Journal of International Education and Practice

Journal of International Education and Practice

Editor-in-Chief

Dr. Mark David Oursland

Journal of International Education and Practice

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ARTICLE
Impact of COVID-19 on Higher Education System: University Student's Perspective

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ABSTRACT

Using a qualitative research approach, the current analysis aimed to investigate the COVID-19 pandemic's effect on Bangladesh's higher education from the viewpoint of students. The report comprises a survey of 300 students from higher education institutions. The Convenience sampling method is used to pick fifty university students for the study to collect enough data to answer the test query. They were students from Bangladesh's eight universities (five public universities and three private universities) and three other universities. The pandemic of COVID-19 has wreaked havoc on all facets of human life, including education. It has culminated in learning experiences that have never been seen before. Many schools and universities have shut their doors and moved their teaching and learning to the internet. This study found that there has an effect of COVID-19 on the higher education system in Bangladesh. Both the government and private universities are required to work together to resolve the academic delays as fast as possible, such as the closing of educational schools and the transition to online schooling, which have a serious impact on the education sector and students' lives. This is the first study of Bangladesh. This study tries to find out the problem of education systems and solving the problem of Bangladesh which will be a great effect on the education system of Bangladesh and the economy.

1. Introduction

The COVID-19 pandemic has become the world's worst fear in 2020. COVID-19 disease outbreaks were first detected in Wuhan, Hubei Province, China in December 2019 [a]. COVID-19 has now wreaked havoc on global healthcare services and impacted every part of human life. Breathing secretions and other organs such as the hands, nose, and mouth will transmit this virus from one person to the next. On March 8, 2020, the first COVID-19 outbreak was discovered in Bangladesh, and on March 26, 2020, the Bangladesh government announced a national lockdown after 17 days. Unlike several other countries, such as India and Pakistan, this lockdown was announced well in advance in the hopes of preventing the infection from spreading [o]. Many policymakers have stressed taking some extraordinary prevention steps, such as improving health centers, closing educational schools, workplaces, stores, restaurants, libraries, and movie theaters, prohibiting social events, closing borders, and imposing travel bans, to reduce the transmission of the disease infection. Education, housing, manufacturing, travel, and other sectors are also affected by these social

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exclusionary policies [3, 4, 19, 24, 25].

After March 17, 2020, Bangladesh's educational institutions have all been closed. To retain social distance, students from primary to tertiary levels are forced to sit at home rather than attend classes in educational institutions. According to various news outlets, Bangladesh has about 30 million students in all types of institutions and close to a million teachers and education staff. Closing educational institutions have previously been shown to be a successful tactic for disrupting the pandemic's vital communication chain [10, 12, 21, 27]. Nonetheless, it has adverse effects on students' academic studies, such as learning disruptions and assessment disruptions, and the effect is exacerbated for students from marginalized communities [b]. The global shutdown of schools, colleges, universities, and other educational facilities for the COVID-19, according to [c], has a negative effect across over 60% of the world's student population. Such extended closures are not only impacting these students' academic careers, but they are also damaging their mental health [16]. The pandemic had a profound impact on higher education students' social lives, as they couldn't catch up with their peers and family [7] monetary conditions, as they lost part-time work, mental health, as they experienced increased anger, anxiety, and dissatisfaction and academic life as they were concerned about their future schooling and career [6]. The government requested that Universities, both public and private maintain their education by online classes and begin their academic activities online on April 30, 2020. According to the University Grants Commission, the number of students studying in higher education in the country is roughly 4.1 million (UGC). There are about 0.3 million students in 44 public universities and 0.4 million students in 103 private universities. A large number of students, almost 3.4 million, are pursuing higher education at National University's multiple colleges. According to the UGC regulations, 63 private universities and 7 public universities are now undertaking online research operations. For certain people, distance-learning or online learning has become a beneficial step during this global pandemic crisis. Owing to the lack of internet access in rural and underprivileged communities, the percentage of unmet student demand has increased to some extent. Different groups of students have limited access to educational opportunities, which creates obstacles to their success. While there are several types of opportunities for using information services in the digital model of education, not all students have easy access to the internet and other instructional materials. As a result, the online learning process affects a country's student's cumulative outcomes.

To combat this situation in Bangladesh in the long run, we need to concentrate more on handling the post-Covid-19 Bangladesh by ensuring that the learning process continues smoothly. Different modes of learning and complementary learning systems, along with effective student population participation, can be a fantastic solution for Bangladesh's educational sector. To determine the educational disturbances caused by COVID-19, longitudinal evidence on the impact of COVID-19 on the higher education sector in Bangladesh and its students is urgently required. As a result, the current study sought to investigate the effect of COVID-19 on higher education in Bangladesh from the perspective of university students.

Using a qualitative research approach, the current analysis aimed to investigate the COVID-19 pandemic's effect on Bangladesh's higher education from the viewpoint of students. The pandemic of Covid-19 has wreaked havoc on all facets of human life, including education. It has culminated in learning experiences that have never been seen before. Many schools and universities have shut their doors and moved their teaching and learning to the internet. This study found that there has an effect of COVID-19 on the higher education system in Bangladesh [20].

The remaining sections of this study are the following: 2. the education system in Bangladesh, 3. Literature review, 4. Research Methodology, 5. Result Discussion, 6. the suggestion of the improvement of the quality of education system in Bangladesh, 7. Policy implications, 8. Limitations of the study and 9. Conclusion.

2. The education system in Bangladesh

During the British rule in Bangladesh, the educational system's plans were drawn. There are three tiers of schooling in the system: basic, intermediate, and higher education. While both primary and secondary education is needed, universal enrollment has remained more of an aspiration than a reality. Primary education is eight years long, and secondary education is four years long. Secondary education is split into two levels: a lower level and a higher level, with public exams at the end of each level [d]. In general, schools in cities and towns are more maintained and funded than those in rural areas. Hundreds of colleges exist, the majority of which are aligned with one of the larger universities, such as the University of Dhaka (1921), the University of Rajshahi (1953), and others. Several medical colleges and a postgraduate medical institute in Dhaka offer medical education. A full-fledged hospital is attached to each college or institute [n].

Regardless of their family's financial situation, German public education requires qualifying students to continue

their education up to the university level. In Germany, the whole educational system is open [e]. There is none in my Golden Bengal. Children from low-income households are unable to attend school. In my point of view, Bangladesh's administration should ensure that everyone, regardless of social or economic status, has access to the same educational opportunities. The entire school system must be free, just as it is in Germany, and funded by the taxpayer.

2. (A) Socio-demographic comparison between Bangladesh and Japan

The Density [+] of Bangladesh is 1,104 and the Density [+] of Japan is 334, the Population of Bangladesh and Japan is respectively 163,046,161 and 126,190,000 (2019). As of 2020, the average life expectancy in Bangladesh is 74 years (72 years for males, 76 years for women). As of 2020, that quantity in Japan is 86 years (83 years for men, 90 years for women). As of 2020, there are roughly 18.1 infants per 1,000 inhabitants in Bangladesh [j]. As of 2020, there are 7.3 infants per 1,000 inhabitants in Japan. As of 2013, around 76 percent of Bangladesh's population have access to electricity. As of 2016, 100 percent of the Japanese people did. As of 2018, roughly 15.0 percent of Bangladesh's population have access to the internet. As of 2018, roughly 84.6 percent of Japanese people do. As of 2018, Bangladesh invests 2.0% of its total GDP on education. As of 2016, Japan spent 3.5 percent of its entire GDP on education [h].

2. (B) Economic comparison between Bangladesh and Japan

Bangladesh has a GDP per capita of $4,200 in 2017, but Japan has a GDP per capita of $42,900. In 2017, 4.4 percent of adults in Bangladesh were jobless. As of 2017, the figure in Japan was 2.9 percent. As of 2016, 24.3 percent of Bangladeshis were living in poverty. In Japan, however, the percentage is 16.1% as of 2013. As of 2016, Bangladesh's highest tax rate was 30.0 percent. As of 2016, Japan's highest tax rate is 56.0 percent. In Bangladesh, youth unemployment rate is 12.8% and in Japan, 3.6% [i].

2. (C) Cultural comparison between Bangladesh and Japan

Japan's culture has been impacted by its neighbors. In Asia, Japanese music has the greatest market. In Japan, there are two main types of music: Japanese Pop and traditional music. Painting, sculpture, Ukiyo-e (floating world prints), and Ikebana are examples of Japanese

visual arts (Japanese flower arrangement) [k].

Bangladesh's culture has been affected by its surroundings. Photography, painting, architecture, folk art, modern art, and sculpture are the most popular forms of art in Bangladesh. Playacting, dancing, and singing are among Bangladesh's performing arts. Bengali dancing is frequently performed to tell a narrative from the past, with dancers wearing heavy make-up and sarees [l].

2.1 Differences between Bangladeshi and Japanese educational system

2.1 (i) Economic difference

Bangladesh devotes barely 2% of its GDP to education, and as a result, it is unable to adequately support its programs and policies. According to the 2015 Education at a Glance report, state spending on education in Japan was 3.5 percent of GDP. According to 2017, Germany spent 4.9% of its GDP to education, Australia spent 5.1% of its GDP, and Canada spend 5.3% of its GDP (2011). France spent 5.5% of its GDP (2017). Malaysia spent 4.2% of its GDP (2019) [q]. In 2021-22 Budget of Bangladesh, TK 94,778 crore have been allocated in the field of education sector [w].

2.1 (ii) Socio-cultural difference

Another distinction between the two nations' educational systems is the relevancy of the quality delivered. Curriculum serves as a link between the educational system and public-sector social and political events. Japan has systems that examine the curriculum on a regular basis, therefore the educational system is typically up to date. Bangladeshi curriculum plans, on the other hand, are not evaluated on a regular basis; as a result, the education system is disconnected from current events in the country [5].

Bangladesh's education system lacks an effective employment program for school personnel due to a poor human resource system [8]. As a result of this flaw, the educational system suffers. Japan, on the other hand, has a strong human resource system, with merit-based hiring. Higher-quality education results from a labor system that hires people based on their qualifications [22].

Bangladesh's colleges do not fulfill international standards for educational institutions. Japan's colleges and universities, on the other hand, are supervised by worldwide educational standards. The regulations that regulate the behavior of teachers and the school employees in Bangladesh are not sufficiently defined. Furthermore, the regulating organizations that are in charge of supervising teacher behavior are inactive. This

flaw permits instructors to engage in unethical activity, such as absence [15]. The Japanese government, on the other hand, has very strong laws about teacher behavior. As a result of this element, absenteeism is quite low, and students get a lot of value for their time in class.

The Bangladeshi educational system believes that students should pursue an education primarily dependent on the country's cultural and religious values resulting in the formation of socially responsible individuals [14]. The Japanese education system, on the other hand, is centered on current global events. Students, for example, get experience in the construction of IT systems as well as the application of technical knowledge in the production and industrial sectors, among other things.

2.1 (iii) Demographic difference

Japanese kids attend school for 240 days each year, 60 days longer than their American counterparts [18]. On weekdays, the average school day is 6 hours long. Drills and other assignments keep students occupied beyond school hours. All pupils finish primary school, more than 90% graduate from high school, and 40% complete college. But in Bangladesh, The poor performance of children in primary school is also a source of concern. The number of students dropping out of school and repeating grades is significant. Low levels of learning accomplishment are caused by poor attendance and a lack of interaction time in school [m]. Education is becoming increasingly expensive, and many students are unable to pay it. According to one survey, 15.5 percent of primary school teachers are absent. That is why less than 70% students are unable to complete the primary level. Bangladeshi kids attend school almost for 228 days each year, less than 12 days than Japanese kids and the average school day is 8 hours long and less than 10% of the students completing higher secondary education [u].

All educational institutions in Bangladesh are closed from 16 March 2020 to 6 June 2021 due to COVID-19 pandemic. In Japan, on February 27, 2020, Abe proposed that all elementary, junior, and senior high schools nationwide close from March 2 through the conclusion of their spring holidays, which usually expire in early April, forcing many students to study at home. A government panel modified the recommendations on Wednesday, dividing Japan into three categories: regions where illnesses are spreading, regions where illnesses have been proven, and places where no illnesses have been verified, enabling schools to reopen in the latter two [p]. But in Bangladesh, all types of educational institutions are still (14 June, 2021) closed even though Corona virus is increasing at decreasing rate.

According to Global Teacher Status Index 2018, the top five countries are China (100), Malaysia (93.3), Taiwan(70.2), Russia (65), and Indonesia (62.1) where the teachers are valued most. At the bottom of the scale are Argentina (23.6), Ghana (18.9), Italy (13.6), and Brazil (1) where the teachers are valued least. The United States was 16th with a ranking of 39.7 [s]. Switzerland and Germany have the highest wages, while Latin America and Africa have the lowest. Surprisingly, teachers in the United States believe their profession has a lesser standing than the general community. In China, India, Ghana, and Malaysia, more than half of parents give "positive support," compared to fewer than 8% in Russia. Despite the fact that Americans believe teachers are underpaid, 42% of parents in the United States would urge their children to pursue a career as a teacher [r]. But In Bangladesh, Private teachers get one time scale in their lifetime, while government employees get three while private school teachers play a key role in secondary education and teachers do not get equal respect for their profession. There are various types of reasons for the low quality of teaching profession in Bangladesh:

(a) Most meritorious student in this country do not usually come to teaching.

(b) At the top of their list of preferences are administration, foreign affairs, taxes etc.

(c) They think that their merits in this profession are not properly evaluated [u].

But maximum international schools are doing great for the teachers than others [t].

But now is the moment for all of us to focus on this issue. The topic of quality education is ranked fourth in the United Nations Global Development Framework 2030, or Sustainable Development Goals (SDGs), which indicates that increasing the quality of teachers, as in other nations where teachers are highly valued, is a requirement for quality education. Without any question, in order to improve teacher quality, the subject of their social and economic dignity must be given equal consideration; otherwise, the targeted aim will never be achieved [v].

Bangladesh is short on scientists and engineers. More people who work in industries are needed in the region[g]. Via enthralling appropriate phases, all departments and universities will improve their appearance and standing in the country and worldwide. Collaboration with other universities for interactions, consulting, case study competitions, pharmaceutical or industry carnivals, and combined study plans should be welcomed. Strategic management based on vision, purpose, aim, and goal-driven delivery should be planned for the national educational context [f].

2.2 Some of the main factors behind our failure to provide quality education:

Three major shortcomings are similar to all of our educational institutions. First is the standard of teachers. Every year, thousands of teachers are hired and sent to classrooms without any preparation. In most other nations, this does not occur. Some government school teachers work in Dhaka solely to find a job. Although private schools are not always good, they are usually the best in countries with excellent educational institutions.

The second issue is institutional governance. At the primary level, maybe not so much, but certainly at the secondary and higher levels. The financial community and government forces are rapidly taking over school management committees. Few members of the political elite are ever involved in enhancing educational standards, even after becoming decision-makers in educational institutions. But for a few, the majority of them are there for personal reasons and financial gain.

Infrastructure comes in third. Thousands of calls for school repairs are sent each year. Many of these are often overlooked. Ministers and lawmakers sometimes come forward and blame it on greed, which is partially true.

3. Literature review

Jena, P. K. (2020), in his article "Impact of Covid-19 on higher education in India" focused that In India, approximately 32 crore students were unable to move schools or universities, and all educational operations were halted. Despite these obstacles, HEIs (Higher Education Institutions) often react positively and have been able to maintain teaching-learning, science, and societal service with the help of certain methods and techniques during the pandemic [17].

Emon, E. K. H., Alif, A. R., & Islam, M. S. (2020), in their article "Impact of COVID-19 on the Institutional Education System and its Associated Students in Bangladesh" differs from the article of "Pravat Kumar Jena (2020)", because they point out that The most immediate effect of the Covid-19 on Bangladeshi students is a reduction in learning opportunities, as well as a variety of other factors. Despite the government's best efforts, COVID-19 is harming Bangladeshi students for a variety of factors [13].

Ahmed, I., Bhuiyan, M. E. M., Helal, M. S. A., Banik, N., Ahmed, I., Bhuiyan, M. E. M., ... & Banik, N. (2020), in their article "Hybrid Instruction: Post COVID-19 Solution for Higher Education in Bangladesh" differs from the article of "Pravat Kumar Jena (2020)", because this article points out that the abrupt closing of sine die has brought the method of teaching and studying process to a halt, resulting in a significant setback for the educational system. Conducting courses electronically will easily compensate for this deficit. As a result, hybrid teaching must be used for teachers and students to retain mutual isolation while continuing to engage in instructional practices [1].

Upoalkpajor, J. L. N., & Upoalkpajor, C. B. (2020), in their article "The impact of COVID-19 on education in Ghana" shows that comparison from the previous article of "Pravat Kumar Jena (2020)", this paper completely shows that the negative impact of COVID-19 on education in Ghana. As a result, schools are seeking funding to help them recover from the educational losses caused by the outbreak [26]. And similarly, Owusu-Fordjour, C., Koomson, C. K., & Hanson, D. (2020), in their article "The impact of Covid-19 on the learning-the perspective of the Ghanaian student" shows the same result. That means a negative impact on education. Since most Ghanaian students have insufficient access to the internet and lack technical knowledge of these technological devices, the e-learning systems that have been implemented pose a threat to the majority of students [23]. Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020), in their report "Impacts of the COVID-19 pandemic on the life of higher education students: A global perspective" defines that teaching staff and university public relations provided the most vital service to students at the university during the pandemic. Students, on the other hand, we're unable to accept a higher level of success when transitioning to the 'new standard,' namely, distance education, due to a shortage of computing knowledge and the impression of a higher workload [2]. Dutta, S., & Smita, M. K. (2020), in their paper "The impact of COVID-19 pandemic on tertiary education in Bangladesh: students' perspectives" differs from previous articles because it nicely points out that numerous, previously unheard-of changes in students' studying, as well as a drop in enthusiasm and research hours, have resulted in several of the physical, psychological, and financial issues relating to academic studies. As COVID-19 continues, the study results on online education, such as the lack of electronic devices, restricted internet connectivity, high internet costs, low internet speed, and challenges in using online platforms, have offered useful insights into the current state of online higher education in Bangladesh [11].

4. Research Methodology

This segment consists of the following sections: 4.1 Study Area and Sampling Method, 4.2 Sample size, 4.3

Research Instruments, 4.4 Materials and Model, 4.5 Research Model and 4.6 Hypothesis.

4.1 Study Area and Sampling Method:

Students of higher education who were at least 18 years old were the target demographic. The Convenience sampling method is used to attract respondents in the target demographics. To obtain information from the target sample, the researcher uses Google Forms to produce the questionnaire, which was then circulated using email and social media platforms.

