Study on the Impact of Severe Epidemics on College Students' Academic Performance

Qun Dang

School of Management, Xi 'an University of Science and Technology, Yanta Street, Xi'an, Shaanxi, China

43419958@qq.com

Keywords: severe epidemic situation, academic achievement of college students, influence, countermeasures

Abstract: By sorting out the data of graduation thesis scores of college students in Shaanxi Province from 2018 to 2020, this paper uses mathematical statistics to analyze the overall situation, gender differences and professional differences of the achievements, focusing on the characteristics of graduation thesis results in 2020, and analyzing the impact of major epidemic on college students' academic performance. The main conclusions are as follows:(1) compared with the overall situation of college students' graduation thesis scores from 2018 to 2020, Under the severe epidemic situation in 2020, the two-level differentiation of grades is the most obvious, while the general level of scores is higher than that in normal years. (2) the discreteness of the graduation thesis scores of male college students is much higher than that of female college students, which reflects that the two-level differentiation of male college students is more serious than that of female students under the influence of severe epidemic situation. (3) the graduation thesis scores of different majors in 2020 show different characteristics due to the influence of discipline characteristics, direction differences, thesis methods and data. Finally, according to the characteristics of college students' graduation thesis results under the major epidemic situation, the paper puts forward some targeted countermeasures and suggestions.

1. Introduction

In recent years, natural disasters and various epidemics caused by global warming have become increasingly frequent and have a greater impact on the world. Among them, the trend of frequent occurrence of major diseases is more obvious, because it will have a long-term impact on human health, economic and social development, the comprehensive impact of disease outbreaks and disasters is even higher as 0.182[1]. In 2020, the COVID-19 epidemic broke out in Wuhan, Hubei Province, and spread to the whole country and even the world in a short time, resulting in a great impact on the country's economy, society and people's lives.

In Shaanxi Province, as a major province for the development of higher education, there are many kinds of colleges and universities and a large number of college students. The huge scale of colleges and universities puts forward higher requirements for the "conceptual" development of higher education in Shaanxi Province, improving the quality of education and promoting the development of college students. With the COVID-19 epidemic in 2020, college students in the province were forced to delay their return to school. Although colleges and universities have adopted online teaching methods to deal with it actively, various factors caused by the epidemic may still have an impact on college students' academic achievement. and then affect the quality of school teaching and the development of college students themselves.

The existing research results on the impact of disaster events on students' performance are mainly focused on the impact of earthquakes, hurricanes, floods, and other natural disasters on college students' academic performance[2-5]. In addition, disturbances such as bad weather conditions and accidental suspension of classes will also have a negative impact on students' performance[6-7]. On the whole, the existing research results on the impact of natural disasters and other disturbances on college students' grades are generally few, and the existing studies at home

  DOI: 10.25236/ssce.2022.046

and abroad do not deal with the impact of disease and major epidemics on college students' grades.

In the environment of global climate deterioration and increasingly frequent disaster events, serious disease outbreaks may occur not only in China but also in other countries and regions. Samples were selected from colleges and universities in Shaanxi Province, and the obtained college students' academic performance data were sorted out. SPSS 12.0 was used to conduct descriptive analysis and regression analysis on the data, and the differences in academic performance between the semesters affected by the COVID-19 epidemic and those not affected by the epidemic were compared, so as to evaluate the nature and degree of the impact of the major epidemic on the academic performance of college students. The research is helpful to enrich the empirical research results of the impact of disaster events on students' performance from the perspective of a disease epidemic. It may have future reference value for emergency management teaching and educational quality management in colleges and universities dealing with disaster events under the conditions of climate change.

