Analysis and Research Based on Method of Questionnaire Survey and the Algorithm of Big Data Analysis

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Abstract. During the COVID-19 epidemic, the whole country suspended classes in schools without stopping studying. Under this circumstance, online teaching experienced a breakthrough development. This paper uses the method of questionnaire survey and the algorithm of big data analysis, and this paper explores the general situation of online teaching in local colleges and universities in southwest Guangxi which face challenges in online learning due to the relative shortage of educational resources and remote geographical location. This paper analyzes the supporting conditions, problems and shortcomings of online teaching in local colleges and universities in southwest Guangxi. Suggestions are also proposed on four aspects to improve online teaching and learning experiences, which are establishing the basis of online teaching conditions, strengthening the basic rules of online classroom management, improving teachers and students’ adaption to online environment, and guiding students to improve independent learning ability.

Keywords: Big data analysis; COVID-19 epidemic; Online teaching; Effectiveness and supporting conditions.

I. Introduction

Since December 2019, affected by COVID-19 epidemic, schools have generally postponed opening, which resulted in teaching process being badly impacted. As such, schools at all levels organized and implemented online teaching, in accordance with the guidance of the Ministry of Education of the People's Republic of China on the Organization and Management of Online Teaching in Colleges and Universities during the Period of Epidemic Prevention and Control and the actual needs of epidemic prevention and control, in order to ensure the continuity of education during the postponement of school terms and to maintain the same teaching standards and learning process of students. Teachers and students responded actively, and online teaching models developed rapidly throughout China and even around the world. (Ministry of Education. Guidance issued by the Ministry of Education on Organizing and Managing Online Teaching in Colleges and Universities during Epidemic Prevention and Control [EB/OL].) (2020-11-13.)

Southwest Guangxi is located in the "Six in One" special area, which stands for old revolutionary base area, ethnic minority area, border area, rocky mountain area, poverty area, and reservoir immigration area. Local university educational resources are limited, and signals for internet connection are weak due to remoteness in rural areas. In order to overcome these challenges and ensure the equivalence of the effect of online and offline learning for local college students in Southwest Guangxi, improve the quality of teachers' online teaching, and bring online curriculum to a new level, this study is problem-oriented and carries out an online questionnaire survey on the online teaching situation of local colleges and universities in Southwest Guangxi. It aims to provide reference for the improvement of online teaching quality for these higher education institutions.
2. Methodology and Objects of Study

This study mainly used questionnaire to collect data. A set of online teaching questions were prepared, which mainly included "conditions of online learning hardware ","students' online learning experiences"," students' evaluation of teachers' online teaching "," students' satisfaction with online teaching" and "problems in students' online learning ", etc. These questions are sorted in twelve questions within five categories. With the help of online platforms, the questionnaire was directed to the students of local colleges and universities in southwest Guangxi. As of 8 May 2020, a total of 15546 students were surveyed. By collating the data, after sorting out unqualified and incomplete answers, 15146 valid questionnaires were collected.

3. Overview of Online Teaching in Local Universities in Southwest Guangxi

By using statistical software spss20.0 the data was analyzed. The results of the overall summary of online teaching in local colleges and universities in southwest Guangxi are shown mainly in four aspects, as follows.

3.1. Basic Learning Conditions are Met, but Quality Learning Tools are Lacking

Data shows that 90% of students have hardware available for learning, such as their own mobile phones or their family's mobile phones and computers; 10% of students say that the current hardware conditions do not meet the online learning requirements. The main reason is that the network signal is not strong at home and especially weak in remote areas. 52.69% of students use tablets for online learning, 45.26% use mobile phones for online learning, and 2.06% use computers (desktop or notebook) for online learning. The data above shows that most students in local colleges and universities in southwest Guangxi meet online learning conditions. However, most of the online learning tools they use are mobile phones. Computers or other better online learning tools are insufficient. At the same time, a small number of students still have not met online learning conditions, which needs the attention from families, colleges and society.