4.2 Sample size:

The report comprises a survey of 300 students from higher education institutions. The Convenience sampling method is used to pick fifty university students for the study to collect enough data to answer the test query. They were students from Bangladesh's eight universities and three other institutions, including five public universities and three private universities.

4.3 Research Instruments:

The information was gathered using a web-based structured questionnaire that included 34 mostly closed-ended questions about socio-demographic, other characteristics, as well as various facets and elements of student life in university education, such as educational online work and life, social life, mental life, personal situations, habit reform, institutional responsibilities and initiatives, and personal thoughts on COVID-19. Originally, the questionnaire was split into four parts. The first part defines the socio-demographic and academic characteristics of the students. The second part defines the mental condition of the students. The third part defines the learning condition of the university students and finally, the fourth part defines the economic condition. The data was collected from 10 March to 25 March 2021.IBM Statistical Package for Social Science (SPSS) has been used for systematic analyzes of the collected results.

4.4 Materials and Model:

The research model (Figure 1) used in this analysis contains frameworks that have shown support in the literature and are based on a body of research conducted in different countries in this field.
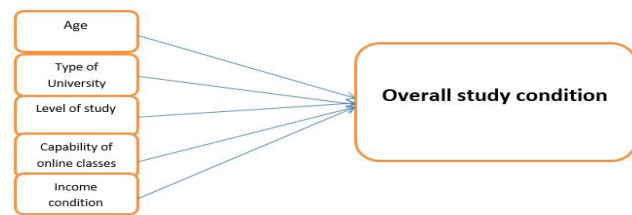
Figure1. Proposed Research Model

4.5 Research Model:

The block diagram of the research model above shows the relationship between the dependent and independent variables. Overall study condition is the Categorical dependent variable in this research which expresses the student's academic performance during COVID-19. Meanwhile, the Qualitative or Categorical independent variables in this research are H1 (Age in the year), H2 (Type of University), H3 (Level of study), H4 (Capability of online classes), H5 (Income condition). The independent variables are believed to be the variables that influence the dependent variable in either a positive or a negative way. The research that is conducted is split into various parts for the detailed outlook. Firstly, the author can test Multinomial logistic regression test statistic [9] by using Model fitting information, Test of Goodness of Fit, Pseudo R square test, Likelihood ratio test, and finally Parameter estimate test on the sample profile for analysis. Then a detailed debate on the processing of study results will be studied. As part of the research, a hypothesis test is established.

4.6 Hypothesis

The following hypotheses were developed from the proposed research model:

Null (H_0): There is no effect of Age (in the year) on the Overall study condition.

Alternative (H_1): There is an effect of Age (in the year) on the Overall study condition.

Null (H_0): There is no effect of the Level of study on the Overall study condition.

Alternative (H_2): There is an effect of the Level of study on the Overall study condition.

Null (H_0): There is no effect of Type of University on the Overall study condition.

Alternative (H_3): There is an effect of Type of university on Overall study condition.

Null (H_0): There is no effect of the Capability of online classes on the Overall study condition.

Alternative (H_4): There is an effect of the Capability of online classes on Overall study conditions.

Null (H_0): There is no effect of Income condition on the Overall study condition.

Alternative (H_5): There is an effect of Income condition on Overall study condition.

5. Result Discussion

The Chi-square statistic was used to test the model's fitness (table 1). The p-value is less than 0.05, and the Chi-square is 231.538. This demonstrates that the dependent variable and independent variables in the final model have a significant relationship.

Table 1. Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	572.471			
Final	340.933	231.538	72	.000

Table 2. Goodness-of-Fit

	Chi-Square	Df	Sig.
Pearson	454.298	428	.183
Deviance	279.226	428	1.000

The Pearson (454.298) and Deviance (279.226) statistics prove that the model is fit. The test is not statistically significant because the p-value is greater than 0.05 (table 1).

Table 3. Pseudo R-Square

Cox and Snell	.538
Nagelkerke	.595
McFadden	.330

Cox and Snell (0.538), Nagelkerke (0.595), and McFadden (0.330) are the Pseudo R-Square scales. Table 3 describes 33 percent to 59.5 percent of the variation and reflects results of meaningful scale.

Table 4. Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	340.933[a]	.000	0	.
H1	383.225	42.292	16	.000
H2	368.166	27.233	8	.001
H3	377.974	37.041	16	.002
H4	387.910[b]	46.977	16	.000
H5	399.771	58.839	16	.000

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

b. Unexpected singularities in the Hessian matrix are encountered. This indicates that either some predictor variables should be excluded or some categories should be merged.

The Likelihood ratio test in table 4 establishes that the respondents' predictor variables like H1= Age (in the year), H2= Type of university, H3= Level of study, H4= Capability of online classes, H5= Income condition of the respondents are significant, indicating that these variables have a major impact on the final model. This study rejected all null hypotheses. So, this study accepted all alternative hypotheses.

The ordinal order of H1= Age (in year), less than 20 = 0 and Between 20 and 23 = 1, Between 24 and 27 = 3, Between 28 and 31 = 4, Above 31= 5 the comparison will be made to less than 20. The first portion of the table 5 has the outcome of "Good study condition" compared to "same as before study condition" – Between 20 and 23 = 1 compared to less than 20 = 0 are less likely to be "Good study condition", p=0.021, Between 24 and 27 = 3 compared to less than 20 = 0 are less likely to be "Good study condition", p=0.067, Between 28 and 31 = 4 compared to less than 20 = 0 are more likely to be "Good study condition", p=0.652, Above 31 = 5 compared to less than 20 = 0 are more likely to be "Good study condition". Now, we can say that the person who is less than 20 is more biased to be "Good study condition", p=0.310. Similarly, the outcome of ''very good study condition'' compared to same as before condition, all categories of age compared to benchmark category and also benchmark

Table 5. Parameter Estimates

Study Conditions	Good		Very good		Bad		Very bad	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.
Intercept	.177	.939	-16.663	.995	-1.155	.610	-.267	.903
[H1=0]	3.251	.310	-7.085	.106	3.216	.277	-.475	.872
[H1=1]	7.079	.021	-6.208	.177	5.723	.051	4.299	.133
[H1=3]	4.943	.067	-2.557	.477	5.128	.053	3.443	.176
[H1=4]	-.744	.652	-21.754	.995	1.347	.451	-.981	.539
[H1=5]	0b	.	0b	.	0b	.	0b	.
[H2=0]	.650	.693	-.667	.777	1.227	.451	1.623	.328
[H2=1]	-3.486	.003	.596	.650	.212	.824	-.269	.790
[H2=2]	0^b	.	0^b	.	0^b	.	0b	.
[H3=0]	-2.959	.243	2.421	.456	-2.035	.371	-.746	.750
[H3=1]	-5.441	.029	4.213	.245	-3.462	.117	-3.439	.134
[H3=2]	-5.137	.056	1.064	.736	-2.879	.217	-2.705	.255
[H3=3]	-3.179	.104	-1.025	.647	-1.800	.305	-3.100	.086
[H3=4]	0^b	.	0^b	.	0^b	.	0^b	.
[H4=0]	.730	.604	3.581	.073	-2.365	.136	.247	.872
[H4=1]	20.217	.994	23.330	.993	19.986	.994	21.778	.993
[H4=2]	-.342	.797	2.254	.189	1.125	.291	2.117	.085
[H4=3]	1.067	.452	1.392	.462	1.141	.337	2.605	.050
[H4=4]	0^b	.	0^b	.	0^b	.	0^b	.
[H5=0]	-.808	.641	20.007	.993	-.129	.922	-.190	.889
[H5=1]	-.916	.452	15.777	.995	-.517	.568	-1.549	.104
[H5=2]	18.522	.998	38.825	.996	18.435	.998	17.093	.998
[H5=3]	-.687	.628	-7.541	.	-3.347	.008	-3.581	.007
[H5=4]	0^b	.	0^b	.	0^b	.	0^b	.

a. The reference category is the same as before.

b. This parameter is set to zero because it is redundant.

c. Floating-point overflow occurred while computing this statistic. Its value is therefore set to system missing.

category are insignificant. The outcome of ''Bad study condition'', age categories (H1=1, 3) compared to benchmark are significant but others are non-significant. Outcome of "Very bad study condition", all categories of age compared to benchmark category and also benchmark category are insignificant.

The Nominal order of H2= Type of University, Other institution= 0 and Public University=1, Private university=2 the comparison will be made to other institution. The first portion of the table 5 has the outcome of "Good study condition" compared to "same as before study condition". Public university and private university compared to other institution are less likely and more likely to be "Good study condition" respectively, p=0.003. Now, we can say that the person who studies in other institution are more biased to be "Good study condition", p=0.693. Similarly, the outcome of ''very good study condition'' compared to same as before condition, all categories of H2 compared to benchmark category and also benchmark category are insignificant. The outcome of ''Bad study condition'', all H2 categories compared to benchmark is insignificant. The outcome of "Very bad study condition", all categories of this variable compared to benchmark category and also benchmark category are insignificant.

The Nominal order of H3 =Level of study, Master's degree or equivalent= 0, Benchmark category. The first portion of table 5 has the outcome of "Good study condition" compared to "same as before study condition" –1st year, 2nd year compared to other institution are less likely to be "Good study condition" respectively, p<0.05 but 2nd year and 3rd year are more likely. Now, we can say that the person who studies in other institution are more biased to be "Good study condition", p=0.243. Similarly, the outcome of ''very good study condition'' compared to the same as before condition, all categories of H3 compared to benchmark category and also benchmark category are insignificant. The outcome of ''Bad study condition'', all categories of H3 compared to benchmark is insignificant. The outcome of "Very bad study condition", H3 categories of age compared to benchmark category and also benchmark category are insignificant without (H3= 3) category, it is significant.

The Nominal order of H4 = Capability of online classes, above 52% = 0, Benchmark category. The first portion of the table 5 has the outcome of "Good study condition" compared to "same as before study condition" – less than 20%, between 20 and 30%, between 31 and 41%, between 42 and 52% compared to benchmark category are more likely to be "Good study condition" respectively, p>0.05. And benchmark category is more

biased to be "Good study condition". Similarly, the outcome of ''very good study condition'' compared to same as before condition, all categories of H4 compared to benchmark category are insignificant, but benchmark category is significant. The outcome of ''Bad study condition'', all H4 categories compared to benchmark are insignificant and also benchmark category. Outcome of "Very bad study condition", categories of this variable (H4=2, 3) compared to benchmark category is significant but others are non-significant, and benchmark category is insignificant.

The Nominal order of H5 =Income condition, Not applicable= 0, Benchmark category. The first portion of the table 5 has the outcome of "Good study condition" compared to "same as before study condition" – income decreased from before, increased from before, same as before, much less than before compared to benchmark category are more likely to be "Good study condition" respectively, p>0.05. And benchmark category is more biased to be ''Good study condition''. Similarly, the outcome of ''very good study condition'' compared to same as before condition, all categories of H5 compared to benchmark category and also benchmark category are insignificant. The outcome of ''Bad study condition'', H5 categories compared to benchmark are insignificant but only one category (H5=3) is significant. Outcome of "Very bad study condition", categories of this variable compared to benchmark category and also benchmark category are insignificant but only one category (H5=3) is significant.

6. Suggestion of the improvement of the quality of the education system in Bangladesh

I) To avoid rote memorization, limit the use of test guides. Increase the number of hours of contact with teachers and students to meet international expectations.

II) Due to the COVID-19 epidemic, the present educational system is in a very horrible state. If professors are cautious while conducting online lessons, students will be able to enjoy their online lessons as if they were offline classes, and the poor study situation would be alleviated to some extent.

III) Upper-level students are having a difficult time studying because many of them are trapped in examinations or were meant to sit for examinations but couldn't due to COVID-19. For this, the UGC must act quickly and effectively to take their exams through online system if they want so.

IV) The condition of students in other institutions is worse than in public or private universities. Educational institutions should arrange online classes for them, so that

they can continue their studies and complete their courses.

V) Teachers Portal will be used to improve teacher instruction. Scholarships for children from very low-income backgrounds. More science and technology universities, as well as planetariums, libraries, labs, and scientific equipment, should be built. Introduce ICT courses in all Bangladeshi post-graduate colleges. Complete the Bangladesh Research Network. Connect national curricula to international benchmarks such as PISA. Teachers are monitored using the multimedia classroom (MMC) dashboard.

VI) Convey the relevance of female education to the general public. Ensure all female students get special financial assistance. More programs can be implemented under the Higher Education Quality Enhancement Project (HEQEP) (2009-2018). The Department of Education and the Ministry of Finance, appoint education professionals to director positions. The University Grants Commission (UGC) and related Parliamentary Committees conduct administrative oversight of universities' operations.

7. Policy implications

COVID-19 has had a widespread effect on Bangladesh's primary, secondary, and tertiary education systems. Various unforeseen social distancing steps were taken by the country's government to deter the diseases from spreading, such as the closing of educational schools and the transition to online schooling, which have had a major impact on the education sector and students' lives. The current qualitative research examines the effect of the COVID-19 pandemic on Bangladesh's higher education system from the perspective of university students.

The current research demonstrates that there is a significant association between students' age, level of study, and overall study condition. Many who are younger have improved study conditions because they are in their first, second, or third year and are not concerned with learning, while those who are older have worse study conditions because they are in their final year, master's degree, or higher study stage. For this, the UGC must act quickly and effectively so that upper-level students do not fall behind and their academic health is not jeopardized. And they must complete the course to progress.

There is a significant association between the type of university and the overall study condition of the students. The students of public universities indicate that their overall study condition is better than other institutions because many public universities have already taken their classes in the online system. And the private university students indicate that their study condition is the same as before. Other institutions have not yet taken any steps to take the class. This disparity in access to technological devices and the internet will obstruct the true goal of active learning by online courses, resulting in a digital divide in education. So, educational institutions should provide all staff members with instruction on how to use multimedia resources to educate students. The university may also find a way to provide eligible students with laptops or desktop computers on a soft loan basis. The availability of Model-based learning management system servers could be increased, or a different server for each university professor could be installed, and network coverage problems could be addressed at the faculty level.

This study also shows that there is a significant association between income condition and overall study condition. This means that those who have good income conditions also have good study conditions. Because they don't have to worry about their income. Those have bad income condition also have bad study condition because financial considerations had a major impact on student's mental health and academic performance: loss of tuitions or part-time work, inability to cover the costs of new online courses, a decrease of parents' income owing to the COVID-19 pandemic, and drop-out of the academic year or semester due to a shortage of funds. Bangladesh's government should alleviate the ongoing lockdown imposed by the COVID-19. So that people's income levels improve, allowing them to continue their children study condition. In addition, the institution must formulate a backup plan to ensure that instructional programs are not disrupted during a disaster.

8. Limitations of the study

This study conducts a Multinomial logistic approach. This is the main limitation of this study. Most of the students are so stressed that they refuse to fill out the questionnaire and have to be coerced into doing so. That is why some of the outcomes are insufficient.

9. Conclusion

The post-COVID situation for Bangladesh's higher education sector is difficult because this is the country's first experience with such a pandemic, and the education system relies on face-to-face onsite contact. The abrupt closing of sine die has brought the system of teaching and study to a halt, resulting in a significant setback for the educational system. Since COVID-19 does not completely vanish immediately, this loss may be easily offset by taking classes online. Other institutions have not yet taken any steps to take the class. So, educational institutions should provide all staff members with instruction on

how to use multimedia resources to educate students. To solve the crisis and reshape the education system, this study suggests some special hygiene and health-related interventions, as well as some socio-economic and technological measures. Since poor economic conditions have also harmed university students' ability to learn. Bangladesh's government should lift the lockout as soon as possible. So that students at advanced levels of education can continue their education. Students' social, economic, emotional, and intellectual disturbances may be minimized with the help of families, colleagues, and the community. In this crisis time of the COVID-19 pandemic, it is recommended that immediate measures must be taken to provide technological services and develop internet connections to ensure uninterrupted online education in Bangladesh to meet the educational needs of higher education students. Universities can provide all-inclusive online-based educational services to reach out to students living in rural areas with or without computers, in collaboration with internet service providers, by offering scholarships or student loans, to ensure students' continued participation in educational processes. Finally, this study provide a guide for improving overall quality of education systems of Bangladesh. 1. Government should increase more budget for research and education purposes. 2. In addition to financial benefits, the dignity and respect of teachers must be ensured. Every research and educational institution must ensure the supply of quality individuals and ensure transparency and accountability of the teachers in each organization. 3. The government of Bangladesh should emphasize on technique/knowledge-based education instead of memorized-based education. 4. Method of job examination should be needed to be changed as early as possible. 5. Job exams should be arranged according to job fields and questions would be made according to specific related fields. 6. The value of each job field would be equally treated, for an equal level of educational qualification. 7. Government should more emphasis on research-oriented knowledge instead of bookish knowledge. 8. The government should create a better environment for education and research sectors so that teachers and students have more opportunities for research activities. In this case, the government should provide more research software and have an agreement with international organizations so that Bangladeshi researchers can get access to more convenient data access from international organizations.

