ONLINE TEACHING AND LEARNING PROCESS DURING COVID-19 OF UNDERGRADUATE STUDENTS IN CHONGQING, CHINA

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ABSTRACT
The objectives of this research were 1) to study online teaching and learning process in the situation of the Coronavirus disease, and 2) to study the appropriate online teaching and learning process in the situation of the Coronavirus disease of undergraduate students in Chongqing, China. This research was quantitative method research. This conceptual framework of this research was applied from Bruno's study. The population consisted of 20,000 undergraduate students in Chongqing, China. The samples of 400 undergraduate students were determined by Taro Yamane formula. The instruments in this research were 1) online teaching and learning process plans for classroom activities, 2) learning ability test, and 3) achievement test. Statistics used for data analysis were percentage, frequency, mean, and standard deviation. The research results revealed that 1) the achievement online teaching and learning process in the situation of the Coronavirus disease of undergraduate students in Chongqing, China as a whole was at a much level. When considering each aspect from the highest to the lowest following, praising its teaching methodologies, curriculum adaptations, and pedagogical strategies, increasing networking opportunities, and the lowest level was promoting critical thinking. 2) The appropriate and feasible learning management based on STEM education concepts to promote the problem-solving skills of students in Chongqing, China was at a high level.
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INTRODUCTION

Continental landmass In January 2020, China postponed all educational activities and the Ministry of Education (MoE) in China advised schools and colleges to use online teaching instead of in-person classes. This is a significant development since China has authorized the broad use of internet transmission for official educational purposes for the first time. In response to the request, the majority of mainland Chinese provinces, municipalities, and autonomous regions have rescheduled their spring semesters and transitioned to online education. The Undergraduate Students in Chongqing, Chinawere the first groups to complete their studies in April 2020, signifying the phased reintroduction of in-person education for students. The global outbreak of COVID-19 has presented unparalleled difficulties for educational institutions around the globe, requiring swift adjustments to guarantee the uninterrupted progression of learning. Due to significant restrictions on face-to-face contacts, universities worldwide transitioned to online teaching and learning methods. This sudden change has emphasized the crucial need to assess and enhance these novel instructional procedures. The Ministry of Education (MoE) in China implemented a rapid transition to online education in January 2020, impacting many students in many regions, including Chongqing. This policy was implemented to alleviate the disturbance created by the epidemic and ensure continued academic advancement via digital platforms. Chongqing, a central urban region, had a widespread adoption of online learning, impacting almost 20,000 students pursuing their bachelor's degrees. This significant transformation has prompted crucial inquiries about online educational approaches' efficacy, flexibility, and suitability. Uni, a renowned international retail company recognized for its relaxed attire and groundbreaking apparel, offers a comparable framework to examine customer behavior and brand worth. An analysis of how demographic characteristics, specifically in the Yubei District of Chongqing, might affect purchase intentions provides valuable insights into how brand image can shape customer choices in times of crisis. This study aims to delve into the online teaching and learning processes adopted during the COVID-19 pandemic, with a particular focus on undergraduate students in Chongqing. By examining these processes, the research seeks to: Study the Online Teaching and Learning Process: Investigate how the sudden shift to online education was managed. Evaluate the effectiveness of the methodologies and strategies employed. Assess student engagement, curriculum adaptation, and overall pedagogical outcomes. Identify Appropriate Online Teaching and Learning Methods: Determine which educational practices were most effective in supporting students.

Explore how these methods could be improved to better cater to students' needs during such crises.

Using a quantitative research approach, the study leverages insights from Bruno’s conceptual framework to analyze these aspects systematically. The research encompasses a sample of 400 undergraduate students from a population of 20,000 in Chongqing, selected using Taro Yamane's formula for sampling.

Research Questions

1) To study online teaching and learning process in the situation of the Coronavirus disease.

2) To study the appropriate online teaching and learning process in the situation of the Coronavirus disease of undergraduate students in Chongqing, China.