2. Data Acquisition and Analysis

2.1. Data Extraction

Due to the major epidemic situation of COVID-19 at the beginning of 2020, colleges and universities in Shaanxi Province adopted different ways to assess the students' scores in courses and internships in the semester from February to July 2020, when only some students returned to school. Among them, some use online examinations, homework inspections, and other forms for performance assessment; some colleges and universities have postponed the course examination that should be conducted at the end of the semester to the beginning of the next semester and intend to use the traditional offline examination method for performance evaluation. The online examination is a new form of examination which has not been widely used in the course performance assessment of full-time college students before, and there is no clear and mature research on the reliability and validity of students' academic performance assessment; and the online examination is adopted on a large scale for the first time, and its course management mechanism needs to be further detailed. In addition, there are also cases in which colleges and universities have postponed the course examination from this semester to the beginning of the next semester. Considering the above factors comprehensively, in order to ensure the feasibility of data acquisition and the high comparability of data for many years, we chose to collect the graduation thesis scores of college students as data and carry out statistical analysis.

Graduation thesis is an academic and scientific research teaching link that takes up the most class hours, has the highest level, is the most comprehensive, and can best measure the overall quality and ability of students in China's talent education and training plan. According to the regulations of the National Academic Degrees Regulations, students must submit their graduation thesis and pass the defense before they can obtain the corresponding professional degree[8]. Graduation thesis teaching involves students, tutors, evaluation teachers, school management departments, and other related subjects. Its quality directly reflects the level and quality of students' studies, teachers' guidance, and school management, and it is an important index to measure the quality of talent cultivation in colleges and universities[9].

2.2. Data Collection and Analysis

Based on the importance of college students' graduation theses in the talent education and training plans of colleges and universities and the continuity of each academic year, the thesis chooses the graduation thesis scores as the research data. We will collect the data from June 1 to June 20, 2020. Finally, the panel data of graduation thesis scores of college students from two universities and seven majors in Shaanxi Province in 2018, 2019, and 2020 were obtained, among which there are 1009 valid data points. The details are as follows: Among them, the data in 2018, 2019, and 2020 accounted for 8.6%, 47.8%, and 43.6% of the total, respectively, and the scores of male and female college students accounted for 51.1% and 48.9%, respectively.

Table 1 Descriptive Statistics

	2018	2019	2020	Total
Number of data (pieces)	87	482	440	1009
Percentage of annual data volume (%)	8.6	47.8	43.6	100
Number of men/women	26/61	251/231	239/201	516/493
Male/female ratio (%)	29.9/70.1	52.1/47.9	54.3/45.7	51.1/48.9

2.3. Data Analysis

This paper presents mathematical statistics and an analysis of the overall situation of graduation thesis results for college students of various genders and majors from 2018 to 2020. It also focuses on the analysis of the statistical data of the 2020 results, showing different characteristics than in previous years.

2.3.1. General Characteristics

According to the quantitative analysis of college students' graduation thesis scores from 2018 to 2020, it is found that under the influence of COVID-19 's major epidemic situation in 2020, the two-level differentiation of graduation thesis scores is the most obvious. However, only from the average and median of the data, it shows that the general level of graduation thesis performance is higher than that of normal years. However, whether this shows that the major epidemic has not had a negative impact on the performance of college students' graduation theses needs to be analyzed in depth according to the actual situation and richer data.

2.3.2. Gender Differences in Score Distribution

The data came from seven different majors. There are differences in the types, research methods, and technical means of graduation theses among different majors, and the results of graduation theses in 2020 show certain characteristics. The analysis of the score distribution will help to deeply understand the possible impact of the major epidemic on the academic performance of students in different majors.

As a result of the epidemic, graduation thesis scores for seven majors at the two universities in 2020 differ from previous years in terms of general level, standard deviation, maximum and minimum value. The general level of graduation thesis results varies; there is improvement (4 majors, accounting for 57.1%), unchanged (1 major, accounting for 14.3%), and decrease (2 majors, accounting for 28.6%), and more than half of the general level of graduation thesis results are improved. Further investigation of the 5 majors with "improved" and "unchanged" states finds that the graduation thesis types of 4 majors include the practice (design) type, accounting for 80% of the total, but the discipline background and technical means of the major do not show a significant correlation with the general level of grades. This may indicate that the general level of graduation thesis scores of majors that pay more attention to practice (design) is less affected by the epidemic. However, in terms of the standard deviation of scores, all 7 majors showed an increasing feature, 2 majors showed abnormally low values, and another 2 majors showed breakthroughs in the highest and lowest values of the results in previous years, which together indicate that the graduation thesis scores are affected by the epidemic, showing the phenomenon of two-level differentiation, and the number of low-level papers has increased compared with previous years.