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Appendix

1. Your age (in year) is-
o   Less than 20
o   Between 20 and 23
o   Between 24 and 27
o   Between 28 and 31
o   Above 31

2. What level of study you are enrolled in?
o   Bachelor's degree (1st year/equivalent semester to 1st year)
o   Bachelor's degree (2nd year/equivalent semester to 2nd year)
o   Bachelor's degree (3rd year/equivalent semester to 3rd year)
o   Bachelor's degree (4th year/equivalent semester to 4th year)
o   Master's degree or equivalent, or MBBS, or MPhil or PhD

3. What kind of university do you attend?
o   Public
o   Private
o   Other institution

4. What do you think, In comparison to a face-to-face lesson, how much will online classes cover?
o   Below 20%
o   Between 20 and 30%
o   Between 31 and 41%
o   Between 42 and 52%
o   Above 52%

5. Is your income the same as before or has it changed?
o   Decreased from before
o   Increased from before
o   Same as before
o   Much less than before
o   Not applicable

Impact of COVID-19 pandemic on higher education system in Bangladesh:
University student's perspectives
Common questions
1. What is your gender?
o   Male
o   Female

2. Your age (in year) is-
o   Less than 20
o   Between 20 and 23
o   Between 24 and 27
o   Between 28 and 31
o   Above 31

3. What kind of university do you attend?
o   Public Private

o   Other institution

4. During the most COVID-19 period, where long have you been living?
o   Urban
o   Rural

5. Has the COVID-19 pandemic impacted your family's financial situation?
o   Yes
o   No
o   Not willing to say

Questions about mental condition
1. What kind of stress has risen the most as a result of the COVID-19 pandemic?
o   Psychological stress
o   Mental and economical stress
o   Physical   stress
o   None
o   Other

2. What causes your frustration to increase?
o   Due to the closure of educational institutions for a long time, I am worried about my future career
o   Reasons for declining family income
o   Many in the family were affected by Corona and I was sick myself Myself own income has also decreased due to Corona
o   Others

3. Has it ever occurred to you to commit suicide out of frustration?
o   Yes
o   No
o   Sometimes
o   Not at all
o   Not willing to say

4. If the online class started, did it start on time?
o   Yes
o   No
o   May be
o   Not applicable

5. If online classes have not started, what is the reason?
o   Neglect of teachers
o   Students are reluctant to take online classes Lack of proper device
o   High cost of internet and low speed of internet
o   Lack of proper teaching experience of teachers, or others

6. What do you think, In comparison to a face-to-face lesson, how much will online classes cover?
o   Below 20%
o   Between 20 and 30%
o   Between 31 and 41%
o   Between 42 and 52%

o   Above 52%

7. Your online classes have been disrupted mainly because of-

o   Lack of internet connection

o   Lack of proper device (smart mobile, laptop, desktop etc.)

o   Lack of internet connection but still having proper device Surrounding environment or family problem

o   Others

8. Which device you use to take your online class?

o   Smart mobile phone

o   Laptop

o   Desktop

o   Traditional devices

o   Others

9. Is it simple to locate any information from your institution through online?

o   Yes

o   No

o   Sometimes Very difficult

o   Not applicable

10. Which do you prefer, your offline class or online class?

o   Offline class

o   Online class

o   Both offline and online class

o   None of them

o   Not applicable

11. Can you fully understand the teacher's teaching in the online class?

o   Yes

o   No

o   Sometimes

o   A little

o   Not applicable

12. Do you agree to begin the face-to-face class in classroom even now, in light of the presence COVID-19 situation?

o   Strongly disagree

o   disagree

o   Neutral

o   agree

o   Strongly agree

13. Do you think, the authority should open the residential halls with adequate health safeguards in current COVID-19 situation?

o   Strongly disagree

o   disagree

o   Neutral

o   agree

o   Strongly agree

14. Did the COVID-19 cause any exams to be postponed, which was supposed to happen?

o   Yes

o   No

15. Did that exam take place in 3 to 4 months?

o   Yes

o   No

o   Likely to happen

o   Not likely to happen

o   Not applicable

16. If the exam is done, is it done offline or online?

o   Offline

o   Online

o   Not applicable

17. How was your exam?

o   Good

o   Bad

o   Very bad

o   Average

o   Not applicable

18. If your exam is average or bad, what is the reason?

o   Lack of adequate communication due to closure of halls and long absence of study

o   Suddenly the preparation for the exam was bad and I did not understand the online class properly

o   Lack of group study and class test

o   Other reasons

o   Not applicable

19. During the COVID-19 pandemic, have you done any online learning course (academic or non-academic, IELTS, TOEFL, GRE, and GMAT etc.)?

o   Yes

o   No

o   I wanted to but I could not

20. What is the overall study condition due to COVID-19?

o   Good

o   Very Good Bad

o   Very bad

o   Same as before

Questions about economic condition

1. Has your internet usage increased for online class?

o   Yes No

o   Sometimes Not at all

o   Not applicable

2. How much has the cost of using the internet increased due to COVID-19?

o   Below 40%

o   Between 40 to 60%

o   Between 61 to 81%

o   Above 81%

o   Not applicable

3. Were you related to tuition or part time job before this pandemic, which is bothering you during pandemic?

o   Yes
o   No
o   I am suffering a lot
o   Not very much
o   Not applicable

4. Is your income the same as before or has it changed?

o   Decreased from before
o   Increased from before

o   Same as before
o   Much less than before
o   Not applicable

5. Has the decline in income had any effect on education?

o   Yes
o   No
o   Not very much
o   Same as before
o   Not applicable

ARTICLE

The Innovative Model of Family Education Guidance of Guiding First, then Supplementing and Further Solidifying

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ABSTRACT

In the new era a new more effective family education model can ease unbalanced and inadequate education development. In the new era, parents look forward to a more personalized, active and interactive form of family education guidance. This new guidance model will start with improving behavior by focusing on emotional behavior and cognition. The Roast can ease parents' anxiety, lectures and reading groups can supplement parents' knowledge, and mutual discussion, vicarious practice and teaching others can solidify a scientific and effective family education behavior. The family education guidance model of "guiding first, then supplementing and further solidifying" focuses on the participation of parents in the whole process, which can improve the effectiveness of family education guidance.

1. Introduction

In October 2019, the Fourth Plenary Session of the 19th CPC Central Committee reviewed and approved the CPC Central Committee's Decision on Some Major Issues Concerning How to Uphold and Improve the System of Socialism. The CPC put forward the general requirements for improving the national basic public service system with Chinese Characteristics, Advance the Modernization of China's System and Capacity for Governance. Among them, "the construction of a family education guidance service system covering urban and rural areas" is an important content in the field of education.

An important feature of education in the new era is the increasingly important basic role and strategic significance of family education. The shortage of high-quality family education has become one of the main manifestations of unbalanced and inadequate educational development. Family education has become the most important growth point of China's educational development in the future. (Zhang Dongyan, Gao Shuguo. 2020)[1] The quality of family education largely depends on parents' educational quality and behaviors. Most parents in China do not have the opportunity to receive systematic and professional training in family education concepts, knowledge and skills, so they mainly rely on intuition, intergenerational experience, or fragmented information for family education. However, intuition may not always be right, intergenerational experience may not keep up with the changes of the times, and fragmented information may not provide fundamental solutions to the problems, so scientific and effective family education guidance is now required in this new era.

Family education guidance refers to a parents-oriented

educational process organized by social organizations and institutions including the family to improve parents' educational quality and behaviors to promote the healthy growth of the next generation's body and mind. (Peng Jianlan, Hu Xiaoping. 2006)[7] Parents are the audience of family education guidance. According to relevant educational theories, a relatively effective family education guidance model should be built by analyzing parents' learning expectations to ease the contradiction of the unbalanced and inadequate education development in the new era to a certain extent, and lay an important foundation for the development of a harmonious society. (Li Li, Yu Kailian. 2011)[5]

2. About the Expectations: the Current Situation of Family Education Guidance and Parents' Expectations

In 2012, the *Five-Year Plan on Guiding and Promoting Family Education (2011-2015)* was jointly issued by the National Women's Federation and other six ministries and commissions, stating that the overall goal of guiding and promoting family education is to build a family education guidance service system covering urban and rural areas and improve the scientific research and guidance service of family education. In the same year, China National Children's Center undertook the key project "Research on China's Family Education Guidance Service System" of the national family education scientific research planning project (2011-2015) and implemented a national survey and research on family education guidance service.

2.1 Current Situation of Family Education Guidance Forms

The family education guidance is aimed to promote the healthy growth of the next generation by improving the educational level of parents. The content of family education guidance is scientific and effective ideas, knowledge and methods of family education. Relatively speaking, the form of family education guidance is not very clear, unified and fixed.

The research group researched 15 provinces and autonomous regions, including Shanxi, Shandong, Jiangsu, Henan, Chongqing and Guangxi. The group focused on a more comprehensive investigation and analysis of the current situation of the family education guidance service system in the above-mentioned six provinces and cities. The survey found that according to the different characteristics of guidance objects, guidance contents and guidance requirements, there are the main four forms of family education guidance, namely, individual guidance,

collective guidance, text and audiovisual material guidance and network guidance. Individual guidance includes the family visit, individual consultation, letter or telephone. Collective guidance includes lecture and report, discussion and analysis, parent-child activity guidance, entertainment performance, etc.

At present, the following problems mainly exist in the form of family education guidance. The first is more attention paid to the content of guidance than the form of guidance. The second is more attention paid to collective guidance than individual guidance. The third is more one-way education and less two-way interaction. The fourth is "single" and "one-off" special guidance. The fifth is no importance attached to the guidance service function of traditional media. The sixth is the unbalanced application and development of modern information means. The seventh is the unreasonable activity schedule.

The research group clearly pointed out that we need to realize the important position of guidance service forms in the family education guidance service system, be soberly aware of the guidance service forms' direct impact on the effectiveness of guidance services, guide instructors to master the basic process and applicable conditions of various guidance service forms, select and use appropriate guidance service forms in the guidance service, to improve the effectiveness of guidance services.(China National Children's Center. 2016)[2]

2.2 Parents' Expectations for the Form of Family Education Guidance

The data show that the actual acceptance rate of parents for "individual guidance" is lower, but the guidance expectation rate of parents is 5.8 % higher than the actual acceptance rate, and parents of all ages show this feature, indicating that parents expect the form of family education guidance to meet the requirements of "personalized" content. In terms of the forms of "collective guidance" such as "lecture and report", "discussion and analysis" and "parent-child activity guidance", the guidance expectation rate of parents for "lecture and report" is lower than the actual acceptance rate, while their guidance expectation rate of the latter two is significantly higher than the actual acceptance rate. This feature is reflected in groups of different ages, indicating that parents are no longer satisfied with passively receiving the guidance of instructors, but expect to get an opportunity of "active participation". The guidance expectation rate of parents for "network inquiry" is significantly lower than the actual acceptance rate, while their guidance expectation rate for "online text interaction", "online voice interaction" and "online 'face-to-face' conversation" is significantly higher

than the actual acceptance rate, once again showing that parents are not willing to be in a passive state of "being guided" in family education guidance and expect to get the opportunity of "active participation" provided by the guidance organization.(China National Children's Center. 2016)[2]

Therefore, we can conclude that the form of guidance will largely determine the guidance effect in the process of family education guidance and parents look forward to a more personalized, active and interactive family education guidance form in the new era.

3. Theoretical Support: the Operational Logic of Family Education Guidance

The ultimate goal of family education guidance is to improve parents' educational behavior. Behaviors are the outward manifestation of psychology, so the improvement of behaviors should start with the analysis of the internal psychological mechanism.

3.1 Emotion is the Background of Behaviors

Social psychology holds that attitude is a stable psychological tendency held by individuals towards specific objects (people, ideas, emotions or events, etc.), including the elements such as cognition, emotion and behavior tendency. The correlation between emotion and behavior tendency is higher than that between cognition and emotion and that between cognition and behavior tendency. For example, even if you clearly know that vegetables are nutritious and the human body needs to eat an appropriate amount of vegetables every day, but if you don't like the taste of vegetables emotionally, you will eat less or even no vegetables in behavior. In this sense, emotion is the background of behavior.

In family education, parents can also clearly feel the impact of emotion on their educational behavior. For example, one day, parents got a promotion and a raise, or other pleasant things happened. When they came home and saw their children playing with mobile phones, parents usually laughed it off or preached at them simply. However, if some unpleasant things happened and the parents were stuck in negative emotions, then that children played with mobile phones may cause a violent quarrel between parents and children.

Therefore, the first step in family education guidance should be to adjust parents' emotions.

3.2 Emotion can be Adjusted

Fortunately, many psychologists have found that emotions can be adjusted through research. Albert Ellis, a famous American psychologist, put forward the emotional ABC theory. A (activating event) represents the objective events, that is, the events activated by emotion and behavior, B (belief) is an individual's belief in A (activating event), and C (consequence) represents the consequence produced by an individual's emotion and behavior. Generally, people intuitively think that A (activating event) leads to C (consequence), but Albert Ellis pointed out that B (belief) is the direct cause of C (consequence).

For example, if a child as a senior 3 student doesn't do well in the mock examination (A) and the parents' belief is "Oh,this is bad! If the result of the mock examination is bad like this, the real college entrance examination will certainly be worse (B) , they will naturally show anxiety and irritability (C). However, under the same circumstances (A), if the parents' belief is "fortunately, the knowledge they haven't mastered is discovered through the mock examination, they have time to master what they haven't mastered from now on, and they will certainly do well or even outdo themselves on the college entrance examination" (B), then they will show optimistic emotions and behaviors (C).

Ellis further developed rational emotional therapy based on emotional ABC theory. He believes that people can be rational and reasonable, or irrational and unreasonable. When people think and act rationally, they will generate positive emotions and effective actions. Emotion is accompanied by people's cognition. so emotional or psychological distress is caused by unreasonable and illogical cognition. Therefore, people's emotional state can be adjusted by changing people's irrational cognition.

3.3 Learning Requires Initiative

No one is born to be a parent. Cognitive change needs to be realized through learning. In 1946, Edgar Dale, an American scholar and famous learning expert, first discovered and put forward the learning pyramid theory (as shown in Fig. 1) showing in the digital form how much learning content learners can remember in two weeks with different learning methods. Edgar Dale believes that the learning methods with an average retention rate of learning contents less than 30% in two weeks are personal learning or passive learning, while those with the average retention rate of learning contents more than 50% are team learning, active learning and participatory learning, including discussion, practice and teaching others.(Ma Guojun. 2016)[6] Parents' expectations of more personalized, active and interactive forms of family education guidance reflect that the learning pyramid theory applies to parents' learning.

3.4 Operational Logic of Family Education Guidance

Parents' educational behavior is affected by their emotions. Positive emotion can be stimulated by changing irrational and unreasonable cognition. The active learning method of discussing, practicing and teaching others is more conducive to improving the learning effect and promoting cognitive change. This process is shown in Fig. 2.

As can be seen from Fig. 2, learning and cognitive change are the basis for improving parents' educational behavior, but emotion is the background of behavior, so parents' emotion is the most direct factor causing parents' educational behavior. Once they get stuck in negative emotions such as anxiety and helplessness, it is easier to cause them to form irrational and unreasonable cognition, and their enthusiasm for active learning will be greatly affected. Therefore, in the construction of family education guidance model, we try to start with parents' emotional guidance and then build rational and reasonable cognition when parents are more stable emotionally, and then consolidate parents' cognition through active learning methods such as discussion, practice and teaching others, and finally solidify a more scientific and reasonable educational behavior.
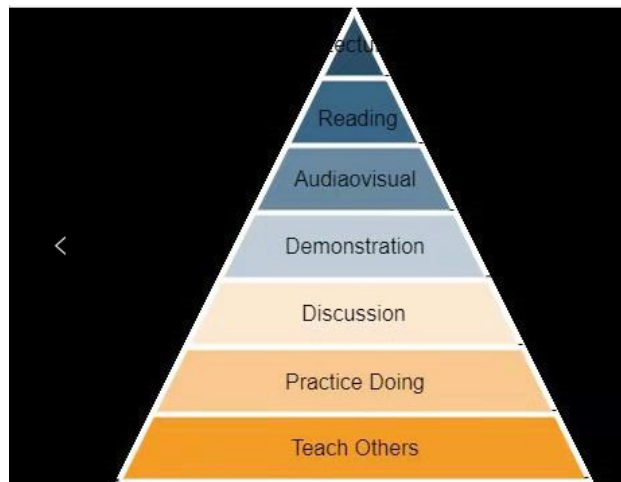

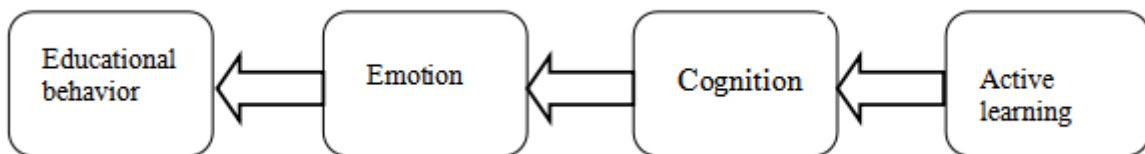**Fig. 1** The model for learning pyramid theory

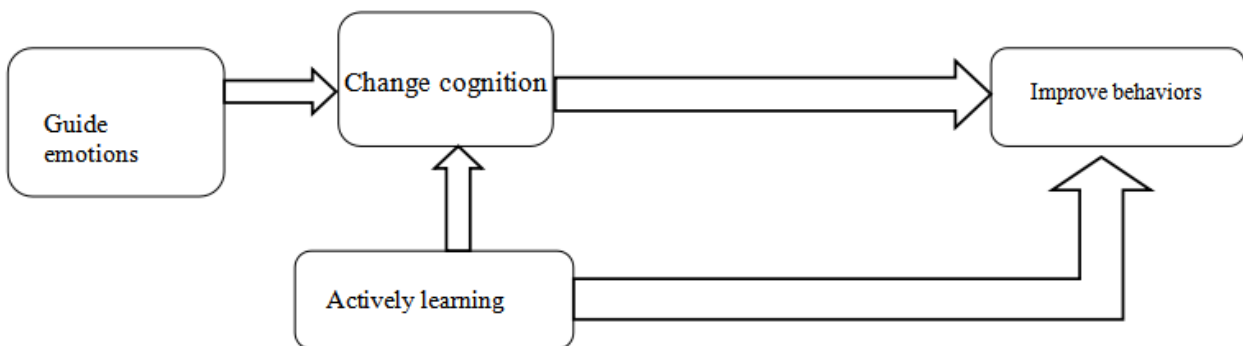**Fig. 2** Psychological mechanism of improving parents' educational behavior

Fig. 3 Operational logic of family education guidance

4. Model Innovation: Build the Family Education Guidance Model of "Guiding First, then Supplementing and Further Solidifying"

4.1 Emotional Guidance: the Premise of Family Education Guidance

In 2018, SmartStudy and Sina Education jointly issued the Survey Report on the Education Anxiety Index of China's Parents (hereinafter referred to as the Report). The survey results show that China's parental education anxiety index is 67%, indicating that parents feel anxious generally about the education for their children. In 2019, Dangdang and iResearch jointly released the White Paper on Growth Anxiety, concluding that 91.5% of parents were anxious about all aspects of their children's growth. Anxiety seems to be the most "popular" emotional state of Chinese parents in the process of family education.

Some studies have shown that moderate anxiety can promote people to think and act positively, but too low or too high emotional arousal levels will reduce work efficiency. Excessive anxiety will have a direct negative effect on parents' educational behavior, then affect the parent-child relationship, and finally reduce the quality of family education. The first task of family education guidance is to help parents ease anxiety.

4.1.1. Causes of Parents' Anxiety

(1) Objective Cause

The Report says that the social environment is the most important factor causing parents' educational anxiety, among which academic records, campus safety and mobile phone addiction rank in the top three factors. Some scholars believe that the parents' anxiety is mainly characterized by the panic about "backward education", the pressure on "educational burden" in the education, and concerns about "useless education", and the scarcity of educational resources, the development of the times and uncontrollable risks are the main factors causing parents' anxiety.(Chen Huazi, Xiao Xiong.2014;[3] Diao Shengfu, Li Xiangling.2016))[4] In addition, as mentioned above, parents mainly rely on intergenerational experience for family education, but the family education experience of the previous generation may not keep up with the development and changes of society. Moreover, the rapid development of the Internet can break the limit of time and space to make parents' individual anxiety develop into group anxiety which in turn sublimate individual anxiety.