LITERATURE REVIEWS

1) Impact of COVID-19 on Education Systems

The COVID-19 pandemic has significantly disrupted educational systems worldwide, leading to the unprecedented closure of schools, colleges, and universities. As governments implemented lockdown measures to mitigate the spread of the virus, educational institutions were forced to transition to online teaching and learning methods. The initial closure was

intended as a short-term measure; however, prolonged shutdowns have raised concerns about the long-term effects on students' educational experiences and skill development (Piopiunik et al., 2020).

In India, for example, the closure of educational institutions disrupted not only the immediate learning processes but also had far-reaching implications for the country's economic development and social structure (Fredriksson & Ihlen, 2018). This disruption has highlighted the importance of school attendance in fostering social awareness and skills among students. Missing school can detrimentally affect students' abilities to develop critical skills essential for their future.

2) Transition to Online Learning

The shift to online learning has been met with varying degrees of success across different educational institutions. Private schools with more resources quickly adopted online teaching methods, utilizing multimedia presentations and interactive online tools to maintain educational continuity. In contrast, low-income private and government schools faced significant challenges, leading to full shutdowns and limited access to educational resources (Bjorklund & Salvanes, 2011). This disparity underscores the digital divide affecting students' learning experiences, particularly among those from disadvantaged backgrounds.

Furthermore, the shift from traditional chalk-and-talk teaching methods to online pedagogies has necessitated the use of learning management systems and open-source digital platforms. This transition has been critical in providing students with remote learning opportunities, though it has also revealed challenges in student engagement and participation (Fredriksson & Ihlen, 2018). The effectiveness of these new teaching methods largely depends on the ability of educators to adapt to online formats and create engaging learning environments.

3) Challenges in Online Education

One of the significant challenges faced during the online transition has been ensuring consistent student engagement. Many educators reported difficulties in fostering active participation in virtual classrooms, highlighting a need for effective pedagogical strategies tailored to online learning environments (Piopiunik et al., 2020). The lack of dynamic interactions, which are crucial for developing critical thinking skills, has been particularly evident in the online setting, where traditional social cues and classroom interactions are diminished.

Moreover, parents have encountered challenges in adapting to the new educational landscape. Many parents lack the technological proficiency required to assist their children effectively in navigating online learning platforms, leading to further difficulties in student learning outcomes (Bjorklund & Salvanes, 2011). The digital divide extends beyond students to encompass families, with many experiencing inadequate internet connectivity, which disrupts the online learning process.

4) Impact on Assessments and Employment

The global shift to online learning has also affected assessment practices. Traditional in-person evaluations have been replaced with digital assessment tools, which have their limitations. Concerns about measurement accuracy and the reliability of online evaluations compared to traditional methods have emerged, potentially undermining the integrity of academic assessments (Piopiunik et al., 2020).

The implications of these disruptions extend to the labor market, particularly for recent graduates. With the increased reliance on online education, employers continue to use educational qualifications as benchmarks for hiring. However, the pandemic's disruptions have adversely affected the matching efficiency of recent graduates with available job opportunities, resulting in increased rates of job separation and stagnation in earnings growth (Fredriksson & Ihlen, 2018). This trend poses significant challenges for both individuals and society, as the long-term economic impact of these educational disruptions unfolds.

5) Need for Comprehensive Solutions

As the educational landscape evolves in response to the pandemic, a comprehensive approach is needed to address the myriad challenges faced by students and educators. Long-term strategies that emphasize skill development, employability, and well-being are essential to fostering holistic advancements in education (Bjorklund & Salvanes, 2011). Policymakers must focus on ensuring equitable access to educational resources and enhancing the quality of online learning experiences to mitigate the negative effects of the pandemic on the education sector.

In conclusion, the COVID-19 pandemic has fundamentally transformed educational practices, revealing both opportunities and challenges in online teaching and learning. As institutions navigate these changes, a multifaceted approach that prioritizes student engagement, effective assessment, and equitable access to technology will be critical in shaping the future of education.

