The Applied Research of Information Technology in Poverty Alleviation through Education

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Abstract—Poverty alleviation through education is one of the effective ways to achieve targeted poverty alleviation and a crucial strategy to beat poverty with precision alleviation. Focusing on the current situation of teaching and the needs of education poverty alleviation in the impoverished region of western China, this paper researched how to put information technology into use effectively through questionnaires and interviews. It is found that 88.6% of the surveyed schools enjoy information infrastructures such as network connectivity and basic conditions for poverty alleviation. Concerning subject demand that for English is the most prominent, and the academic types distinguish from school to school. Based on the findings of the empirical research, this paper proposes a project of education poverty alleviation based on group enjoying, sharing to others, evaluation and diagnosis and treatment, which could enrich the teaching contents of schools in the impoverished region and promote self-development of teachers.

Keywords—Education; Poverty Alleviation; Information Technology; Network Platform

I. INTRODUCTION

Poverty alleviation through education, that is, to let children in the impoverished region be well-educated, is of importance for poverty alleviation and development, as well as holding the key to stop poverty from being passed on to the next generation. The traditional poverty alleviation aided by the government, namely, the “blood transfusion” way, is unable to get rid of poverty thoroughly, while the one through education, like “hemopoiesis”, is the most contributing and direct model, as well as one of the most achievements [1].

A series of methods are always adopted in traditional education poverty alleviation, including exemption or reduction of compulsory fees, strengthening the ranks of teachers working in the countryside and facilitating the targeted recruitment of key universities [2]. However, such approaches could not cover all impoverished regions rapidly, with tremendous resource consumption. In recent years, technology has begun to work in education amid the development of information technology and gradually surpassed the traditional way. Teng Yilin and others point out that information and network can transfer high-quality education resources to rural compulsory schools and impoverished regions, so that needy students can receive fair and high-quality education to solve the problem of educational disequilibrium [3]; Dillahunt, T. holds that the platform, providing sharing teaching-resources and information-based teaching skills training, can help poor rural areas to tackle the problems of insufficient teacher resources and training; Phillip A. Olt believes that students can get access to the synchronous online learning courses, which provides experience for teaching institutions to design effectively, forming the sustainable information technology products [5].

The above embodies the necessity of poverty alleviation through education and the usage of information technology. Nevertheless, how to verify the demand of educational resources in impoverished regions, and how to specifically adopt information technology to achieve education poverty alleviation, are still on the waiting list to be studied deeply in western China where the construction of informatization started late. Focusing on the problems mentioned above, questionnaires and interviews of teachers and teaching managers were launched in the poor areas of western China, and the available path of information technology to achieve poverty alleviation in education is given, with an in-depth analysis of the demand for educational resources based on the survey.

II. QUESTIONNAIRE AND ANALYSIS OF SUPPORTING EDUCATION FOR POVERTY ALLEVIATION THROUGH EDUCATION

A. The Design and Collection of Questionnaires

This paper carries out an exploratory empirical study based on questionnaires and interviews for digging the present situation of education and the demand for education poverty alleviation in the poor areas of western China. Firstly, it is vital to comprehend the current situation of the popularization of informatization in poverty-stricken areas and to explore whether those areas are adequately equipped. Secondly, the plight of teaching should be considered to tell the direction of information-based poverty alleviation.

Therefore, two following inquiry questions are central in the questionnaire:

1) Current situation of school information construction in poverty-stricken areas;
2) The relieving demand in poverty alleviation through education.
At present, the education in impoverished regions in western China mainly centralize in primary and secondary school. Therefore, in order to ensure the efficiency of questionnaires, this paper issued them to the principals, middle managers, teachers in schools in Shangluo City, Yan’an City, Weinan City and other prefecture-level cities of Shaanxi Province. A total of 295 questionnaires were distributed and collected, including 260 valid ones. According to the statistics, respondents in primary school make up the largest proportion, reaching 51.15%, and then 25.77%, 17.69% and 5.39% of junior high school, senior high school and kindergarten, respectively.

B. Analysis of Information-based Poverty Alleviation

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1) Current situation of school information construction in poverty-stricken areas

In terms of the degree of school information construction in poor districts and counties, 88.6% of the surveyed schools have completed or partially completed the information-based infrastructure such as network and computers, and only 11.4% of the schools do not have. Furthermore, an analysis is made on the use of teaching terminals such as Internet facilities and electronic whiteboards by teachers in infrastructure owned schools. The statistical analysis results are shown in Table 1. 84.66% of teachers regularly or daily use the network for teaching under the complete construction of the information-based infrastructure in schools, whereas 72.89% of teachers do in partially completed information-based infrastructure. This shows that in the investigated schools in poverty-stricken districts and counties, most teachers tend to use the network for teaching in high frequency. Therefore, there is a broad space of information technology application in education poverty alleviation.

2) The relieving demand in poverty alleviation through education

The survey and statistical analysis were conducted on the needs of poverty alleviation projects through education in poverty-stricken areas. The main findings include:

First, the analysis is about the demand for education poverty alleviation in subjects in poverty-stricken areas. It shows that the demand for Chinese, math and English is higher, with 35.77%, 34.23% and 41.92% respectively, in which the demand for external assistance in English is the most prominent. In addition, there is a strong demand for art and the development of comprehensive practice in schools.