(2) Subjective Cause

The social environment is the main objective factor causing parents' anxiety, while resource scarcity is the main subjective factor causing parents' anxiety. (Yang Xiaowei.2019)[8] In the face of the same social environment and educational resources, whether parents have a clear educational purpose and a clear cognition of becoming a useful person and becoming successful, these different views on education and success all determine parents' educational mentality and emotions. Whether parents have an objective and rational evaluation of their children's existing abilities and whether they can establish appropriate expectations for their children based on the evaluation are also subjective factors affecting parents' educational emotions and behavior.

4.1.2. The Roast Can Ease Parents' Anxiety

"Treating emotions is like governing rivers and it is better to divert rather than block".(Zhao Xudong.2019)[11] Letting parents pour out their emotions can reduce anxiety to a certain extent. Through the Roast, Social organizations and institutions such as community and family education guidance institutions can gather the parents with the same characteristics - their children study in the same school, they live in the same community, or they have two children. Participants take turns to pour out the problems and puzzles they encounter in the process of parenting. Other parents can just listen or share their ideas. Moreover, family education instructors can give professional suggestions. We can't change the social environment by ourselves, but social psychology says that when the nature of the event is ambiguous, we tend to judge the event by the reactions of others.(Yue Guoan.2010)[9] Individuals will have a clearer understanding of the social environment through communication with others. In the Roast, because participants have similar backgrounds and characteristics, the communication process will be more targeted and the possibility of empathy will be higher. After a few times, parents will find that the parenting problems from each family are similar, and many problems are inevitable experiences in the process of children's growth. They will realize that they are not the only anxious parents, and their children are not the children with the biggest problems. As long as parents have the beliefs that "it is normal for children to have problems in the process of growth" and "there will be fewer and fewer problems in family education when we master the law of children's growth and development through learning", anxiety will naturally fade down and the desire to learn will gradually increase.

4.2 Knowledge Supplement: the Key to Family Education Guidance

Emotion is the background of behavior. Parents can realize that family education behavior can be improved by easing anxiety, but knowledge is still required to promote the change from consciousness to action. According to the current situation in China, most parents do not have the opportunity to receive systematic and professional family education knowledge training, so social organizations and institutions providing family education guidance services need to broaden the knowledge dissemination channels.

4.2.1. Lectures Improve the Parents' Efficiency of Learning Knowledge

Because of the disadvantages of low pertinence, the weak interaction and lack of continuity, parents' expectations of family education guidance forms such as lectures are decreasing, but a large number of participants, great momentum, high popularity, a wide range of benefits brought to parents and high guidance efficiency are the irreplaceable advantages of lectures. In face of the current situation that most parents lack the opportunities for systematic learning, it is necessary to systematically design lectures to solve the problems of how to give full play to the advantages of lectures and make up for their shortcomings as much as possible.

In terms of content design, lectures should take into account commonness and individuality. The "problems easily happened in family education for the corresponding age" is the main content of family education guidance services, and the guidance expectation rate of parents for "individual special problems" has increased significantly. (China National Children's Center. 2014)[1] Combining the common problems reflected by parents in the Roast, lectures not only spread knowledge on the developmental psychology of all ages but also provide solutions for specific problems. In terms of form selection, lectures should take into account both collective and individual, including offline lectures or online courses, and make full use of new media to guide individual interaction and group interaction between instructors and parents and between parents and parents. In terms of organization and arrangement, lectures should be a series of lectures dominated by one instructor and supplemented by other instructors. This can not only ensure the systematic and consistent lecture content and style, but also improve the adhesion between the lecture and parents. In addition, with the increasingly abundant network information, the network resources related to family education guidance are vast, but the good and bad are intermingled. Ordinary parents without professional knowledge of pedagogy and psychology may easily get lost in the ocean of information, so this requires social organizations and institutions specialized in providing family education guidance to "ensure a correct understanding of the facts" through "official" lectures and other forms.

4.2.2. The Reading Group Strengthens the Effect of Learning Knowledge by Parents

Reading is another channel for parents to learn family education knowledge, and it is also a more subjective and personalized method of learning knowledge. However, the effect of parents' reading behavior may not be ideal without professional guidance. The reading materials on skill guidance are easy to understand, but parents often know what it is but don't know why. They can solve "one" problem according to guidance, but they can't comprehend by analogy and solve "one type" of problems. Although theoretical guidance reading materials are professional and profound, parents may lack interest in reading, and may not have the ability to deeply study and apply what they have learned.

Family education instructors provide reading lists, organize online, offline or online and offline parent reading groups, and regularly organize reading discussion activities. With the company and supervision of companions, reading behavior can be continued for a longer time. With professional guidance and analysis, reading behavior can be more efficient. With the understanding and discussion of participants, reading gains can be better transformed into behavior. If parents do not have the time to often participate in reading group activities, instructors can also provide relevant text and audio-visual materials by new media to help parents.

4.3 Behavior Solidification: the Goal of Family Education Guidance

Emotional guidance and knowledge supplement can change parents' current family education behavior, but to solidify good family education behavior into a habit, parents also need to take the initiative to learn. According to the learning pyramid theory, discussing, practicing and teaching others is a more effective active learning method, and also the learning method with the highest retention rate of learning effect.

4.3.1. Internalize Family Education Knowledge in Mutual Discussion

Discussion is an effective way to internalize knowledge. Parents have mastered some knowledge on family education through the Roast in the early stage and the lectures and reading groups in the middle stage. With the accumulation of knowledge, parents gradually

change from "don't know, what they don't know" to "know, what they don't know". There may be more and more confusion and questions, but they are more willing to share their views and opinions with others. In the later stage of family education guidance, interesting topics are designed and offline or online free discussions are organized by using the form of TV variety show "U CAN U BIBI" for reference, and parents can further internalize their knowledge in the process of expressing their views, and can also further supplement knowledge in the process of sharing with others.

4.3.2. Understand Family Education Behavior in Vicarious Practice

The retention rate of learning content in two weeks is up to 75% for learning through practice, so we can see from this that this learning method is very efficient. Therefore, parents always put the role of "parent" into practice all the time, and the learning effect should be the highest, but why is this always different from the fact? On the one hand, family education is affected by the emotional factor, so parents' rationality in the process of practice is greatly reduced, thus affecting the learning effect. On the other hand, parents separate learning from practice unconsciously, so the expected effect cannot be realized by practice.

In the later stage of family education guidance, parents can be provided with the opportunity of "vicarious practice", and play the role of parents through practice from the perspective of a "third party", which may have different effects. The concept of "vicarious practice" comes from "vicarious learning" proposed by Albert

Bandura, a famous American psychologist, that is, learners observe the behavior and results of role models in a certain situation without the need for direct reinforcement. The concrete method of "vicarious practice" is to extract some typical fragments of the hit TV plays such as A Love for Separation, A Little Reunion, Tiger Mom, and guide parents to analyze why the characters in the play have such behavioral responses. If he or she is the character in the play, is there any other better treatment method? This is only "vicarious practice" without the interference of emotional elements, so parents can better understand the family education behavior in the real situation through more rational and objective analysis, and finally apply these methods into their practice.

4.3.3. Solidify Family Education Behavior in Teaching Others

Solidifying family education behavior is to make a scientific and effective family education behavior become a permanent lifestyle of parents, so parents can make a response habitually when encountering the same or similar situations. Behavior solidification needs repeated deliberate practice and feedback. It is the best way to practice repeatedly in practice. However, it may be more efficient to realize behavior solidification by teaching others. After the emotional guidance in the early stage and knowledge supplement in the middle stage, parents receiving family education guidance in the whole process can better internalize knowledge in mutual discussion and vicarious practice, and apply the scientific and effective family education behavior into practice. At this stage, the new round of family education guidance activities

行为固化

Behavior solidification

知识弥补

Knowledge supplement

相互讨论 Mutual discussion

替代实践 Vicarious practice

教授他人 Teaching others

情绪疏导

Emotional guidance

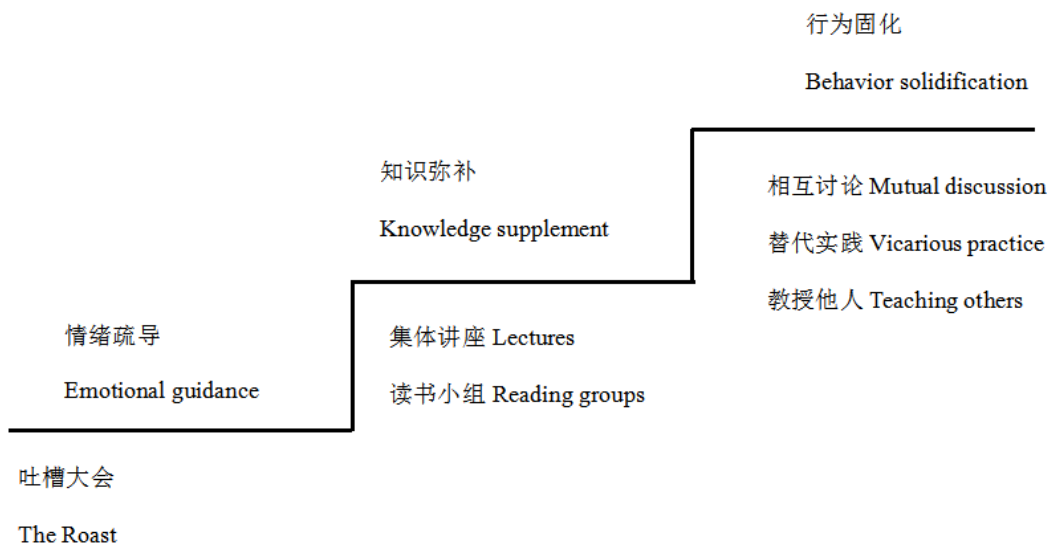集体讲座 Lectures

读书小组 Reading groups

吐槽大会

The Roast

Fig. 4 The family education guidance model of "guiding first, then supplementing and further solidifying"

will be restarted. The parents previously participating in family education guidance are invited as the instructor to participate in the Roast for a new group of parents to help other parents adjust their emotions and share their experiences. In this process, participants are required to express their learning, thoughts and actions in words clearly, and make themselves understood by others, and further solidify their family education behaviors.

One of the links to perfect the national basic public service system is to build the family education guidance service system and explore the effective family education guidance model. With the gradual promotion of family education legislation, family education problems and family education guidance have become a social focus. The existing family education guidance services usually focus on popularizing knowledge and providing methods and are provided through the unidirectional transmission of organizers and instructors, but ignore the parents' participation.

5. Conclusion

According to the family education guidance model of "guiding first, then supplementing and further solidifying", emotion is the background of behavior, and now anxiety has become a "popular" emotion, so only by helping parents adjust negative emotions such as anxiety and helplessness can they stimulate their willingness to learn and change actively. After that, the lectures, reading guidance and other activities organized by instructors can supplement parents' family education knowledge, help them understand the development laws and characteristics of their children at all ages, and better guide family education behavior. In the process of mutual discussion, vicarious practice and teaching others, parents can further solidify a scientific and effective family education behavior, and finally realize the purpose of family education guidance service. The family education guidance model of "guiding first, then supplementing and further solidifying" starts with the analysis of the internal psychological mechanism of parents' educational behavior to explore the effective operational logic of family

education guidance, and focuses on the participation of parents in the whole process of guidance, improving the effectiveness of family education guidance.

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ARTICLE
A Logistic Regression Model to Predict Graduate Student Matriculation

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ABSTRACT

Higher education institutions invest a significant amount of resources every year to recruit new students. However, higher education administrators have been continuously facing challenges in enrollment management due to the demographic shifts, dramatic increases in educational costs, intense competition among institutions, and the uncertain nature of human selection patterns (Baum, Kurose, &McPherson, 2013).[3] Today's post-baccalaureate applicants are more knowledgeable than in previous years, because they can access information on a specific graduate program, in a given college, at any time. As reported in numerous studies, the number of graduate students switching out of their universities continues to be an essential issue. A useful prediction model of matriculation that uses available student data is highly desirable to assist the graduate students with timely advising early in their universities. This study was designed to build a predictive model for the probability that a specific admitted graduate student will matriculate. The results indicated that ten predictive variables were statistically significant at the .05 level. Getting an assistantship made the most substantial positive contribution in predicting student matriculation, followed by FAFSA, experience with the university, campus, degree level, college, gender, age, the number of days between application and admission, and distance to the university. This study's results could be beneficial for improving marketing efforts aimed toward individuals with characteristics most likely to enroll. Administrators could calculate the predictive score (or percentage) for each prospective student based on the predictive model. Marketing efforts could then concentrate on those applicants whose predictive score is high and eliminate the low qualifying students from their recruitment plan.

1. Introduction

A Logistic Regression Model to Predict Graduate Student Matriculation

Many universities in the United States (U.S.) have

seen an increase in postbaccalaureate degree program enrollment. In fact, between 2000 and 2010, there was a 36% increase in postbaccalaureate enrollment (Snyder, de Brey, & Dillow, 2018).[31] Postbaccalaureate degree programs include master's and doctoral programs, as well

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as medical, dentistry, and law. According to Snyder et al. (2018),[31] in fall 2015, over 2.9 million students were enrolled in postbaccalaureate degree programs (2016). In addition, these studies estimated that between 2015 and 2026, postbaccalaureate enrollment will increase by 12% (from 2.9 million to 3.3 million students). Graduate education in the U.S. has risen to the top of the international education enterprise (Shanghai Ranking Consultancy, 2009).[30] Worldly university rankings such as *The Times of London* and the Shanghai Jiao Tong University placed the U.S. postbaccalaureate degree programs and their research facilities among the best in the world (Wendler et al., 2010).[40]

Countries like China and India are "investing substantially in improving their graduate education systems and in the undergraduate programs that feed into those graduate programs" (Wendler et al., 2010, p. 2).[40] Therefore, it is in the best interest of U.S. postbaccalaureate institutions to find out what type of graduate students are enrolling in their degree programs and, most importantly, create a tool that can help with graduate student matriculation and benefit a university by filtering what degree programs are best suited for each type of graduate degree seekers.

In attempts to obtain more knowledge on student matriculation causes, there were many research efforts made to develop student retention theories or matriculation models at the college level. Some of the most notable student retention theories are Tinto's models of student retention (Tinto, 1975),[38] John Bean's model of student attrition (Bean, 1983),[4] and Astin's theory of involvement (Astin, 1984).[2] Based on these theories, researchers have applied different modeling methods to model student matriculation. The most widely used methodologies in the student matriculation research studies are logistic regression (French, Immekus, & Oakes, 2005;[15] Veenstra, Eric, & Gary, 2009),[39] discriminant analysis (Burtner, 2005),[9] and structural equation modeling analysis (Cabrera, Nora, & Castaneda, 1993).[10] Among these previous research efforts, many of them focused mainly on models that predict undergraduate student matriculation. It is still unclear if these models are applicable to choice decisions at the graduate level since these models were developed and designed for use in understanding undergraduate enrollment. This study was designed to build a predictive model for the probability that a specific admitted graduate student will matriculate why Graduate Degrees are Vital to the United States Economy.

Graduate degree holders are crucial to the many challenges that we see in today's innovative world.

Recent studies show a shrinking population of graduate students entering the workforce (Allum & Okahana, 2015;[1] Wendler et al., 2010).[40] The U.S. Bureau of Labor Statistics recently projected that employers would add nearly 2.4 million jobs requiring a graduate or even more advanced degree between 2012 and 2022 (Flaherty, 2015).[14] If this projection is correct, then the enrollment of graduate students in the U.S. must increase to meet that demand. Undergraduate education is essential to the creation of a stable economy, providing students with foundational knowledge and the necessary skills that are required to work in a particular field. Meanwhile, graduate education goes beyond basic knowledge; providing students with expertise also further develops critical thinking skills and produces innovators and visionaries (Wendler et al., 2010).[40] Graduate students become modernizers that can lead the way in areas of advancement that are essential to the American economy. Areas such as renewable and alternative energy sources, advanced agricultural practices, pioneering medical procedures, and groundbreaking disease control techniques all require advanced graduate degrees. If the U.S. is to stay advanced in such innovative areas, then appropriate measures need to be taken at the institutional level to help with recruitment and marketing strategies to match the right student with the proper graduate program and degree.

Financial Aid. Inherent in the economic perspective of college enrollment and persistence is the student demand theory, which is related to price. Student demand theory is applicable to enrollment and persistence in higher education as it is a function of the individual's income, the price of an education, the price of the alternatives to a college education, and the aspirations and desires of the individual. Student demand theory assumes that less education will be purchased when the educational costs are high (Leslie & Brinkman, 1987).[23] The impact of financial aid on student matriculation has been widely studied. Although, much of the financial impact occurs at the point of entry, finances may also influence dropout directly through short-term fluctuations in financial need. Terkla and Jackson (1984)[34] found that the cost of education significantly affected students' matriculation decisions, and financial aid awards significantly affected college attendance. However, aid uniquely contributed to the shorter-term measure of academic year persistence.

According to reports by the National Association for College Admission Counseling (NACAC), the 2016 national average acceptance rate at four-year colleges and universities in the United States was 66.1%, up from 63.1% in 2012. Colleges and universities accepted nearly two-thirds of the applicants. The national college six-year

graduation rate in the U.S. was 53.8% in 2015 and 55.7 in 2012. During a period of increased acceptance rate in the higher education, decreased percentages of degrees awarded, and increased costs incurred in constant dollars, it seems especially necessary to evaluate the effects of different forms of financial aid on persistence for students presently enrolled in institutions of higher education. National studies analyzing the effects of student financial aid on matriculation have not always concluded that all forms of financial aid had a positive impact on persistence. Therefore, the financial variables in the present study were comprised of assistantship, student loan, and federal student aid.

Different Types of Graduate Students

The potential graduate students who are of importance to the current research are those students who fit into the domestic student category. Domestic students are defined as "citizens or lawful permanent residents of the U.S. or have been granted asylee, refuge or are paroled in the Public Interest status by the U.S. government" (Defining Applicants as International or Domestic, n.d., par.2).[11] These students typically have average GRE scores and have qualified for acceptance into specific programs and universities of their choosing. However, full funding for the domestic student group may not always be available (e.g., full-time and half-time assistantships, full-ride scholarships, and grants). These potential graduate enrollees must assess the cost and benefits of enrolling in a graduate program. The financial risk of increasing the debt that most undergraduate students accrue during their baccalaureate can be a significant setback for most potential graduate students.

Graduate school cost. The Average Student Loan Debt reported that less than 20% of undergraduate students could complete their post-secondary education without accumulating some level of student loan debt (2015).[35] The admission data on domestic students can be broken down and categorized even further by considering the tuition-based cost. While private schools typically cost the same for in-state and out-of-state students, tuition prices at public colleges and universities differ based on this distinction in residency.