3.2. The Online Learning Style is Flexible, but the Learning Effect is not Good

According to the survey, 84.27% of the students said that they could use online teaching resources to complete tasks and learn online, which means that they could effectively achieve the teaching objectives ;15.73% of the students said that the existing teaching resources could not help them complete learning tasks. Among these students, 35.21% of the students like online live teaching, 33.79% like "self-study + teacher guidance on the online curriculum platform ", 11.98% like "micro-class + teacher guidance ", 19.02% like "self-study + teacher guidance according to teaching materials and reference books ", 64.71% like teachers' tutoring. This means that students in general have high expectations for teachers who teach online.

For challenges of online learning, 57.69% of the students think that having the "consciousness of autonomous learning" is the biggest challenge learning online. 24.01% of the students think that "autonomous learning ability" is the biggest challenge for them. The lack of time and online learning tools pose difficulties for only a small number of students.

According to the data above, most students in local colleges and universities in southwest Guangxi have the ability to complete tasks for online courses, but there are also few students who lack learning ability and have poor self-control. This requires teachers to use "teacher guidance + lecturing on platform" to reduce the time for live broadcast, improve teacher-student interaction, arrange learning tasks ahead of time, and make it a norm for students to bring problems to the classroom and leave with active thinking. At the same time, we should tighten the monitoring of students' classroom behaviors, enhance the enjoyment of learning, communicate with students through various channels, understand the difficulties of online learning, and actively answer questions from students.
3.3. Teachers are well Prepared for Online Teaching, but the Management of Teaching Process is Insufficient

According to the survey, 89.05% of the students said that teachers could effectively deal with emergencies and have emergency plans when they carry out online teaching. When students are unable to enter the online classroom, teachers could provide other ways to solve this problem; 10.95% of the students said that teachers could not deal with the unexpected situations of online classes as they had no emergency plans. In view of this, online teachers should make different scenarios of online teaching. In the process of "presupposition" and "generation" of knowledge, they should possess the "educational wit" as university teachers should have and maintain the standard of online teaching quality.

In regard to teachers providing online assistance to students, 89.16% of students said that teachers could provide remote assistance to students in the process of online teaching, while 10.84% said that teachers could not. 95.82% of the students reflected that teachers could make rational use of teaching resources to fulfill lesson plans and ensure that teaching was carried out in an orderly manner, while 4.18% said teachers could not fulfill this goal. 89.05% of the students said that the teachers had conducted the platform network test before class to ensure successful access of students; 10.95% of the students said that the teachers had not carry out network tests in advance which resulted in some students failing to enter the online class on time. 95.93% of the students said that teachers could teach according to the schedule of this semester, and 4.07% others thought that the teachers did not carry out online teaching according to the schedule of this semester.

The data above shows that most teachers in local colleges and universities in southwest Guangxi can meet online course requirements, well prepare before class, have the ability to deal with the unexpected situations of online courses, and successfully provide remote assistance to students. However, there are also a small number of teachers who cannot provide students with remote assistance because of their own lack of information literacy and emergency plans for internet problems. Worse, few teachers lack requirements for themselves and prepare inadequately before class. They do not teach according to teaching plans and rather manage online classes arbitrarily.

3.4. Teachers have Abundant Online Teaching Resources, but Their Teaching Quality is not Good Enough

Data shows that for the question of “What needs to be improved for online teaching,” 50.57% of students believed that teachers' video teaching needed improvement, 27.12 % of students believed that teachers' electronic teaching plans or PPTs needed improvement, 17.67% of the students thought that assignments given by teacher were ineffective and not specific enough. 4.63 % of students felt that other aspects could be further developed. Regarding to the overall satisfaction with the implementation of online teaching, 10.55% of the students said that they were highly satisfied, 28.72 % of students were satisfied, 25.2 % of students were basically satisfied, 32.23 % of students thought that online teaching was fine, 3.3% of students were dissatisfied.