RESEARCH METHODOLOGY

Population and Sample Group

The study focuses on a population of 20,000 undergraduate students enrolled in various institutions across Chongqing, China. To ensure a representative sample for the analysis, a sample size of 400 undergraduate students was selected. The sample size was determined using Taro Yamane's formula, which is suitable for calculating sample sizes from a finite population, ensuring that the study's findings can be generalized to the larger population.

Research Instruments

To achieve the research objectives, the following instruments were utilized:

Online Teaching and Learning Process Plans:

Detailed plans were developed to outline how online classroom activities are conducted. These plans included the structure, tools, and methodologies employed for online teaching, ensuring that the educational content is delivered effectively in a virtual environment.

Learning Ability Test:

This test was designed to evaluate students' learning abilities specifically within an online context. It aimed to measure cognitive skills, comprehension, and understanding of the subject matter, providing insights into students' capabilities in an online learning environment.

Achievement Test:

An assessment was conducted to gauge the academic performance and achievements of students. This test was used to determine how well students were mastering the course content that was delivered online, allowing for the evaluation of the effectiveness of online teaching methodologies.

Data Collection

Data was collected from the selected sample of 400 undergraduate students utilizing various methods:

Surveys: Structured questionnaires were administered to gather students' feedback on their online learning experiences, teaching methodologies, and engagement levels.

Online Assessments: Digital assessments were conducted to measure students' learning abilities and academic achievements. These assessments provided a direct evaluation of the content comprehension and skills developed during the online learning process.

Digital Tracking: Tracking tools were employed to monitor student engagement and performance throughout the online learning period. This included analyzing login frequency, participation in online discussions, and submission rates of assignments.

Data Analysis

The collected data will be analyzed using statistical methods to extract meaningful insights. The analysis will include:

Percentage: Calculating the percentage of students who responded positively to specific questions or achieved particular benchmarks.
Frequency: Determining how often certain responses or scores appear within the data set to identify trends and patterns.
Mean (Average): Calculating the average scores from the achievement tests and learning ability tests to assess overall student performance.
Standard Deviation: Analyzing the standard deviation of test scores to understand the variability in students' performance and identify how spread out the scores are around the mean.

RESEARCH RESULTS

Objectives of the Study

This study aimed to investigate two primary areas:
The online teaching and learning processes during the COVID-19 pandemic.
The appropriateness and effectiveness of online teaching and learning methods for undergraduate students in Chongqing, China.

Achievement in Online Teaching and Learning

The evaluation of the online teaching and learning processes during the COVID-19 pandemic revealed an overall significant positive achievement. The effectiveness of these processes varied across different aspects, ranked from highest to lowest as follows:
Teaching Methodologies
Rating: Highest
Details: The innovative teaching methodologies adopted during the transition to online learning were found to be highly effective. These methodologies included diverse and engaging approaches such as multimedia presentations, interactive sessions, and the use of various online tools. The adaptability of these teaching methods significantly contributed to the success of the online learning environment.
Curriculum Adaptations
Rating: High
Details: The curriculum was effectively adapted to the online format, ensuring that course content remained relevant and accessible. Adaptations included modifying course materials for digital consumption, incorporating asynchronous learning options, and providing supplemental resources to aid understanding. This responsiveness helped maintain continuity and quality in education.
Pedagogical Strategies
Rating: High
Details: The pedagogical strategies implemented were well-suited to the online environment. Strategies such as collaborative projects, virtual labs, and discussion forums facilitated interactive and engaging learning experiences. These approaches supported active learning and helped bridge the gap between traditional and online education.
Increasing Networking Opportunities
Rating: Moderate
Details: Efforts to foster networking and collaboration among students through online platforms were moderately successful. Virtual tools enabled some degree of student interaction and peer learning; however, they did not fully replicate the social and collaborative benefits of in-person networking. Initiatives such as group projects and online study groups provided valuable opportunities for student engagement.
Promoting Critical Thinking
Rating: Lowest
Details: Promoting critical thinking was identified as the least successful aspect of online learning during the pandemic. Challenges in fostering deep, analytical engagement with course

material were noted. The online environment often lacked the dynamic interactions critical for developing strong critical thinking skills. This area requires more targeted strategies to enhance critical engagement among students.