The Institute for College Access and Success (2016)[36] reported that post-secondary graduates had incurred an average loan debt of (a) $25,550 from attending a public college, (b) $32,300 from a private university, and (c) $39,950 from a for-profit college. The combination of undergraduate and graduate debt accrued by degree areas breaks down as follows (a) Master of Education is approximately $50,879, (b) Master of Science is approximately $50,400, (c) Master of Arts is $58,539, and (d) law and health sciences range on average between $140,000 - $162,000 (Delisle, Phillips, & van der Linde, 2014).[12] Currently, the most extensive fields of total enrollment were in education and business, with 19% and 15%, respectively, of all graduate students. 73.1% of all students were enrolled in master's degree or graduate certificate programs (Flaherty, 2015).[14]

Undoubtedly the growing cost of attending graduate school has become a problem and a significant setback for most Americans. Most graduate students lessen the financial burden by working full-time while attending graduate school. However, the time and effort that is needed to withstand the demands of graduate school and to keep up with one's personal life leave a minimal amount of time for individuals to do anything else.

In-state residency/Out-of-state. Since each state controls its own education system, each public educational institute is funded by taxpayers' taxes. As a result, in-state residents can attend publicly funded colleges and universities for less cost than out-of-state students/ residents.

Predicting Graduate Student Enrollment

Graduate student matriculation can be increased by changing the applicant pool size, employing the right marketing strategies for applicants, and examining admission standards (Khajuria, 2007).[21] As previously discussed, universities have already taken measures to increase their applicant pool size. Therefore this study aims to develop an appropriate model to predict graduate student matriculation based on students' admission data. In doing so, university administrators can employ the correct marketing strategies to attract the right kind of potential graduate students. By utilizing an appropriate prediction model, the university enrollment and recruitment managers can direct their efforts towards prospective graduate students. These are the students that with the correct prediction model can be identified early on and informed of the many possibilities and specific graduate programs that fit their career goals.

Variables that can be used to predict undergraduate student enrollment in a given model may include gender, age, race, social, economic status, residency status, extracurricular activities, high school grade point average (GPA), and SAT/ACT scores. However, some of these variables change at the graduate level. Therefore, the authors built a more appropriate variable selection criteria for graduate student enrollment by reviewing the available literature from comparable resources available (e.g., Council of Graduate School (CGS) reports, the Graduate

Record Examination (GRE) Survey reports, undergraduate matriculation variables, and related case study reports on matriculation prediction).

Graduate student variables

Some of the variables included are non-cognitive variables such as referral data, marital status, and some behavioral data. Data collected on how a potential graduate student was referred to a particular program at the university such as through alumni, friend, or family member is known as referral data. Behavioral data includes the number of days between the application date and admission decision date, if the student confirmed admission (yes/no), and the interactions tracked in Customer Relationship Management (CRM). This study examined and used the non-cognitive variables discussed above along with some cognitive variables such as a graduate student's GRE score, baccalaureate GPA, admission status (regular/ conditional/ provisional), the cost of the graduate program, and whether or not they received their undergraduate degree from the same university. Goenner and Pauls (2006)[17] stated that the selection of variables "differs across models, but generally reflects the academic and personal characteristics of the student in addition to variables that reflect the fit of the institution with a student's preferences" (p. 939). By controlling for such variables, a predictive model can estimate the probability that a potential student who has either applied or been admitted into a specific graduate program will matriculate (Geonner & Pauls, 2006).[17]

Existing Empirical Literature

Most of the research studies on college student matriculation consider the influence of background variables, including ethnicity, age, gender, residency, campus, and location, on student college choice and persistence. Research revealed that the distance between the permanent residence of students and students attending college had a significant direct effect on educational attainment (Bogard, Helbig, Huff, & James, 2011).[5] Pritchard, Klumpp, and Teichler (2015)[26] found that for every percent increase in the distance between the students' home and their college attended, the likelihood of obtaining a degree was decreased by 2.38 percent. A recent study conducted by Garza and Fullerton (2018)[16] found that students who attend colleges at a greater distance from home to school reported a lower level of persistence. Regarding ethnicity, being of African-American descents is included as influential in the persistence process because of a growing concern

in higher education that blacks are underrepresented (St. John, Kirshstein, & Noell, 1991).[32] The existing empirical literature focused mainly on models that predict undergraduate student matriculation, although there have been some advancements made in the medical field when it comes to the use of admissions data in predicting medical student matriculation. For instance, in a longitudinal study conducted by Burkhardt, DesJardins, Teener, Gay, and Santen (2016),[8] data was collected from 2006 through 2014 from the University of Michigan Medical School (U-M) and the American Medical College Application Service. The databases were combined to include each applicant's demographic characteristics, along with their academic application scores, institutional financial aid offer, and choice of school to attend. Binomial and multinomial logistic regression models were produced to estimate the predicting factors related to student matriculation at the local institution (i.e., U-M) compared to other highly competitive educational institutes. Both types of logistical models utilized (the binomial and multinomial) were found to be statistically significant ($\rho < .001$) with similar predictive performances (Burkhardt et al., 2016).[8] Results from the binomial model indicated that females, underrepresented minority students, GPA, Medical College Admission Test score, admissions committee desirability score, and most individual financial aid offers were statistically significant ($\rho < .05$) predictors of student matriculation. The multinomial model (excluding females) produced separate likelihoods of students enrolling at different institutional types (Burkhardt et al., 2016).[8] The importance of what should be noted from this study is how imperative it is to have tailored predictive models (i.e., the relevant predictive variables for a given sample) for a university's enrollment management. Predictive models tested and designed to meet the demands of enrollment management and recruitment efforts at a given education institute are crucial to the survival of graduate programs.

Another study conducted by Jeffe and Andriole (2011)[20] focused on the matriculation of MD-Ph.D. graduate students with and without the Medical Scientist Training Program (MSTP) funding. The study examined "the extent to which differences in educational outcomes and career plans exist among MD-Ph.D. program graduates of medical schools with MSTP funding" compared to those without MSTP funding (Jeffe &Andriole, 2011, p. 953).[20] With permission from the Association of American Medical Colleges, the authors examined de-identified records for the national cohorts of all 1993-2000 U.S. medical school matriculants. Jeffe and Andriole (2011)[20] analyzed each MD-Ph.D. graduate student's pre-

matriculation characteristics, educational outcomes, and career-setting preferences. Three MSTP funded groups were of interest (a) long-standing MSTP funded schools, (b) newly funded MSTP schools, and (c) schools with no MSTP funding. Several multivariate logistic regression models were conducted to test the authors' hypotheses. Jeffe and Andriole (2011)[20] found that the "graduates' pre-matriculation characteristics, educational outcomes, and career plans differed among the three MSTP funding groups" (Jeffe &Andriole, 2011, p. 955).[20]

The authors also concluded that women and nonwhite graduates were more likely to graduate from long-standing MSTP-funded schools. Jeffe and Andriole (2011)[20] also found that while controlling for MSTP school funding, MD-Ph.D. graduates with a total debt of $100,000 or more were more likely to be interested in a non-research-related career (e.g., clinical practice, medical/health career administration, etc.).

Lastly, a study conducted at Howard College of Dentistry by Henley to determine appropriate predictor variables for incoming freshman matriculation utilized several statistical models (viz. factor analysis, discriminate analysis, and logistic regression) to determine the most suitable predictor variables. The study used entrance data collected from the Dental Admissions Test (DAT) (i.e., DAT testing and academic performance data), and all eligible sophomore students' freshman GPA between 2004 and 2008 predict successful graduates. The study's final results indicated a "significant statistical difference in DAT and GPA averages existed between successful and failed students" (Henley, n.d., p. 1).[18] The author's hypothesis on the prediction of failed to successful students was tested via a logistic regression model that resulted in an overall percentage of 87% correct. Therefore Henley's findings suggested that a student's age, DAT score, and freshman GPA do have an overall effect on the student's success in graduating. These results indicate how vital recruitment and targeting the right potential graduate student is for obtaining higher matriculation rates. Enrollment management based approach to recruiting students into specific graduate programs would improve the likelihood of a student's success. It also plays a crucial role in understanding the failed matriculation of highly desirable candidates as well (Burkhardt et al., 2016).[8]

Logistic regression modeling to predict graduate student matriculation

Today's postbaccalaureate applicants are more knowledgeable than those in previous years. They can access information for a specific graduate program, in a given college, at any time. Potential candidates are able to apply to graduate programs by utilizing online formats and filling out online applications, as well as applying for financial aid, assistantships, grants, and scholarships. These students are "shopping for the best package" (Bohannon, 2007, p.1).[6] Hence there is a need for a predictive model that can help assist college administrators and recruiters in reaching the right applicants.

Many of the same factors that influence the decision to apply to a particular graduate program are also the same factors that affect a student's decision to enroll. Predictive models of enrollment are usually based on if a student enrolls or not while conditioning on that student's application to a program or their acceptance (Bruggink & Gambhir, 1996;[7] DesJardins, 2002; [13] Goenner & Pauls, 2006;[17] Leppel, 1993;[22] Thomas, Dawes, & Reznik, 2001).[37] In such cases, where a binary outcome is desired (e.g., matriculation, non-matriculation), the use of a logistic model is appropriate to control for confounding variables. This study employed a logistic regression model to predict graduate student matriculation. Predictive modeling "analyzes past data to make future predictions, or in econometric terms, data is analyzed to estimate a model which is used to make out-of-sample predictions" (Goenner & Pauls, 2006, p. 936).[17] The purpose of this predictive enrollment model is to better understand the contributing characteristics of the incoming graduate student population that help define the variables, which influence a graduate student's decision to matriculate. However, due to the dearth of literature available on graduate student matriculation, selecting the relevant variables for the predictive model was challenging.

2. Methodology

Population

The subjects of this study were 3,718 domestic graduate students who applied and were accepted for admission at an American university over a period of 4 years from 2013 to 2016. The dataset was requested from the Information Management and Technology (IM&T) Department at the university, and it included two subsets. The first one, the development subset, was comprised of 2,573 students who applied and who were admitted during the years from 2013 to 2015. The second one, the validation subset, included 1,145 students who applied and who were admitted at the beginning of 2016.

Research Design

This study was designed to predict the probability that a graduate student who was accepted for admission would actually enroll. No experimental design was necessary

due to the use of historical data. Due to the dichotomous nature of the dependent variable (matriculated/non-matriculated), we applied a logistic regression model which can be used to predict a binary response from multiple independent variables.

The actual enrollment of a student was the dependent variable in this study. When collecting data, the researchers extracted information that indicated whether a particular student enrolled at the university. The dependent variable was coded 1 if the student enrolled; 0 if the student did not enroll, therefore making it binary. Based on previous literature about student matriculation studies and practical feasibilities, a total of 14 predictive variables were included in the logistic regression model. These variables were grouped into four categories: demographic (e.g., age, gender, residency, campus, student's distance to site, and race), academic (e.g., degree level, college, and GPA), financial aid (e.g., assistantship, loan, and FASFA), and behavioral (e.g., time between application data and admission date, experience with the university, and how did you know about the university). The logistic regression model was specified as:

$$\ln(ODDS) = \alpha + \beta_1 \chi_{1i} + \beta_2 \chi_{2i} \ldots\ldots + \beta_n \chi_{ni} + \varepsilon_i \quad (1)$$

$$ODDS = e^{\beta_0 + \beta_1 \chi_{1i} + \beta_2 \chi_{2i} + \ldots + \beta_n \chi_{ni}} \quad (2)$$

where *ODDS* represents the probability of a student enrolling divided by the probability of a student not enrolling; α is the constant of the equation, also known as the intercept; $\beta_1, \beta_2, \ldots, \beta_n$ are the estimated effects for each corresponding χ (independent variable); and ε_i represents a random error term which is logistically distributed. After calculating the odds ratio for each observation by using formula (1) and (2), the researchers then calculated the probability of enrollment through formula (3)

$$P_i = \frac{ODDS}{1 + ODDS} \quad (3)$$

where P_i is the probability that student *i* will choose to enroll at the institution to which they applied.

The researchers assessed the predictive accuracy of the final model to predict student matriculation by looking at calibration (or reliability) and discrimination (also called resolution or refinement) in the development subset, as well as in the validation subset. Calibration describes how closely the predicted probabilities agree numerically with the actual outcomes. A standard method that has been widely used to assess model calibration is the Hosmer and Lemeshow (2000)[19] goodness of fit test. Discrimination refers to the ability of a model to correctly distinguish between those with and those without the outcome (Prytherch et al., 2005).[27] Discrimination of the model was examined by calculating the area under the receiver

operating characteristic (ROC) curves. The ROC curves show the sensitivity (the proportion of truly positive observations which was classified as matriculated) and specificity (the proportion of truly negative observations which was classified as non-matriculated). The area under the curve, summarized by c-index, represents the likelihood that the proposed model will determine that a student who chooses to matriculate will have a higher probability than a student who chooses not to matriculate. The further the curve above the reference line, the more accurate the model. According to Hosmer and Lemeshow (2000),[19] reasonable discrimination is indicated by c-index values of .7 to .8 and good discrimination by values over .8. Since the predicted values for the dependent variable (matriculation status) are probabilities which range from 0 to 1, the classification of the two-matriculation status (predicted matriculated/predicted non-matriculated) depend on a particular cutoff probability value. The selection of the cutoff probability value was based on the field of study and previous literature. According to Sampath, Flagel, and Figueroa (2009),[28] a student with an estimated 35% to 40% chance of enrolling can be treated as a positive indicator of matriculation. Therefore, the value of .4 was selected as the cutoff probability value in this study.

3. Results

Descriptive Statistics

For the purpose of this study, students who matriculated (2413) and non-matriculated (1306) were identified. The average age of the sample was 30 (SD=8.7), with 70.8% female and 29.2% male. Caucasian students dominated the proportion of the sample with 78.9%, followed by Hispanic (8.9%), other (7.1%), African American (2.5%), and Asian (2.4%). In-state students comprised 53.0% of the student body, and 24.5% of respondents were university's former students. Table 1 and Table 2 provide the details of descriptive statistics for all quantitative variables used in this study.

Logistic Regression

Before performing a series of multiple logistic regression models, the multicollinearity was checked. Multicollinearity occurs in regression models when one predictor variable can be predicted (linearly) from the other predictor variables in the model. According to Pallant (2007),[24] the variance tolerance value cannot be less than .10, nor can the variance inflation factor (VIF) value be larger than 10. The results indicated that none of the variables met this criterion. Therefore, it was judged

that multicollinearity was not a factor that could influence the predictive model in this study. Pallant (2007)[24] also recommended that correlations between independent variables should be .30 or better. Correlation analysis among all predictors indicated most pairs to be significant (>.30) and strongly correlated as expected.

A logistic regression model to predict graduate student matriculation was developed with all predictors utilizing the development subset (n=2573). The initial results indicated that the independent variables of race, GPA, residency, and how students knew w about the university were not statistically significant. A subsequent logistic regression model was developed, excluding these four insignificant predictive variables. The results revealed that ten predictive variables were statistically significant to produce the following outcome model:

$$\Pr(Enroll) = \frac{\exp(y)}{1 + \exp(y)}$$

With y equaling -0.797-0.002×(time between application date and admission date)+0.299× (college-1)+0.0001× (college-2)-0.018× (college-3)-1.032× (college-4)+0.208× (degree level-1)+0.67× (degree level-2)+0.144× (degree level-3)-0.565× (campus)-0.314× (gender)-0.002× (distance to X))+0.062× (age)+1.333× (FAFSA)+6.463× (assistantship)+0.579× (experience with X).

The model explained 40.1% of the total variance in the log odds for student matriculation by the above ten predictive variables (Cox & Snell R^2=.40). The -2Loglikelihood of 1458.05 was significant. The Omnibus Test of Model coefficient Chi-square was 127.66 with eight degrees of freedom. The beta, standardized error, Wald, degree of freedom, significance, and odds ratio for each significant predictor are displayed in Table 2.

Predictive Accuracy

Calibration. Hosmer and Lemeshow goodness of fit test indicated that the predicted probabilities did not deviate from the probabilities aligned with the prediction of the binary distribution, and the model was adequate for analysis (χ^2 (8, n=2573) =17.38, p=.58).

Discrimination. The researchers used a cutoff probability value of .4 and applied the final prediction model to the validation subset resulting in an overall model accuracy of 77.6%. Specifically, 60.4% of applicants that were predicted to matriculate did matriculate, while 17.2% of the applicants that were predicted not to enroll did not enroll. Table 3, below, presents the predicted and actual matriculation of the validation subset. The c-index had a value of .81, which according to Hosmer and Lemeshow (2000),[19] falls into the group of good discrimination.

Discussion

Through the use of a predictive model, this study has attempted to expand understanding of the college choice process. It has added to and strengthened the literature by giving certain enrollment management professionals a tool to use for predicting their own graduate student enrollment. The results indicated that there were ten predictive variables that were statistically significant at the .05 level. Among the ten predictors, the graduate student's matriculation was mostly influenced by the financial aid variables. For instance, the current study found that the odds of matriculating were 640.9 higher for a student with an assistantship than a graduate student without an assistantship. Moreover, the odds of matriculating are 3.8 times higher when a graduate student receives FAFSA. This is consistent with countless studies in student retention (e.g., DesJardins, Ahlburg, & McCall, 2002;[13] Singell, 2004;[29] St. John, 2000),[33] which have illustrated the positive effect financial aid factors have had on student matriculation. For example, conducted a study to investigate the impact of financial aid on student matriculation for public/private higher education. The results demonstrated that financial aid had a significant positive impact on matriculation. Providing adequate funds for students who are unable to defray the full costs of higher education has always perplexed postsecondary institution administrators. These days, postsecondary institutions are no longer in a seller's market. As a result, students' buying habits have also changed. To an increasing degree, graduate students base their initial entry decisions and their staying or leaving decisions on their perception of the cost of attendance. There were eight other significant predictors, including experience with university (former student were 1.8 times more likely to enroll than students who had not attended the university), campus (off-campus students were 1.8 times more likely to enroll than on-campus students), degree level (specialist students were two times more likely to enroll than doctoral students), college (compared with the business major students, students majoring in education were 2.8 times more likely to enroll), gender (males were 1.4 times more likely to enroll than females), age (with one unit increase in age, the odds of matriculating increase by one), the number of days between application and admission (with one unit increase in the number of days between application and admission, the odds of matriculating increase by one), and distance to the university (with one unit increase in distance to the university, the odds of matriculating increase by one).