According to the data above, the online teaching quality of local colleges and universities in southwest Guangxi needs to be improved. Teachers should sort out important resources from a massive sea of information, use teaching resources properly, deepen their study in multimedia or information literacy. They should also make great efforts to prepare lessons and make course summaries, focus on innovative teaching design, and optimize online teaching materials, such as teaching videos, electronic teaching plans, PPTs, etc.

4. Cause Analysis of Online Teaching Problems in Local Universities in Southwest Guangxi

In its early stage, because of its advantages of abundant resources and flexible study methods, online teaching has aroused students' interest in learning, and ushered in new opportunities and development for teaching activities. However, some problems in online teaching are difficult to solve at a fundamental level, which leads to the weakening of some students' learning motivation and the deviation of learning behavior. Combining the answers to the open questions of the survey, the analysis for the reasons of the problems in online teaching in local colleges and universities in southwest Guangxi are as follows:
4.1. Inadequate Online Teaching Conditions
Due to the lack of high quality learning tools, most students use mobile phones as a learning tool. The limitation in the functions of mobile phone weakens the effect of online teaching. The problems of imperfect online teaching are mainly shown in two aspects. First, the platform is difficult to use. Online teaching platform is not unified. Teachers and students need to be familiar with various platforms, which increases the difficulty of teaching; second, some teachers and students have online education at home, where the lack of good network adds to the difficulty to teaching process, which includes insufficient data flow, bad internet connection, and problems in logging in platforms. This seriously affects the teaching interest and effect of teachers and students as their teaching activities cannot be sustained and good teaching quality cannot be guaranteed.

4.2. Effective Communication between Teachers and Students is Difficult to Achieve
In the process of online teaching, students receive knowledge from teachers and put forward their questions during interactive sessions. However, because teachers cannot observe the learning status of students through network in real time, they do not have a good understanding of their learning situations and effectively solve the problems encountered by students. This makes it difficult to realize the effective communication between teachers and students. In the long run, it may lead to the decrease of students' enthusiasm for curriculum learning, the rise of doubts on teachers' teaching methods, and the formation of negative teacher-student relationship.

4.3. Lack of Adaptability of Teachers and Students to Online Courses
In the process of online teaching, the ability of teachers to "teach" and students to "learn" also greatly constraints the teaching effect. According to the survey, 15.73% of the students said that they could not use the existing teaching resources to complete learning tasks, which is mainly manifested in the lack of ability to research, collect, and analyze materials independently and inadequate self-discipline. At the same time, teachers' insufficient online teaching ability also contributes to the problems because of their shortcomings in information literacy and educational wit. Also they are unable to provide better remote assistance and make rational use of teaching resources.

4.4. Online Teaching Monitoring is More Difficult
Affected by the epidemic and due to the long duration of online teaching, students feel fatigue easily from watching videos for a long time. In addition, without face-to-face classroom interactions, students' enthusiasm for learning also decreases with the passage of time and dropping of interest. This is manifested in students leaving the online teaching platform as soon as they check in, low participation rate in the classroom, and playing mobile phones or chatting during class, etc. On the internet, teachers are unable to monitor students in these circumstances. The lack of face-to-face supervision and reminders from teachers makes it hard to draw students' attention back to class. The teaching effect is greatly reduced, and the teaching quality is difficult to guarantee.

5. Suggestions for Improving the Effectiveness of Online Teaching
Based on the analysis of the conclusion in the survey regarding general situations of online teaching, existing problems and analysis of causes, this paper puts forward the following four suggestions for online course teaching in order to further improve the online teaching efficiency and promote the quality of student learning.