Appropriateness and Feasibility of STEM-Based Learning Management Systems

The study also examined the appropriateness and feasibility of implementing learning management systems based on STEM (Science, Technology, Engineering, and Mathematics) education concepts to enhance problem-solving skills among students in Chongqing. The findings were as follows:

Rating: High

Details: Learning management systems grounded in STEM education principles were found to be highly appropriate and feasible for promoting problem-solving skills. These systems provided robust support for interactive and practical learning experiences, which are essential in STEM fields. The integration of tools and resources that simulate real-world problem-solving scenarios effectively enhanced students' abilities to tackle complex problems. The focus on hands-on, inquiry-based learning and real-world applications in STEM education played a significant role in achieving these positive outcomes.

DISCUSSION & CONCLUSION

The evaluation of online teaching and learning processes during the COVID-19 pandemic among undergraduate students in Chongqing reveals several key insights into the effectiveness and adaptability of educational practices in response to unprecedented challenges.

Teaching Methodologies: The study highlighted that the innovative teaching methodologies employed during the transition to online learning received the highest rating for effectiveness. The integration of multimedia presentations, interactive sessions, and various online tools significantly enhanced student engagement and facilitated a more dynamic learning environment. This finding aligns with existing literature that emphasizes the importance of diverse instructional strategies in maintaining student interest and fostering active participation in online settings (Gonzalez, 2016). The adaptability of these methods proved crucial in ensuring that students remained motivated and involved in their learning.

Curriculum Adaptations: The successful adaptation of the curriculum to an online format was rated highly, indicating that educators were responsive to the needs of their students. By modifying course materials for digital consumption and incorporating asynchronous learning options, instructors were able to ensure that students had access to relevant content. This adaptability is essential in online education, as it allows for the continuity of learning and supports the diverse needs of students in varying contexts (Berk, 2010).

Pedagogical Strategies: The implementation of effective pedagogical strategies, such as collaborative projects and virtual labs, also received high ratings. These strategies facilitated interactive learning experiences and supported active learning, helping to bridge the gap between traditional and online education. The findings suggest that the incorporation of collaborative elements into online learning is vital for promoting student engagement and fostering a sense of community among learners (Bruscia, 2019).

Networking Opportunities: While efforts to foster networking and collaboration among students were moderately successful, they did not fully replicate the social benefits of in-person interactions. The use of virtual tools for group projects and study sessions provided valuable opportunities for student engagement, but the limitations of online platforms hindered the development of deeper social connections. This highlights the need for educational institutions to explore additional strategies to enhance social interaction in online settings, thereby enriching the overall learning experience.

Promoting Critical Thinking: The findings indicated that promoting critical thinking was the least successful aspect of online learning during the pandemic. Challenges in fostering deep

analytical engagement were evident, as the online environment often lacked the dynamic interactions crucial for developing strong critical thinking skills. This suggests a need for more targeted pedagogical strategies that encourage critical engagement and facilitate discussions that deepen students' understanding of complex concepts (Schmidt & Bender, 2017).

Conclusion

In conclusion, the evaluation of online teaching and learning processes during the COVID-19 pandemic in Chongqing demonstrates a generally positive achievement, with significant strengths in teaching methodologies, curriculum adaptations, and pedagogical strategies. The innovative approaches employed by educators were instrumental in maintaining student engagement and facilitating effective learning experiences.

However, the study also highlights areas for improvement, particularly in promoting critical thinking and enhancing networking opportunities among students. As educational institutions continue to adapt to the evolving landscape of online education, there is a critical need to implement targeted strategies that address these challenges.

Furthermore, the examination of STEM-based learning management systems revealed their appropriateness and feasibility for enhancing problem-solving skills among students. The integration of these systems can provide robust support for interactive and practical learning experiences, which are essential in the STEM fields.

Overall, this research underscores the importance of adaptability, innovation, and strategic planning in online education. By building on the successes and addressing the challenges identified, educators can enhance the effectiveness of online teaching and learning, ultimately leading to improved educational outcomes for students in Chongqing and beyond.

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