Practical Implication

The primary purpose of this study was to develop a predictive model that would more accurately predict a graduate student's likelihood to enroll at a university. The predictive model of matriculation generated from this study could be used by the universities to enhance their recruitment efforts. For example, using the current software program, the Department of Student Admission and Recruitment could calculate the predictive score (or percentage) for each prospective student based on the predictive model. The office personnel could then focus their time and monetary resources on those applicants whose c-index was .4 or higher. Furthermore, after running prospective students' information through the predictive model, enrollment managers could then eliminate the low qualifying students from the recruitment plan. This would allow the staff to spend more time on the qualifying graduate students and save the institution financially by not mailing the low qualifying students as much direct mail.

Limitations and Future Research

While a model that targets applicants or admitted students is helpful, it is still limited to a small population of graduate students who have already shown interest in enrolling at one university. A more efficient way of drawing from a larger pool of potential applicants would be to implement a predictive model much early on in the recruitment stage such as in the inquiry stage (i.e., when the student is still searching for information on graduate degree programs). A model as Goenner and Pauls (2006) [17] suggested, "can early on in the recruitment cycle provide admissions and recruitment officers with a tool to craft recruitment and marketing efforts to solicit more applications and increase enrollment" (p. 940). An inquiry may include "a student filling out an information card, attending a college fair, making a campus visit, sending an email, or phoning to request information" (Goenner & Pauls, 2006, p. 937).[17] Focusing on the student's data collected from their inquiry into the university helps to estimate a student's interest early on in the recruitment process, which can target specific marketing and recruitment efforts based on a potential applicant's interest (Goenner & Pauls, 2006).[17] The exchange of information at the inquiry level may be the most important for institutions to increase applications and enrollment (Paulsen, 1990).[25]

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Table 1 Descriptive Statistic for Development Subset

Categorical Variables	n(Matriculated)	%(Matriculated)
Gender		
Male(n=773)	520	67.3%
Female(n=1800)	1170	65.0%
College		
EBS(n=1087)	798	73.4%
NHS(n=1023)	582	56.9%
PVA(n=305)	203	66.0%
HSS(n=119)	79	66.4%
MCB(n=39)	28	71.8%
Campus		
Main(n=1495)	829	55.5%
Off(n=1071)	858	80.1%
Degree Level		
Doctoral(n=485)	311	64.1%
Master(n=1833)	1218	66.4%
Specialist(n=147)	92	62.6%
Certificate(n=108)	69	63.9%
Assistantship		
Yes(n=321)	320	99.7%
No(n=2252)	1370	60.8%
Race		
White(n=2044)	1353	66.2%
Hispanic(n=214)	152	71.0%
Black/Afr. Am.(n=62)	43	69.4%
Asian(n=57)	36	63.2%
Other(n=196)	106	54.1%
Experience with University		
Yes(n=657)	542	82.5%
No(n=1916)	1148	59.9%
Residency		
In-State(n=1390)	1102	79.3%
Out-State(n=1182)	587	49.7%
FAFSA		
Yes(n=1583)	1210	76.4%
No(n=990)	480	48.5%

	Min.	Max.	M	SD
Continuous Independent variables				
Distance to University (Miles)	.1	3367	34	504.1
# of days from application - admission	2	808	97	87.6
Age	20	67	30	8.9
GPA	1.9	4.0	3.6	.3

Note: M=Mean, SD= Standardized deviation

Table 2 Descriptive Statistic for Validation Subset

Categorical Variables	n(Matriculated)	%(Matriculated)
Gender		
Male(n=315)	520	67.3%
Female(n=830)	1170	65.0%
College		
EBS(n=447)	798	73.4%
NHS(n=529)	582	56.9%
PVA(n=109)	203	66.0%
HSS(n=42)	79	66.4%
MCB(n=18)	28	71.8%
Campus		
Main(n=627)	829	55.5%
Off(n=518)	858	80.1%
Degree Level		
Doctoral(n=193)	311	64.1%
Master(n=872)	1218	66.4%
Specialist(n=39)	92	62.6%
Certificate(n=41)	69	63.9%
Assistantship		
Yes(n=149)	320	99.7%
No(n=996)	1370	60.8%
Race		
White(n=891)	1353	66.2%
Hispanic(n=119)	152	71.0%
Black/Afr. Am.(n=31)	43	69.4%
Asian(n=34)	36	63.2%
Other(n=70)	106	54.1%
Experience with University		
Yes(n=253)	542	82.5%
No(n=892)	1148	59.9%
Residency		
In-State(n=581)	1102	79.3%
Out-State(n=564)	587	49.7%
FAFSA		
Yes(n=706)	1210	76.4%
No(n=493)	480	48.5%

	Min.	Max.	M	SD
Continuous Variables				
Distance to University (Miles)	.1	3369	424	535.9
# of days from application - admission	4	1201	92	92.4
Age	19	45	30	8.6
GPA	2.1	4.1	3.6	.4

Note: M=Mean, SD= Standardized deviation

Table 3 Logistic Regression Results

Predictor	B	SE	Wald	df	Sig.	OR
Time between application date and admission date	-.002	.001	3.903	1	.048	.998
College			15.337	1	.004	
College (1)	.299	.432	.479	4	.489	1.348
College (2)	.001	.429	.001	1	.999	1.000
College (3)	-.018	.473	.002	1	.969	.982
College (4)	-1.032	.520	3.935	1	.047	.356
Degree level			9.255	1	.026	
Degree level (1)	.208	.379	.300	3	.584	1.231
Degree level (2)	.670	.345	3.780	1	.049	1.954
Degree level (3)	.144	.431	.111	1	.739	1.154
Campus	-.565	.183	9.577	1	.002	.568
Gender	-.314	.146	4.637	1	.031	.730
Distance to University	-.002	.001	68.193	1	<.001	.998
Age	.062	.011	31.349	1	<.001	1.064
FAFSA	1.333	.142	88.687	1	<.001	3.791
Assistantship	6.463	1.032	39.207	1	<.001	640.851
Experience with University	.579	.177	10.723	1	.001	1.785
Constant	-.797	1.038	.589	1	.443	.451

Note: B=beta weight, SE=Standard error, df = Degree of freedom; Sig.= Significance; OR = Odds ratio

Table 4 Predicted and Actual Matriculation of Validation Subset

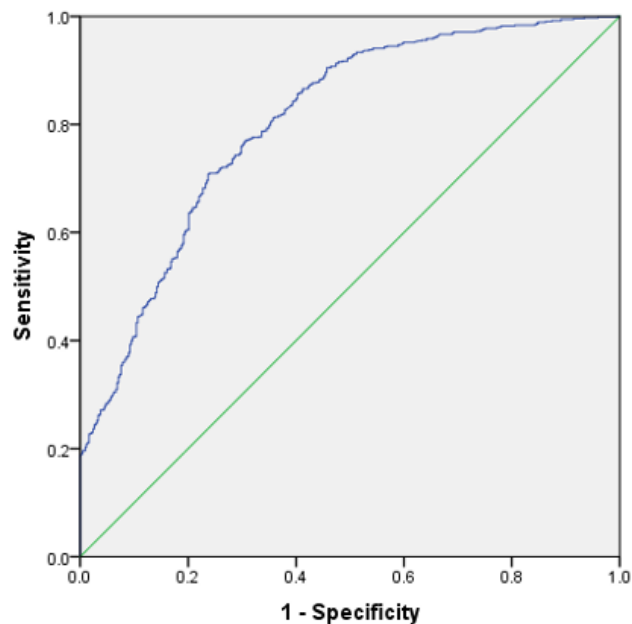| Matriculated		Predicted	
		Non-Matriculated	
Actual	Matriculated	692 60.4%	31 2.7%
	Non-Matriculated	225 19.7%	197 17.2%

Figure 1 Receiver Operating Characteristic Curve

ARTICLE

Improving Group Member Participation of 4th Year Section A Civil Engineering extension Students in integrated Project Work at Debre Markos University

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ABSTRACT

Group work is a form of voluntary association of members benefiting from cooperative learning, which enhances the total output of the activity. Therefore, group discussion is a way for active participants to explore new ideas.

Based on the previously observed practices in 4th year civil engineering students at Debre Markos University, the group member participations was not pleasing. The objective of this study was to identify the core causes of low participation of group members in their project work and to take actions for improving group member participation. The data collection method used questionnaires and interviews and was analyzed using Microsoft Excels.

Action research done in civil engineering 4th year Extension courses focused on continuous advising and instruction. These practices have achieved a good understanding of how to increase active participation in their group work activities. Therefore, a main conclusion of this project is that an active learning method helps the students to share skill, knowledge and attitude to each other.

1. Introduction

Group discussion is a way for active participants to explore new ideas from the active participants in groups which greatly helps the individuals engages in the task. Active learning develops the knowledge, skills, values and attitudes that plays a vital role in bringing socio-cultural, economical, technological, political and environmental advancements (Sewnet Tesfaye and Kassegn Berhanu, 2014).[9] However, to achieve these goals the teaching learning process at all educational institutions must support strong teachers' and students' interaction to use active learning methods such as making suitable class room environments and resources for projects.

Ministry of Science and Higher Education has advocated and proclaimed all over Ethiopian Universities for applying active learning and teaching methods. Accordingly, at Debre Markos University (DMU) several active learning methods such as group work, presentation, laboratory works, project works etc. have been implemented and studied in many different fields of studies. Group work is the focus of this study.

From the experience we know that improving educational quality can't be achieved at once; rather it requires tireless efforts in all levels of educational institutions. To achieve better teaching methods of active learning the instructors focused on the participation of students.

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Students play an important role for their own learning, so the teaching methods must include practices that require students to take responsibility for their own learning. This action research project will focus on student participation in group work by using active learning methods (ALMs). Data of student participating in the *Civil Engineering* 4th *Year Section A Extension course will be* obtained using questionnaires and interviews. The data synthesized using Microsoft Excel.

1.1 Problem Statement

All higher education institutions in Ethiopia (Jimma University, Addis Ababa university, Arba Minch university, …) including Debre Markos University strives to generate competent graduates, give community serves and engaging in research activities. As a result, the university curriculum incorporates some integrated projects for their academic achievement. It was observed that students' participation in the *4th Year Section A Civil Engineering Extension Integrated Project was very unequal. U*sually one or two members of the group became responsible to perform all the tasks of the project and the rest of the group members were not actively participated. This result of unequal participation leads to unequal assessment of basic knowledge and skills. The challenge of this study is to identify the cause of low participants of the group members in the project work and improve or enhance their participation.

1.2 Objective

The main objective of the research is to improve active participation the group members in their project work.

   i. To identify the root causes of low participation of group members

   ii. To take actions for improving group member participation

1.3 Significance and Scope of the Study

The significance of this study is to create active participant students. Active participant students are less dependent of others and develop to increase self-confidence in their abilities throughout life. Actively participating students learn more from their mistakes and how to create relationship.

The scope of the study is to use action research to identify the root causes of low participation of students in group work by collecting student data and using that data to develop intervention teaching practice to improve the level of participation in *their integrated group project.*

2. Importance of Modern Education

Education enhances socio cultural, economical, technological, political and environmental development. Applying active learning teaching methods is a crucial strategy in creating responsible, strong, self-confidence, leaders who will improve the development of the country. Expanding the universities to over 33 nationwide and increase the intake capacities of universities to over 100,000 students each year is a start. Also university-industry linkage was created to support development, making the intake capacity of universities 70% for science and technology and 30% for social science which can support the country for its development in technology (Yosef Kasa, 2016).[11]

Over the years, scholars, researchers and national reports have discussed the importance of employing active learning instructional strategies to maximize student learning in the college or university classrooms, and researchers have proved that active learning is a very promising teaching method (Gallagher, S., 1997).[5]

Most education researchers Eggen, P., & Kauchak, D. (2007),[3] Laura Maher (2010),[8] Atalay Mesfin Aneteneh (2014),[1] Sewnet Tesfaye and Kassegn Berhanu, (2014)[9] and Shi Qing-he, (2016)[10] agree that active learning methods consists of students working together in groups small enough so that everyone can participate in a clearly assigned task.

One of the advantages of student participation is that it offers the possibility of exploring a variety of viewpoints and an opportunity to share their own experience and knowledge.

There are many different methods for increasing participation that were very similar to our study. Many researchers Kumera Takele Yadeta (2020),[7] Yosef Kasa (2016),[11] FIPPI APRILA (2017),[4] Carlos Gonzalez De Sande and Juan ignacio godino llorente (2014),[2] Atalay Mesfin Aneteneh (2014),[1] Laura Maher (2010)[8] and Kriflik, L. and Mullan, Judy (2007)[6] concluded that the following active learning teaching methods were effective small group size formation, inclusive group formation, providing clear instruction for each activity and teaching students communication skills.

Therefore the students' participation can be improved by continuously applying the following critical techniques; forming small inclusive groups actively supervising the students on each activity and offering continuous instructions in how to be actively participate on each activity

3. Location of the Study Area

This study is conducted at the Technology Institute

school of civil and hydraulic engineering, Debre Markos University in the 4th year Civil Engineering program and specifically sec A for extension students.

The University is found in Debre Markos which is located in north western part of Ethiopia. The town is 300 km NW of the capital, Addis Ababa and 265 km SE of Bahir Dar, the capital of Amhara National Regional State.

4. Methods

The primary student data was collected in 4th year Civil Engineering Section A extension course. For this research the following primary data collection methods were applied.

i. Questionnaires

Eleven crucial questions were prepared and framed different perspectives to explore the feeling/attention and practice of *students* with respect to active participation during the course High-Way group project. All those interviews were focus mainly on how to enhance the quality of education and improve the actively participation of students in the classrooms. Finally the distributed questionnaires were collected and interpreted using excels.

ii. Interview

Interviews were the second way of gathering student data. The interviews were focused on how to enhance the quality of education and improve the actively participation of students in the class room. Five well reviewed and structured interview questions were distributed to explain their ideas freely.

iii. Sample Size

In this research the target population of the study includes 4th year civil engineering students who participated High-Way design project. The actually number of students was small in number that is 15 students. Therefore, all the students have been taken as a population for the study.

5. Results and Discussion

Data was collected from the target population of civil engineering 4th Year Section A extension students through questionnaires and interview data collection system.
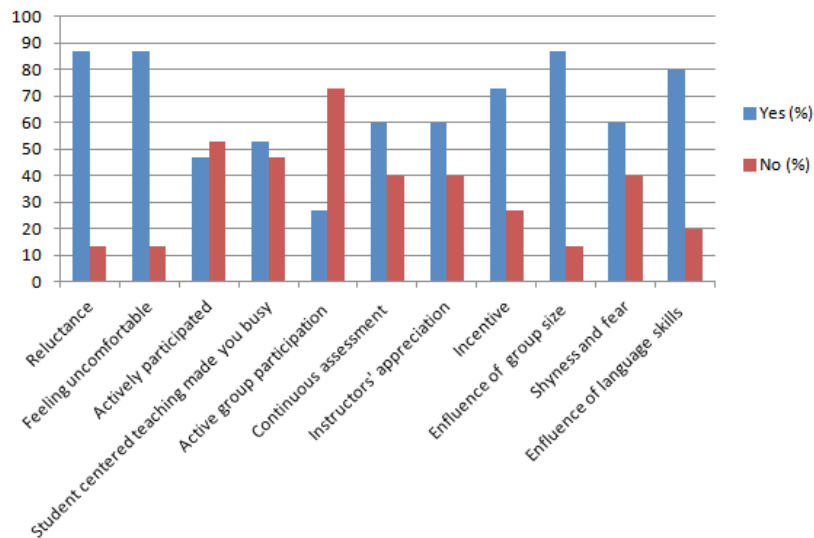
5.1 Data Obtained from Questionnaires

To analyze the feeling/attention and practices of civil engineering 4th Year Section A extension students, eleven crucial questions were prepared and framed from different perspectives. The responses to the questionnaires revealed the instructor to student relationship was not always positive; A few of the instructors have treated the students unwisely responding to diminish their vision and dreams of actively participation in the class (Table 1). Therefore, most of the interviewees stated that creating a safe learning environment is essential. Instructors should have training for active learning-teaching methods.

From the above table 87% of the students responded that group participation has been affected by being afraid, reluctance or feeling uncomfortable when they randomly asked to response to the whole class. Only 27 % of the students responded that all members of the group have actively participated in each activity. On the other hand 60% of the students stated that the instructors positively appreciating their trails in participation. While 60% the students stated self-confidence, shyness and fear are the triggering factors to present their ideas in front of the whole class clearly and freely. 87% of the students responded that large group size has a negative impact on active participation teaching methods.

The cluster analysis of questioners responses presented on the bar graph below.

Table 1 Questionnaires and the response of civil engineering 4th Year Section A extension students

No	Questionnaires	yes	%	No	%
1	Feeling afraid and being reluctance to present their ideas for the whole class	13	87	2	13
2	Feeling uncomfortable for brain storm question that you're randomly invited to response for the class	13	87	2	13
3	Always attend and actively participated in the whole activities	7	47	8	53
4	student centered teaching methods made you busy	8	53	7	47
5	All members of the group have actively participated in each activity	4	27	11	73
6	To create self confidence & competent student, continuous assessment is vital.	9	60	6	40
7	Positively treating and appreciating of your trial	9	60	6	40
8	Incentive/encouraging instructors to push and actively supervising each group	11	73	4	27
9	Large group size has a negative impact in active participation	13	87	2	13
10	Shyness and fear are the triggering factors to present in front of the audience	9	60	6	40
11	Language skills has negative consequence for actively participating	12	80	3	20

Graph 1. The cluster analysis of the questioners

5.2 Data Obtained from Interview

The second methods of collecting primary data for this action research were through interviewing Debre Markos University institute of technology civil engineering 4th year sec A extension students and some staff members to explain their ideas freely. For this activity the five framing questions were prepared.

1. Why the students are not actively participation in the group work activities?
2. Which types of assessment method do you prefer and why?
3. What do you feel on applying active learning methods in your field of study?
4. What is the impact of class room arrangement on teaching learning process?
5. Do you think that the usual organized class arrangement has a negative impact on group participation?

The responses obtained from the interview were articulately described and summarized as follow.

Based on their experience and observation the staff members of Debre Markos University responded that students had not been attended in the group work activities, lack of willingness and poor habit of participating in group work. They also noted the main reasons students were reluctant to use active learning methods, course curriculum condition (nature of the course content), lack of subject matter knowledge were the major causes of students that do not participated actively in the group works.

According to the civil engineering section A extension students low participation resulted from:- a. lack of time they come from remote areas, b. different geographic location of the group members preventing them to meet together, c. unable to get internet access to update their content and subject knowledge, d. jobs, they are partly governmental employees, e. home life being a leader of the family, f. feel tired due to overloading, g. expense increase due to transportation cost, h. lack of willingness to work together were the major factors/causes for low participation of students in group work. On the preferred assessment method, students preferred objective types of questions per specified test/exam schedule since they believed that it gives some preparation time. Students believed that time was a limited factor to apply active learning method to their field. Based on the interview conducted the usual class room arrangement has its own impact in applying group work activities. The class room arrangement should be regarding when applying the active learning methods.