Then, SPSS Statistics (statistical product and service solutions) was used to analyze whether there were significant differences between schools (including senior high schools, junior high schools, primary schools and kindergartens) on subject assistance. Fig.1 shows the frequency analysis under cross-grouping, which illustrates that the subject assistance distinguishes from types of schools. In this table, more than 70% of kindergarten administrators’ demand for subject assistance is concentrated on comprehensive practice. Moreover, subjects like sports, science and art are required, and the cultivation of children’s comprehensive learning ability is attached great importance, especially the development of children’s extracurricular activities. There are differences between primary schools and secondary schools due to different subjects, among which, the level of needs for subject assistance in high schools for subjects related to college entrance examination is higher than that of art subjects and comprehensive practice. Because of some factors such as intense competition and the entrance examination, the demand for subject education needs more resources of high-quality, sufficient and comprehensive subject assistance with the rise of the school category.

In ways of improving self-ability, assistance like systematic training, communication opportunities with experts, advanced teaching management and effective teaching experience are what teachers in poverty-stricken areas are eager to receive. However, due to the shortage of funds and the high cost of out-of-school training, there is a contradiction between the demand and the priority and opportunity of communication with top teachers and experts, which leads to the unsatisfactory effect of improving the ability of the teaching team and the management team.

Some foci on views of poverty alleviation through education by information technology are as follows. The principals and teachers hope that students have access to abundant teaching resources, such as learning materials and teaching videos. At the same time, it is hoped that teachers will be exposed to the advanced teaching methods of cultivating teaching concepts and imparting teaching modes. Courses about operating skills of software and hardware facilities are also expected in order to improve teachers’ comprehensive ability. It is also hoped that the psychological education system of students can be constructed, and the psychological health of students can be concerned through information-based poverty alleviation.

### Table 1. Use of information-based equipment

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<tr>
<th>Daily use</th>
<th>Regular use</th>
<th>Occasional use</th>
<th>Subtotal</th>
</tr>
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<tbody>
<tr>
<td>All classrooms have Internet access with electronic whiteboards or other teaching terminals</td>
<td>76(43.18%)</td>
<td>73(41.48%)</td>
<td>27(15.34%)</td>
</tr>
<tr>
<td>Some classrooms have Internet access with electronic whiteboards or other teaching terminals</td>
<td>28(37.84%)</td>
<td>26(35.14%)</td>
<td>20(27.03%)</td>
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III. Project Design of Poverty Alleviation through Education Supported by Information Technology

Combined with the investigation and analysis results, this paper gives the project design of poverty alleviation through education supported by information technology. Fully combining the existing conditions of Internet access and basic equipment such as electronic whiteboards in poverty-stricken areas, and centering on the four dimensions of group enjoying, sharing to others, evaluation, and diagnosis, the paper proposes a project in information-based poverty alleviation through education, including resource sharing, synchronous classroom in the subject network, online interaction of top teachers, principal forum, co-activities with well-known schools, examination assessment and psychological diagnosis.

Schools’ demand for teaching resources should be satisfied by the introduction of information technology, thus realizing the function of sharing resources between schools in developed areas and poverty-stricken areas. According to different school types, resources such as classroom courseware, teaching video and examination questions from top teachers and famous schools meeting the teaching needs are shared respectively, thus alleviating the shortage of teaching resources in poor districts and counties.

The application of Internet technology including synchronous live broadcast, interactive and other forms of subject network classrooms can alleviate the shortage of teachers, narrow the educational quality gap between urban and rural schools, and finally realize the integrated development of the main classroom and branch classroom [6].

Teachers’ demand for self-development need to be fulfilled and the interaction of famous teachers based on the network platform need to be realized. The teaching resources shortage due to the region, time and school financial conditions need to be solved, and teachers should be supported with teaching skills, technical knowledge as well as other related knowledge that helps mold teachers’ multifaceted skills like cognition, brain science development, children’s physical and mental health, etc. [7]

In view of the school administrators’ needs of improving teaching management methods and enhancing teaching management efficiency, the principal forum is designed to help realize inter-school cooperation and exchange thus to solve the outstanding problems in teaching management and guiding the school to find out management method suitable for themselves, also learning management experience from elite schools.

According to the requirements of increasing school activities and broadening students’ horizons, the function of sharing famous schools’ activities is designed. In the remote poverty-stricken area, due to the shortage of resources, schools are unable to carry out rich extracurricular activities to improve students’ comprehensive ability. By sharing elite schools’ activity through the network, students’ vision can be broadened and exchanges between schools can be promoted. The contents of all extracurricular activities can, therefore, be enriched.

Aiming at the problem shown in the interview that teachers are having a negative attitude towards teaching, teaching observation, learning score table, and other ways are introduced to assess and supervise the live classes in different schools and teachers’ enthusiasm in helping students so as to correct the problems timely. Besides, these methods are also convenient for government teaching and research personnel to supervise the effect of the live broadcast course on the platform and realize the function of evaluation.

On the question of teachers’ concern for students’ psychological health, we designed the function of the students’ psychological remote diagnosis and treatment based on the Internet. Based on the stress level and mental health status of students measured by special techniques and algorithms, reasonable effective treatment methods are set up according to different degrees of psychological stress, which is of great significance to students with mental diseases in poor areas.

IV. Summary and Outlook

Informatization provides the superiority and feasibility of poverty-alleviation education compared to the traditional poverty-alleviation education model. By carrying out an empirical study, this paper focuses on the demand for educational resources in poverty-stricken areas, analyzes the basic informatization situation in poverty-stricken areas and the content and direction of information-based poverty alleviation. Furthermore, this paper puts forward an educational poverty alleviation project base on the four dimensions of group enjoying, sharing to others, evaluation and diagnosis and treatment, supporting the decision-making in realizing regional overall assistance and accurate school education assistance.

In the future research, we will actively explore the advanced teaching mode, such as how to integrate VR course [8], SPOC (Small Private Online Course, small-scale restricted online course) with teaching through the more specialized teaching process, thus to improve teaching quality and achieve education poverty alleviation.

REFERENCES