2.3.3. Major differences in score distribution

The graduation thesis scores of college students of different genders are affected by the major epidemic situation. Compared with 2019, the average graduation thesis score of male college students decreased by 0.26% in 2020, while that of female college students increased by 1.16%. The median score of male college students increased by 1.22%, while that of female college students increased by 1.07%. The standard deviation of male students increased by 49.23%, while that of female students increased by only 5.28%. The general level of graduation thesis scores of male and female college students is not greatly affected by the major epidemic situation, in which the average level reflected by the median is slightly higher than that in 2019, and the gender gap is

small; compared with 2019, the change range of the standard deviation of achievement in 2020 shows obvious gender differences—the increase in the standard deviation of male college students is much higher than that of female college students. From the above analysis, we can see that the major epidemic situation in 2020 has little impact on the general level of graduation thesis scores of male and female college students. However, the influence on the discreteness of graduation thesis scores of male college students is far greater than that of female college students. Combined with the fact that only male college students have an abnormal low point that did not exist in 2019, while that of female college students does not, it further reflects that the differentiation between the two grades of male college students is much more serious than that of female students in 2020.

It can be seen that the common characteristic of the graduation thesis scores of seven majors in 2020 is that the standard deviation is higher than that of the previous year, indicating that there is a common situation of aggravation of two-level differentiation of grades.

For majors with different professional backgrounds, the changing characteristics of graduation thesis scores in 2020 are different. The general level of graduation thesis scores of the majors with liberal arts backgrounds is higher than that of the previous year, and the improvement is greater than that of the majors with science backgrounds. The differentiation between the two grades is obvious, but it is not serious.

For majors going in different directions, there are also differences in graduation thesis scores in 2020. In comparison, the median can better reflect the general level. The improvement of the general level of professional performance in the design direction in 2020 is the highest (3.21%), followed by the management direction (3.12%), and finally the improvement in the engineering direction is very small (0.11%). On the other hand, the degree of differentiation between the two grades is that the increase in standard deviation in engineering direction is the highest (39.95%), followed by management direction (30.48%). Due to the existence of an abnormally low value in the design direction, the standard deviation of its performance increased by 193.42%. Through interviews with professional teachers, it is found that this abnormally low value is caused by the accumulation of students' learning problems for many years, which has little to do with the teaching of graduation thesis. Therefore, if we choose to eliminate this abnormally low value here, the standard deviation of the design direction will increase by 8.02%. In short, according to the type of direction, the general level of improvement in the design direction is relatively high, followed by the management direction, while the improvement in the engineering direction is very small. The engineering direction of the two-level differentiation is the highest, the management direction is the second, and the design direction is the lowest.

The graduation thesis of different majors can be divided into three types: research type, practice (design) type, and research/practice (design) type, which also reflects the difference in achievement change in 2020. In terms of the increase in the median score, the general level of practice (design) papers is higher (3.21%), followed by research papers (3.12%), while the general scores of research/practice (design) papers have almost not improved (0.11%). In terms of the degree of differentiation between the two grades, the research/practice (design) category is the most obvious (39.95%), followed by the research category (32.83%), and the practice (design) category is low (16.9%). Or it can be explained that the practical (design) papers mainly rely on the accumulation of professional knowledge and ability, and the general level of achievement has been improved under the background of the major epidemic situation in 2020, and the degree of polarization of achievements, which generally existed during the epidemic period, has not been seriously intensified. In contrast, because the research/practice (design) papers are generally selected for engineering majors, the difficulty of obtaining research data, the requirements for research methods and techniques, and even the operation of certain instruments and equipment may be the reasons for the almost complete lack of improvement in the general level of these papers and the serious degree of differentiation between the two levels.