Generally from the above analysis there are gaps in the behavior of some of the students and instructors. The authors strongly believed that a continuous and actively supervising of the students is vital to bring behavioral and learning change for students.

5.3 Actions to be Taken to Improve Student in Group Participation

The analyzed questionnaire and interview data lead us to plan effective changes related to students' needs. Several approaches can be used to improve students' participation in group work. The approaches were identified on the basis of the researchers' experience, interview with teachers and questionnaire from the students. The following approaches were used to make group work effective.

- Friendly communication to students about the rele-

vance of the group work
- Small group sizes formation.
- Inclusive group formation.
- Clarify the process and the final outputs of the tasks (Giving clear direction about the group work).
- The group work tasks will be interdependence and fairly distribute among each members.
- Apply Crossover group communication.
- Formulate adequate mechanism to assess the contribution of each group member.
- Use continuous assessment methods

5.4 Actions Implemented

The approaches identified by the researchers to improve students' participation in group work were implemented on the fourth year section A civil engineering extension students. First, the students were told about the relevance of group work for their learning (rationale for using group work). Second, the students were assigned randomly into five disaggregate groups of three members (small group) to keep the groups balanced. Third, the students were given clearly set direction and expectation for group work. Fourth the presenters were randomly assigned among students with circulating group leader. This ensures everyone will be ready, responsible, actively participate and avoid dependency among one another. After the presentation is completed, each student was instructed to answer some questions from the teacher and members of other groups based on what was presented by his/her respective group.

Finally, an assessment technique that considers the contribution of each group was implemented. During the implementation of the final approaches, both the process and the product of the group were considered.

Lastly, the students were required to show their understanding on each task to ensure all students were participated equally in each task. They performed very well, with full confidence in their presentations in front of their classmates.

5.5 Evaluation of the Changes

The researchers tried to see whether the selected approaches have brought changes in students' behavior (participation) in group work. To this end, when the group work is in process, completed and submitted, the researchers were committed to evaluate the accomplishments of the action research in each stage.

The points listed below were the evaluation that was done by the researchers:
- Strict observation were held by teacher during their group work activities,

- The students were required to answer some questions such as state the objectives and significance of their group work tasks,
- The students were also requested to present their group work to their class. In that way the contribution of each member of a group is determined on the basis of his/her response to questions rose mainly by the teachers and by the members of other groups as well.

Finally, it was observed that almost all the group members of the students were able to answer the questions raised from the teachers and their classmates. It helps the researcher to check individual participation in group work. This indicates that the participation of the students in group work improves after the selected actions or strategies were implemented.

Therefore, on this action research project we have justified that active learning teaching methods such as collaborative, group works, cross over groups, balloon game, jigsaw, microteaching, buzz groups, presentation and others similar activities are the basic solutions to enhance students' participations in group work and help each other.

6. Conclusion

According to the data that we have collected from civil engineering 4th year section A extension students applying Active Learning Methods is extremely difficult. This is because we can't solve many of the participation problems of students, many come from remote area to the university, some of them were overloaded by engaging in governmental office and have being the leaders of their families. As a result of these factors, they did not have enough time to meet for group works. However, according to the action research done in civil engineering 4th year extension students through continuous advising and convincing to apply active learning methods, they have achieved a good understanding and performing active participation in their group work activities.

In this action research we have learned that it is possible to improve students' participation in group work by appropriately implementing different methods such as communicating the relevance of group work for learning, assigning students randomly into groups of small size, random assigning of presenters, circulating the group leader, giving clear directions and expectation about group work and assessing students based on individual contribution. Therefore, we have concluded that an active learning method helps students to share skill, knowledge and attitude to each other through group participation.

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ARTICLE

Empowering Culture Change: Internationalization in the Academic Department

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ARTICLE INFO	ABSTRACT

Internationalization of higher education has widespread benefit to society and has become the expected norm. The literature offers many calls for and models of comprehensive internationalization. Society expects higher education graduates to be global ready when they graduate. Responsible citizenship and professional life require that people be inclusive and sensitive to the worldviews of others. Those calls for change raise an opportunity: a model for culture change to be followed by others. University programming is centered at the department, which is the center of faculty life (e.g., teaching, curricular change, interaction with peers, promotion and tenure). The academic department is the center of institutional change. We used a three-year, inclusive process, to develop a strategic, international, intercultural plan for a department in a comprehensive US university. Our plan includes four themes, complemented by 12 goals. Each goal has actions with time frames (i.e., 1-3 years, 5-7 years, 10-12 years). There are 49 total actions. Among those, 28 are in the 1-3 year time frame, and each of those has a responsible actor (e.g., individual or committee). The plan is adaptive, and includes assessment to advance accountability and transparency. We began implementation coincident with the pandemic, and with significant social unrest in our community and nation. The year of experience provided both affirmation and redirection. Our model guides departmental change, empowering necessary growth and offering a model for others wishing to advance internationalization.

1. Introduction

Society is an increasingly interconnected network of experiences, perspectives, and worldviews. Functioning in that network requires intercultural understanding (de Hei *et al.* 2020[10]). Several authors have called for internationalizing higher education (e.g., Kaowiwattanakul, 2016;[27] de Wit et al. 2015;[13] da Wan 2018).[9] Internationalized higher education incorporates knowledge of the relationship between values and societal patterns (e.g., poverty, economic disparity, individual vs. collective values) (Bourn, 2014;[6] Poort *et al.,* 2019),[40]

as well as vulnerable social groups (Perry *et al.,* 2018).[39] Students, professionals and citizens who develop a broader social understanding are more analytical about cultural perspectives and more interested in attempting a broader understanding (Bourn, 2014).[6] This broader approach recognizes that we are global citizens, sharing a single, complex environment and a common future (Schultz, 2007).[46] Weaving international and intercultural views into educational practice can be transformative, encouraging emerging professionals and future citizens to be more inclusive (Baily and Holmarsdottir, 2019)[4] and

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helping universities make a greater contribution to society (Hou and Jacob, 2017).[22]

Academic institutions have reported many benefits from internationalization, including global readiness among students, attractiveness in recruiting students and faculty, diversity of views on campus, and revenue generation (American Council on Education, 2017;[3] Niehaus and Wegner, 2018).[35] Institutions that are more international and intercultural in their perspective contain more dynamic communities, and members of those communities are more effective in developing new skills and knowledge (Rahman and Alwi, 2018).[41] Students graduating from such institutions have increased intercultural appreciation (Mok, 2018).[33] They also have increased capacity to live, work and learn effectively with others (Green, 2019)[18] and an expanded worldview about the importance of intercultural understanding (Witkowsky and Mendez, 2018).[50] Students who have international experience like study abroad report being more reflective about their role in our interconnected world (Dolby, 2007)[15] and more open-minded and resilient (Ruth *et al.*, 2019;[43] Shaftel *et al.* 2007).[45]

In spite of the benefits, progress on internationalization is fragmentary. Academic departments need systemic change, advancing a culture that values international teaching, learning and research. Hudzik (2011)[23] proposed Comprehensive Internationalization (CI), suggesting that effective change must be institutional. CI is a goal we have yet to achieve very broadly. For example, Hawawini (2011)[20] and Spencer-Oatey and Dauber (2019)[48] among others, hold that academic departments are not achieving significant cultural growth in spite of repeated attempts at institutional change. Although there is widespread attention to programming such as Study Abroad (e.g., Robinson 2012;[42] Wonson *et al.,* 2020)[51] and Internationalization at Home (IAH, Mittelmeier *et al.*, 2020),[32] cultural change is slow and difficult (Bovill *et al.*, 2020).[7] Most academic institutions implement teaching and learning following values that have evolved over decades. Infusing new values (e.g., systemic internationalization) requires incremental change at the margin. Such changes are slower in academia than in some subsets of society (e.g., business) (Nilemar and Brown, 2019;[37] Paige and Mestenahuser, 1999).[38] Choosing to invest institutional energy and resources toward global citizenship is controversial in cultures that are nationalistic and/or are increasingly influenced by capitalistic societal mores (Clifford and Montgomery, 2014).[8] For example, in the decade 2005-2014, there was a 2-3% increase in outgoing US students and a 40% increase in students coming to the US (Nguyen-Voges, 2015).[34] The US sends less than 3% of its students abroad in any given year, far fewer than most other western countries (Nguyen-Voges, 2015).[34] Many institutions struggle with the contrast between national, protectionist values and international, global values (Mok, 2018).[33]

Culture change (e.g., internationalization) occurs at three levels: institutionL, personal, and disciplinary (Gregersen-Hermans, 2014).[19] If departmental programming is to become international and intercultural, there must be institutional support for the individuals involved. That support will be influenced by the institution (the university), as well as the beliefs of each individual. Similarly, internationalization is influenced by personal circumstances (e.g., financial status, family responsibilities, mental and physical health). Specific actions that empower international and intercultural behavior focus in the academic department. The department is most often a collection of 10-50 faculty, teaching several hundred students, conducting research and overseeing graduate programs, and faculty life. Leadership of and by the faculty is a central influence over the success of internationalization (Egekvist *et al.* 2017).[16] The faculty are empowered or constrained by institutional philosophy, and associated money and power. If members embrace a culture that values internationalization, opportunities for placing cultural values into practice will increase and constraints will decrease. An academic unit with effective leadership and a vision of internationalization advances "conscientious intent", which includes being aware, reflective, concerned, and critical (Ledger and Kawalilak, 2020).[28] This paper offers a strategic plan for achieving that momentum.

2. Institutional Context

The changes reported in this paper were undertaken at a large, comprehensive university with a tradition of international scholarship, a tradition that is highly variable among units. It has the Xth largest number of US students studying abroad annually (2017/18 data) (https://opendoorsdata.org/data/us-study-abroad/leading-institutions-by-institutional-type/). The university has 12 colleges and 150 academic majors (Link removed for peer review). Our department is typical within the University (i.e., 21 faculty, ~225 undergraduates and 50 graduate students) (actual numbers vary widely across the institution). Our departmental mission is "… to foster a high-quality natural environment by contributing to the management, protection, and sustainable use of fisheries and wildlife resources through teaching, research, and outreach" (Link removed for peer review). Approximately 25% of our students participate in study abroad, several

of which are taught by our faculty. Several faculty have research programs in countries beyond the US.

3. Purpose and Methods

Our department has functioned in its current configuration for 40 years. During that time, our faculty have conducted research in, and taught students from hundreds of locations around the world. We are part of a large university in an urban setting. As expected, we feel that our graduates must to some degree, be intercultural upon graduation. We have adopted the term *global ready* (da Wan, 2018)[9] as a description of our goal. In pursuit of that goal, we have embraced long-term internationalization of education and research.

At project initiation, our goal was culture change: to increase the value and practice of internationalization. We believed that our students, faculty and staff were supportive of internationalization, as defined by de Wit (2009;[11] 2020)[12]: "… integrating an international, intercultural or global dimension into the purpose, functions and delivery of post-secondary education, in order to enhance the quality of education and research for all students and staff and to make a meaningful contribution to society." We believed our community was interested in global readiness, and desired to be inclusive, intercultural and international. However, we historically had not identified or committed to systematic actions to cause us to behave in those ways. Therefore, we designed and implemented a planning process to advance internationalization goals.

Our three-year planning began early in 2017. Much of 2020 and 2021 were strongly influenced by the coronavirus pandemic and social unrest. The latter was particularly influential in our community, where three people of color were killed by police in separate incidents during those 18 months. The pandemic delayed some actions and caused us to change some priorities. For example, international travel was unavailable for a year and half, which affected teaching, research and collaboration. Both the pandemic and the social unrest caused us to revisit the plan to build new actions to advance diversity and inclusion. Those actions are making us a stronger community and are redirecting some energy more broadly from internationalization to Diversity, Equity and Inclusion (DEI).

In this paper, we describe our methods in sufficient detail that users could adapt them for their use. Our planning began with internal discussions among faculty and with colleagues from the Internationalizing Teaching and Learning program (a partnership of the Global Programs and Strategies Alliance [GPS] and the Center for Educational Innovation ([CEI]). We then developed a plan framework, which provided a tool for four focus groups: undergraduate students, graduate students, teaching faculty and post-docs, and research and engagement faculty and post docs. Participation was voluntary. Participants joined because they had an interest in internationalization. Questions were relatively similar among groups (Table 1). Our general goal was learning about participants' positive and negative experiences with international and intercultural work, gaining ideas for improving those experiences, and identifying resources to make improvements. We synthesized results of the focus groups and used that synthesis to build a draft plan. We discussed that draft at length with members of the department, and college and university colleagues (e.g., Learning Abroad Center [LAC], GPS Alliance, CEI).

Table 1 about here

We took extensive notes during focus groups, but did not record sessions. We analyzed focus group notes to develop four syntheses representing views expressed by participants. We used those syntheses to develop a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. That analysis allowed us to examine our history, our stakeholders and our present community. We offer exemplary SWOT results here; findings of a similar approach will be relatively specific to any department that follows this process.

4. Findings

Results include our SWOT analysis, which identifies directions upon which to capitalize, and our focus group results frame community interests, allowing us to capture ongoing momentum. Those results were woven into our action plan, described below.

4.1. Strengths and Weaknesses:

Strengths: Our greatest asset is our community and its interest in global engagement. Some faculty members have international research programs, others have collaborations with tribal communities or other cultural groups. Most of our graduate students are reflective, aware of the responsibilities and privileges that come with a graduate degree. We have a vibrant study abroad program, taught by committed and experienced faculty.

Weaknesses: Our faculty and student bodies have low diversity, making it a challenge to attract people from different backgrounds. That weakness is common to the natural resources field (Bonata *et al*, 2015).[5] International efforts are demanding and can place high demand on faculty energy (Jiang and Carpenter, 2014).[25] Intercultural

and international teaching and research require significant investments of time and energy. They depend on sustained relationships in host communities. Post-doctoral associates and graduate students have constrained timeframes, and their activities are bounded by the funding that supports their positions.

4.2. Opportunities and Threats:

Opportunities: Our university offers a wide range of programs and support for international study. We have access to resources within and beyond the university that help students and faculty be globally engaged. Our state has a strong network of tribal communities and our metropolitan area is highly multicultural. Our college supports a Diversity Scholars' Fellowship program, a development office, and a range of intercultural communities. Our university supports an Institute for Diversity, Equity and Advocacy (Link removed for peer review) that deepens opportunities.

Threats: Internationalization requires time to develop trusting, respectful relationships. Such time demands often conflict with professional and personal lives, and may be seen as risky investments. Other cultures often are unfamiliar, making it difficult for some to begin discussions. Although financial support is available, study abroad remains an expensive experience, often limited to those with means. International students who are not fluent in English start slowly, impeding progress on funded work.

Limitations: Our plan faces two significant limitations. First, participants in our focus groups represent people who already have an interest in internationalization. We do not have cross-sectional representation. Second, implementation of our plan coincided with a global pandemic and with significant social unrest, the latter of which was pronounced in our community. Those influences have delayed actions and re-directed energies.

Advancing accountability: Our draft plan, containing goals, actions, outcomes and reporting structure was adopted by the departmental faculty and staff, resulting in commitments to action. The plan has four themes, representing our community's international and intercultural aspirations . Each theme has goals; each goal has time-bound actions: "3 years", "5-7 years" and "10-12 years". Thirty three of the 49 actions are "within 3 years". Leadership for implementing and reporting each of those is designated (i.e., person or committee).

5. The Strategic Plan

5.1 Themes, Goals and Actions

Each of our four themes has a series of goals; each goal has a series of actions. In this section, we describe short term goals in some detail, and longer term (5-7 year or 10-12 year goals) in less depth.

Theme 1 We will become inclusive, intercultural and globally engaged. We will work with communities within and beyond Minnesota to address conservation issues at a range of spatial and temporal scales. We believe international and intercultural competence includes knowledge and appreciation of diversity, social complexity, and comfort working with people from other cultures (Soria and Troisi, 2014).[47] We demonstrate global engagement through the activities, skills and attitudes of our community members.

Goal 1.1 *Become an inclusive, respectful and reflective community.* Internationalization will advance global readiness of our students, increase the intercultural nature of our classes, and strengthen international aspects of our research. Those changes will in turn, advance inclusivity and internal reflection. We achieve this through a range of actions, including:

Within 3 years

- Establish a departmental International and Intercultural committee. Build ties between that committee and the college Office of DEI.
- Designate a volunteer faculty member as International and Intercultural Coordinator to lead programming and facilitate communication.
- Review and update all goals and actions of this plan biennially. Discuss each biennial progress report and any suggested changes with the faculty.

Goal 1.2 *Build relationships that contribute to public engagement with community partners within and beyond X State.* Relationships are central to global engagement. Relationships must be built on trust, mutual benefit and longevity. Establishing them requires time, financial investment, respectful interactions and a willingness to rethink attitudes. Our actions target faculty because this growth is slow and students are with us for a relatively short time.

Within 3 years

- Provide recognition in faculty annual reviews for investments in developing intercultural and international relationships, including skills for intercultural engagement.
- Invest in connections with XX communities of color, including immigrant communities, through conversations about collaborative research, co-management of resources and shared education.

Such co-curricular learning experiences can be powerful tools for acquiring intercultural knowledge (Soria and Troisi, 2014).[47]

- Host open houses for under-represented local communities interested in learning about conservation issues, potentially developing ongoing partnerships.
- Identify local, intercultural gathering places at which to host sessions about our programs, and listen to community interests, discovering new opportunities to increase engagement of under- represented groups.

Longer term

- Develop graduate research that directly supports under-represented partner communities in addressing local conservation challenges.

Goal 1.3 *Offer the leading undergraduate and graduate curricula for students motivated to engage with diverse audiences within X State and other parts of the world.* Our plan makes a bold commitment to intercultural and international teaching, research and engagement. We are driven to find innovative approaches to preparing global-ready students and conducting globally engaged research. A central part of effective planning is assessing and reporting results and responding to those results. All assessments will be reflective, helping us change practices and serving as a model for others.

Within 3 years

- Publish a biennial assessment of our achievements, including assessing global readiness of students.
- Foster a culture of collaborative partnerships and participatory research, disseminating findings to stakeholders and explicitly acknowledging the value of partnerships.
- Pursue funding for an endowed faculty position in environmental sociology, strengthening our ability to teach and conduct research in ways that prepare students for cultures different from their traditional base.
- Endow annual, graduate, public engagement fellowships.

Longer term

- Recruit, support and retain diverse faculty, seeking individuals who represent and promote strong international and intercultural diversity.

