then we will collect students' evaluations about learning motivation, comprehension, enthusiasm for class, satisfaction, etc.

We will also prepare a questionnaire for teachers, not only about impressions of ICT in education but also about frequency, skills, difficulties, training courses of using ICT and so on.

(vi) Depth interview

Based on the above results, we will interview the administrators of Education Informatization of each school to earn more details and information.

We will analyze the data using mixed research.

The following results derived from this review of the collected materials and related literature will be presented.

Results

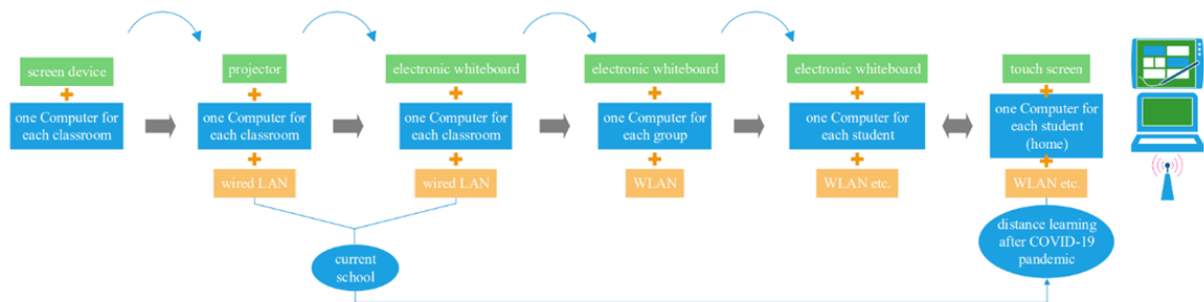
We collected some research findings that suggest that effects of the devices introduced depends on teachers' consciousness, motivation, and other factors. Ding. (2020) stated that middle schools are not taking full advantage of various digital resources in education. He. (2017) pointed out that major causes of this situation are imbalance in the allocation of information resources and lack of ICT training courses for teachers. Shimizu et al. (2008) emphasized the significance of teachers' awareness about ICT utilization.

According to the results of the survey by now, we learned that there are several stages of ICT environment in the class (Figure 3). Almost all the schools have already set ICT environment like stage 2 or 3 in each classroom, but a widespread distance learning has brought a big improvement from stage 2 to stage 5 in Lanzhou's middle school since COVID-19 pandemic. We could see that teachers are using touch screens, computers, lap-top computer, smart phone for online lessons. Tests and exams are also conducted online on the platform like VooV Meeting. Teachers and students have communicated by SNS during the period when students are not able to go to school. Meanwhile,

teachers have begun to exchange experiences frequently about teaching online and using ICT devices. Some of teachers who don't use ICT often also have started to learn how to use ICT in class.

Figure 3

Stepping up of ICT environment in classroom



Discussion

The next steps of future research will be collecting and organizing more research findings and data, conducting the questionnaires and interview, analyzing the data.

We are afraid the retrograde step will happen when students back to school. But we believe teachers will take advantage of the experience during this special period for the sake of achieving a sustainable and effective use of ICT in middle schools. It was a good start that teachers' awareness and skills of using ICT were improved by this way. New devices for online lessons are also not a waste, teachers and students' devices could be reuse by BYOD (Bring Your Own Device) in the future.

It is expected that this research will be a useful experience of improving the current situation of ICT in education in China and further promote.

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