5.1. Laying Down a Solid Foundation of Online Teaching Conditions
②Online teaching meets the learning needs of most students and promotes the renewal of teaching methods in colleges and universities. At the same time, it can also meet the development needs of enterprises to a certain extent and promote the development of national education. Therefore, "suspending classes without stopping teaching and learning" requires all levels of education departments and schools to work together. The government, enterprises, colleges and universities also need to cooperate extensively to help the development of online teaching. First, the government and enterprises should try their best to provide basic network services for online teaching, formulate such
policies and measures as network construction and preferential network fees; second, teachers should make rational use of online teaching platform resources to avoid using too many online platforms to "teach" and "learn" at the same time; third, enterprises should speed up the integration of online teaching platform resources and improve the platform function application system; fourth, enterprises and colleges and universities should strengthen the training on the use of online platform for teachers and students, so that teachers can skillfully use the online teaching platform and improve the compatibility between "teaching" and "learning ".(Department of Education: Using the Internet platform , " Stop classes but continue learning "[ EB/OL].); and (2020-11-13). [2020-02-05]. http://www.moe.gov.cn/jyb_xwfb/gzdt_gzdt/s5987/202001/t20200129_416993.html.)

5.2. Strengthening the Regulations of Online Classroom Management
To tackle online communication obstacles between teachers and students, teachers should reinforce the management of online classrooms. First of all, students are required to sign in in advance. Teachers need to find out the reasons for students who are absent; secondly, during the course, interactive activities should be arranged so that students can concentrate and become interested in learning. At last, teachers should be patient in answering students’ questions and help them with any problems they have, providing a good educational service for students.

5.3. Improving the Adaptability of Teachers and Students to Online Teaching
The improvement of teachers and students' ability of "teaching" and "learning" depends on the joint efforts of colleges and universities, as well as relevant departments of colleges and universities and teachers. In order to make the linkage of the three the most effective, colleges and universities, relevant departments, and teachers should first actively strive to create a suitable online learning environment for students, providing good learning atmosphere; secondly, colleges and universities should actively carry out activities such as training sessions and observation on excellent online class models to improve teachers' technological teaching ability. They should also guide teachers to further explore the implementation methods of "Internet + teaching ", optimize teaching design, and promote practical research of teaching mode under the condition of information technology, promoting teachers' teaching ability to a higher level. Teachers should continue to pay close attention to students' learning status, make rational use of network teaching resources, and fully grasp and utilize the key teaching parts such as core content analysis, interactive participation and timely feedback, providing timely online tutoring and answering questions to help students achieve high efficiency in quality learning. At last, teachers should improve their learning of theoretical knowledge and competency of online teaching, through such ways as joining demonstration lessons provided on various platforms or participating in the courses of teachers' online classes of the same majors from the same faculty to enhance their online teaching abilities.

5.4. Guiding Students to Enhance their Self-consciousness of Independent Learning
The relevant functional departments of colleges and universities, colleges (faculties and departments) and teachers should accurately understand the causes and practical difficulties faced by students through different channels and perspectives, help students to seek solutions in time, and provide specific assistance. At the same time, we should provide a good psychological guidance to students, help them adjust their mentality as soon as possible, direct them to clarify their learning objectives, stimulate students’ learning potential, increase their active learning and strengthen self-discipline to deal with online courses effectively. It is also important to guide students to use metacognitive learning strategies to plan, monitor and regulate self-learning to eventually achieve their learning goals.

6. Conclusion
The development of online teaching during the epidemic provides a strong safeguard for continue operations of local colleges and universities, which has an impact on the current education mode of colleges and universities. Online teaching is both an opportunity and a challenge. As such, local colleges and universities in southwest Guangxi should take this opportunity and bravely accept the
challenges. They should give full play to their own advantages, optimize the allocation of resources, actively promote the innovation of educational and teaching ideas and methods, and strive to achieve a comprehensive realization of education modernization.

Acknowledgements
This study was jointly supported by the Guangxi Vocational Education Teaching Reform Research Project in 2019 (Grant Number: GXGZJG2019B002).

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