3. Conclusion

Through the collation of the graduation thesis performance data of college students, this paper

makes mathematical statistics and analysis on the overall situation of graduation thesis results from 2018 to 2020, college students of different genders and different majors. It also focuses on the analysis of the statistical data of 2020 results, showing different characteristics in previous years. The main conclusions are as follows:

Firstly, according to the quantitative analysis of college students' graduation thesis scores from 2018 to 2020, it is found that under the influence of COVID-19 's major epidemic situation in 2020, the two-level differentiation of graduation thesis scores is the most obvious. However, only from the average and median of the data, it shows that the general level of graduation thesis performance is higher than that of normal years. However, whether this shows that the major epidemic has not had a negative impact on the performance of college students' graduation theses needs to be analyzed in depth according to the actual situation and richer data.

Secondly, the graduation thesis scores of college students of different genders are affected by the major epidemic situation. The general level of graduation thesis scores of male and female college students is not greatly affected by the major epidemic situation, in which the average level reflected by the median is slightly higher than that in 2019, and the gender gap is not large; compared with 2019, the change range of standard deviation of achievement in 2020 shows obvious gender differences—the increase in standard deviation of performance of male college students is much higher than that of female college students. It shows that the major epidemic situation in 2020 has little impact on the general level of graduation thesis scores of male and female college students. However, the influence on the discreteness of graduation thesis scores of male college students is far greater than that of female college students. Combined with the fact that only male college students have an abnormal low point that did not exist in 2019, while that of female college students does not, it further reflects that the differentiation between the two grades of male college students is much more serious than that of female students in 2020.

Finally, the graduation thesis scores of different majors in 2020 show different characteristics due to the influence of discipline characteristics, direction differences, thesis methods, and data.

In view of the characteristics of college students' graduation thesis scores under the major epidemic situation, this paper puts forward some countermeasures and suggestions on cultivating college students' learning goals and professional views; improving students' self-restraint ability, and strengthening the teaching and learning of core courses. Take mastering and applying knowledge as the main goals, improving learning efficiency in an all-round way and improving students' self-study ability.

Acknowledgements

This work was supported by an Epidemic Prevention and Control Special Research Project grant funded by the Shaanxi Higher Education Society (No. XGH20146), an Undergraduate Teaching Case Database Construction Project grant (No. ALKCSZ22001), a "Student Centered" Teaching Reform Project grant (No. JZ22039) funded by Xi'an University of Science and Technology, and by Dr. Yuan Wang, Furong Bai, Hong He, and Qi Wang, who provided valuable data.

References

[1] LI Yuheng,WU Wenhao,LIU Yansu.(2020)Evolution of Global Major Disasters During Past Century and Its Enlightenments to Human Resilience Building.Bulletin of Chinese Academy of Sciences, 20,345-352.

[2] Xu Huanyu,Su Chang,Xu Ying,Li Yuchen,Ji Yuanyi,Ma Xiao,Zhou Huan,Yang Yang,Liu Qiaolan. (2018) Analysis of reciprocity between mental health status and academic achievement under the protective effect of psychological resilience in junior school students in earthquake-hit area. Journal of Hygiene Research,47,749-755.

[3] Pietro GD.(2018)he academic impact of natural disasters:evidence from L'Aquila earthquake. Education Economics,26,62-77.

[4] Krane,NK,DiCarlo,RP,&Kahn,MJ.(2007)Medical Education in Post-Katrina New Orleans:A Story of Survival and Renewal.Journal of the American Medical Association,298,1052–1055.

[5] Kawin Thamtanajit.(2010)The Impacts Of Natural Disaster On Student Achievement:Evidence From Severe Floods in Thailand.The Journal of Developing Areas,54,130-143.

[6] Marcotte.(2007)Schooling and test scores:A mother-natural experiment.Economics of Education Review,26,629–640.

[7] Marcotte.(2008)Unscheduled School Closings and Student Performance.Education Finance and Policy,3,316–338.

[8] General Office of the Ministry of Education.Notice on Strengthening the Graduation Design (Thesis) Work of ordinary Institutions of Higher Learning[Z].No.12004214,High School Hall.

[9] ZHOU Gui-lin,XIE Hong-mei.(2013)The Role of the Tutors in the Improvement of Undergraduate Graduation Thesis Quality.Journal of Chongqing Technology and Business University (Natural Science Edition),30,60-63.