Theme 2 Provide an engaging undergraduate curriculum that advances intercultural and international learning. Most undergraduate student exposure to intercultural and

international perspectives is through coursework. There is a deep literature on Internationalization at Home (IAH) (e.g., Hofmeyer and Jacob, 2002)[21] which supports and guides classroom-based change. Learning benefits when faculty share their intercultural and international research. Classroom-based learning opportunities provide introductory global engagement to students who might not participate in study abroad (Ahwireng and Pillay 2020).[1] Specific learning outcomes leading to global-readiness may lead to creative approaches to integrating intercultural and international perspectives in the classroom.

More immersive opportunities, both study abroad and domestic intercultural study will advance the global readiness of our students. Fostering a departmental culture of globally relevant teaching will have a spill-over effect beyond the curriculum. Graduate students (e.g., teaching assistants) will benefit from the development of instructor capacity for intercultural and international teaching.

Goal 2.1 *Improve accessibility of study abroad courses.* Study abroad benefits students in many ways, helping them develop as professionals and global citizens, yet these courses are not accessible to all (Jones, 2020).[26] Barriers include financial resources and insufficient understanding of how study abroad advances graduation within four years. It is critical that our undergraduate students have access to resources including financial support and salient information about course planning.

Within 3 years

- Communicate effectively about study-abroad scholarship availability.
- Strengthen mentoring to better support students considering study abroad.
- Establish a fund for students of color to support undergraduate research, travel to professional meetings, and mentoring opportunities.
- Raise funds for means-based, study abroad scholarships, allowing a greater diversity of participation.
- Improve clarity and flexibility regarding the role of study abroad in the curriculum.

Goal 2.2 *Increase opportunities for intercultural learning in the curriculum.* Few undergraduates gain immersive, intercultural experiences. Domestic, intercultural learning will empower students whose budgets, schedules or interests do not align with study abroad, helping these students broaden fieldwork, interpersonal, and professional skills. The department will encourage and support faculty investment in this goal.

Within 3 years

- Host conversations with at least two under-represented communities in the XX Cities Area. Conversations will target undergraduate education, as well as use of, and decision-making about natural resources.

Longer term

- Join collaborators from several cultures in X State to develop a colloquium exploring conservation as seen from different cultural perspectives.
- Nominate scholars with intercultural experience from elsewhere in the University and the state to serve as adjunct faculty.
- Sustain relationships with one or more tribal community colleges, fostering intercultural learning (e.g., co-taught classes, undergraduate seminars).

Goal 2.3 *Encourage increased faculty investment in teaching intercultural and international courses*. Most of our study abroad courses are taught by faculty who are late in their careers. Developing new international courses feels risky, which deters investment by younger faculty.

Within 3 years

- Reduce barriers of uncertainty and risk through a shadow experience, allowing younger faculty to join experienced faculty in a study abroad course.

Longer term

- Develop faculty peer-to-peer networking opportunities to support international and intercultural learning. Our goal is at least one international or intercultural exercise in each class.

Goal 2.4 *Support students from under-represented groups and international students*. We will be a hospitable, supportive home for students from other countries and underrepresented cultures.

Within 3 years

- Build interactions among student groups representing underrepresented people (e.g., share events and experiences, co-host guests). Engaging with international students helps domestic students acquire knowledge about other cultures and enhances their intercultural competence (Soria and Troisi, 2014;[47] Deardorff, 2006).[14]
- Host annual visits by people from elsewhere in the university, representing resources and helping faculty become familiar with support and opportunities.

- Facilitate interactions among student groups that have international membership, including shared speakers, hosted guests, and collaborative experiences.
- Explore a peer-to-peer program in which students who are international or from a non-majority culture serve as mentors to incoming and less- experienced students.

Theme 3 Graduate education encourages intercultural engagement and international learning. Graduates embrace international lessons and values, advancing our mission after graduation. These students rely on their advisors for established relationships with intercultural and international communities. We will take steps to ensure that students have consistent exposure to intercultural and international learning opportunities, which will require addressing limitations of our current curriculum, and demonstrating departmental commitment to training global-ready scholars. Every graduate student engages in research, many pursue professional development, and our TA program provides opportunities for graduate teaching and advising.

Goal 3.1 *Build international and intercultural opportunities for graduate students*.

Within 3 years

- Routinely host seminar speakers who share intercultural and international perspectives; devote a semester-long seminar series to that theme.
- Adopt a measure of graduate student global readiness upon graduation, and weave that measure into our international/ intercultural report, advancing transparency.
- Develop a Certificate of International/ Intercultural competence (e.g., scholarship, teaching abroad) for graduate students.

Longer term

- Offer a graduate level course that builds capacity in global engagement skills and attitudes.
- Recruit an adjunct faculty member to offer an international, seven-week, graduate level, problem-solving course.
- Recruit adjunct faculty to teach courses intended to enhance intercultural or international skills.
- Explore shared-scholar agreements with international universities supporting student, scholar and faculty exchanges.

Goal 3.2 *Support graduate students pursuing intercultural or international research and learning opportunities*.

Our focus groups emphasized the difficulty of identifying opportunities and navigating the complexities of international research. We will address this barrier in several ways.

Within 3 years

- Maintain a website describing graduate opportunities and resources (e.g., funding, guidance, contacts).
- Work with campus graduate student associations to develop peer-to-peer networking for graduate students pursuing international and intercultural work.
- Share information (e.g., courses, seminars, resources) with other graduate programs.

Longer term

- Develop funding to support graduate students presenting research at international conferences.

Goal 3.3 *Increase recruiting and retention of graduate students and postdoctoral scholars interested in intercultural and international work.* International and intercultural students and scholars are key to our global engagement. Their participation builds cultural sensitivity and understanding, and creates opportunities for-long lasting collaborative relationships. These scholars from other cultures often require additional support to thrive in our department and university. We will provide assistance in helping them learn the norms and expectations of the department and university.

Within 3 years

- Provide assistance to graduate student organizations establishing a peer-mentoring program for new students.
- Recruit and retain underrepresented students in our graduate program.

Longer term

- Encourage our intercultural, adjunct faculty to serve on graduate student committees.
- Partner with tribal colleges to promote graduate school readiness for their students.

Theme 4 Our departmental members conduct research that is interculturally and internationally relevant to informed, inclusive decision -making. Understanding and responding to the needs of others is key to international and intercultural success. If we are to make globally relevant contributions, our faculty, post-doctoral scholars and graduate students must conduct research that is mutually beneficial to the researchers and the local communities. Further, our research will contribute to local capacity to address conservation threats and opportunities.

Goal 4.1 *Promote globally relevant and intercultural research among our faculty.* Faculty face many demands on their time. Choosing to focus on globally relevant research, particularly research with local partners, comes at a cost. However, globally relevant research is key to our mission. Thus, it is important that we continue to foster a research culture that supports this work.

Longer term

- The mentoring committee for probationary faculty will have at least one member with experience in international research and/or teaching, lowering the threshold for initiating new research in international or intercultural settings.
- Actively promote sabbatical leaves that are explicitly intercultural and international in nature.

Goal 4.2 *Focus on conducting research with, as well as within partner communities.* Conducting research that is relevant to partner communities requires that we understand how they see the problem. To achieve that, we will not only be physically present at an intercultural or international site, but also be actively engaged in seeking local perspectives, receiving those with open minds, and addressing them in research outcomes.

Longer term

- Recruit a tribal natural resource faculty member, with a disciplinary focus tied to our department and an interest in working with X State tribes, integrating western science and traditional ecological knowledge.
- Actively recruit adjunct faculty who can expand our research engagement with indigenous, immigrant, or international communities.

Goal 4.3 *Effectively communicate our commitment to globally relevant research.* Ensuring that our research is globally relevant requires that we share it in ways that are accessible to interested parties. Sharing relevant research with a wide audience of interested individuals demonstrates that we are interested in partnering with communities in addressing conservation challenges.

Within 3 years

- Enhance our web and social media presence to feature intercultural and international work and facilitate interactions with partners.
- Promote participation by our research staff and graduate students in community-based and non-academic conferences and workshops related to their

expertise. This includes recognizing in performance reviews the role of this engagement as central to sustaining collaborative research with cross-cultural and international partners.

- Regularly provide story leads to university communications staff, featuring our intercultural and international research.

6. Moving into Action

Our plan was approved and adopted by the faculty. Timing coincided with the start of the pandemic and our first year of experience coincided with significant social unrest. Those influences caused us to redirect, and provided opportunities. For example, after the social unrest in the summer of 2020, students advocated for more immediate action on some of our 3-year actions like diversity training and greater racial/ethnic diversity of guest lecturers in departmental courses. Those actions were elevated to more immediate, "within one year" timeframes. Further, our college has embarked on a strategic realignment which will provide opportunities for collaboration and opportunities to seek investment.

We began with initial actions that will lead to larger changes (i.e., changing the departmental constitution, establishing a new committee, communicating priorities of the plan to collegiate leadership and development staff). We will sustain our momentum through an annual assessment of progress, adjusting goals as appropriate, and reporting to the faculty after each assessment. Our approach to planning has been to work within existing capability, but prepare ourselves for opportunity. We can achieve our short-term goals by redirecting the energies of faculty and staff. We can meet our longer-term goals (e.g., new faculty directions) through attrition. If however, an opportunity arises (e.g., a new donor or college realignment), our plan positions us to adapt and take advantage.

Results of first year implementation include

- o Establishing a departmental International and Intercultural Committee, a 5-person group that includes faculty, staff and graduate students. The committee has advanced transparency through communication with community members.
- o That committee has instituted a newsletter and a Slack channel for interaction among graduate students, both of which have been very well received
- o A sister department in our college has a new, tenure track faculty member who is Native American and whose teaching and research strengthen our understanding.
- o Departmental communications with the outside

world in this time of social unrest and an ongoing pandemic have become much more explicit about our internationalization goals and practices.

- o Although international travel was constrained, we developed two new study abroad classes.

We feel that continued success depends on adaptability, transparency and accountability, as well as accepting the fact that change is a slow and variable process.

7. Discussion

This work advances internationalization in three ways, each of which is discussed below: 1) We offer and demonstrate a strategic approach to change at the department level, 2) our plan weaves together international and intercultural change, and 3) the approach is adaptive and centered on transparency and accountability. It is the responsibility of higher education institutions to help students be global ready, capable of succeeding in an ever-changing, increasingly interconnected world, and to help members of the academic community teach and conduct research that is inclusive (Tanhueco-Nepomuceno, 2019).[49] To be successful, internationalization of higher education must be systemic and strategic, ensuring that students and faculty are supported and encouraged at all levels (Sanderson, 2008).[44]

Faculty and student life is centered at the department, where the curriculum resides and where research teams function. Our strategic approach at the department level incorporates visioning, community buy-in, and staged goals (following Mitchell and Buckingham, 2020).[31] We found that the iterative process of tiered focus groups allowed us to be strategic. Planning and implementing curriculum change, as well as changing departmental culture toward greater internationalization advances diversity, enhances global readiness, and deepens the contributions of the faculty. Such changes are difficult and slow, but can be advanced by practices like regular discussions about intercultural and international programming (Niehaus and Williams, 2016)[36] and engaging all community members in explicit, thoughtful planning (Friesen, 2013).[17] Our use of focus groups to gather information prior to developing a plan is one of very few that have tried to understand student views of internationalization (Deardorff, 2006).[14] Our approach of linking teaching with research, and faculty with students, supports development at the scale of the individual, involving cognitive, affective, and behavioral domains (Soria and Troisi, 2014;[47] Lee *et al.* 2012;[29] Deardorff, 2006).[14] This adaptive, strategic plan allows us to take advantage of unforeseen opportunities (e.g., funding for curricular or research efforts) as well as empowering us to

act thoughtfully as needs arise. Such a need arose during the >18 month pandemic in which our practices and communication needed to change to be effective..

Internationalization of the curriculum is an active field of study and practice (American Council on Education, 2017;[3] Hudzuik, 2011).[23] However, linking domestic change to intercultural education is less common (de Hei *et al.* 2020;[10] Lehtomaki *et al.* 2018).[30] The approach we offer here weaves together growth and change that are both domestic and international. Inclusivity is an explicit goal of many curricular efforts, but is rarely an explicit component of internationalization (Almeida *et al.* 2019).[2] We identified both need and opportunity in the intercultural aspects of our planning. Our community members expressed interest in, and desire for, engagement with intercultural research and teaching in the metropolitan area surrounding our university as well as with tribal partners within and outside X State. This attention to inclusivity in programming will increase our understanding of needs in our field (Bonata *et al.* 2015)[5] and will support our goal of graduating global ready students.

The approach we developed is adaptive, transparent and accountable. We are in the first phase of our implementation and have found that all three of those attributes are critical to success. We must be more inclusive, and the injustices that have been part of our society for a long time must be addressed. The inequality that is inherent in many of our practices demands attention and change (Ibrahim and Zore, 2020).[24] Adaptation has been important as our community has reflected on the social unrest that has gripped much of the US in 2020-21. In response to demands from our community members, we have been able to reflect on our goals, changing both actions and time frames. Development and implementation of our plan has been transparent, involving repeated discussions with faculty and student representatives. Our practice of publishing the plan and publishing annual assessments of our goals and actions demonstrates accountability to our community.

8. Conclusion

We have developed and demonstrated a department-level, strategic planning process for internationalization and intercultural growth. The plan has specified actions that guide our departmental function. We assess those actions and communicate our results through an annual process in which we evaluate the degree to which our students are global ready and our departmental community is internationally and interculturally engaged and inclusive. The curriculum is designed and implemented by faculty members in a department, and we have chosen to implement change at the level of the academic department. This paper describes and illustrates a process for developing a strategic plan for culture change and provides exemplary results of such planning in a department of a large, comprehensive university. We demonstrate how philosophy is put into action by identifying goals to be met within three years, and longer time frames (i.e., within 10 years). This strategic, action-oriented approach is adaptive and leads to transparency and accountability within our community, and to global ready citizens who participate in their own and in distant communities, resulting in positive change. The accountability and transparency built into the plan provide clarity and strength, but also pose risks. We are investing energy in changing culture, which is necessary but inherently slow and difficult. If we are unsuccessful in achieving our goals, we face the risk of losing the gain we might have achieved from smaller changes. If we are successful, our students will be global ready, we will multiply our positive impact on society and others will adapt this model for their own use.

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- What keeps you interested in teaching study abroad courses?
- What opportunities or resources are available to support or encourage international teaching and learning?
- How do you find out about these resources
- Are those resources adequate?
- Where would you go for information if you wanted to start a new class?
- What are the barriers to developing or maintaining a study abroad course
- Vote on the most significant of those
- In what ways do you incorporate cross-cultural experiences into courses you teach here at home?
- What opportunities or resources are available to support or incentivize domestic cross-cultural teaching and learning?
- How do you find out about these resources?
- What are the barriers to incorporating cross-cultural teaching and learning experiences in domestic courses?
o Vote on results
- Thinking about both international and cross-cultural teaching and learning as contributing to our goal of fostering global engagement for our students, is there anything you think the Department could do to help you and other members of the faculty develop or improve courses that feature global engagement?
o Vote on results
- What could (the College) do to further cross cultural and international teaching and learning?
- What could the University do to further cross cultural and international teaching and learning?
- One thing we learned from the first focus group with undergrad students was that they relied on personal, positive interactions with a few faculty who champion study abroad courses. Those faculty served as sources of information, inspiration and encouragement for students interested in study abroad. We would like to know: what factors might affect your inclination to serve as a study abroad resource or champion for students?
- What are the Pros and cons of an international version of our required, Sophomore-level field session?
- Does personal compensation for teaching internationally matter?
- Why would someone want to be engaged in cross-cultural teaching and learning?
- What are the limits to engaging cross-culturally with others in the Twin Cities?
- Other comments to offer or questions to discuss?

Table 1 We conducted four focus groups for the SWOT analysis. We invited all department members who represented a particular role (e.g., teaching, research). We had 10 participants each in the Research and Public Engagement group, the Graduate Program group and Teaching and Learning group, and 14 in the Undergraduate Student group. Questions were relatively similar among groups but targeted specifically to the role of group members; questions used in the teaching and learning focus group are presented here as examples.

Author Guidelines

This document provides some guidelines to authors for submission in order to work towards a seamless submission process. While complete adherence to the following guidelines is not enforced, authors should note that following through with the guidelines will be helpful in expediting the copyediting and proofreading processes, and allow for improved readability during the review process.

Ⅰ. Format

- Program: Microsoft Word (preferred)
- Font: Times New Roman
- Size: 12
- Style: Normal
- Paragraph: Justified
- Required Documents

Ⅱ. Cover Letter

All articles should include a cover letter as a separate document.

The cover letter should include:

- Names and affiliation of author(s)

The corresponding author should be identified.

Eg. Department, University, Province/City/State, Postal Code, Country

- A brief description of the novelty and importance of the findings detailed in the paper

Declaration

v Conflict of Interest

Examples of conflicts of interest include (but are not limited to):

- Research grants
- Honoria
- Employment or consultation
- Project sponsors
- Author's position on advisory boards or board of directors/management relationships
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- Other financial relationships/support
- Informed Consent

This section confirms that written consent was obtained from all participants prior to the study.

- Ethical Approval

Eg. The paper received the ethical approval of XXX Ethics Committee.

- Trial Registration

Eg. Name of Trial Registry: Trial Registration Number

- Contributorship

The role(s) that each author undertook should be reflected in this section. This section affirms that each credited author has had a significant contribution to the article.

1. Main Manuscript

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Supplementary figures, small tables, text etc.

As supplementary data/information is not copyedited/proofread, kindly ensure that the section is free from errors, and is presented clearly.

Ⅲ. Abstract

A general introduction to the research topic of the paper should be provided, along with a brief summary of its main results and implications. Kindly ensure the abstract is self-contained and remains readable to a wider audience. The abstract should also be kept to a maximum of 200 words.

Authors should also include 5-8 keywords after the abstract, separated by a semi-colon, avoiding the words already used in the title of the article.

Abstract and keywords should be reflected as font size 14.

Ⅳ. Title

The title should not exceed 50 words. Authors are encouraged to keep their titles succinct and relevant.

Titles should be reflected as font size 26, and in bold type.

Ⅳ. Section Headings

Section headings, sub-headings, and sub-subheadings should be differentiated by font size.

Section Headings: Font size 22, bold type

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Main Manuscript Outline

Ⅴ. Introduction

The introduction should highlight the significance of the research conducted, in particular, in relation to current state of research in the field. A clear research objective should be conveyed within a single sentence.

Ⅵ. Methodology/Methods

In this section, the methods used to obtain the results in the paper should be clearly elucidated. This allows readers to be able to replicate the study in the future. Authors should ensure that any references made to other research or experiments should be clearly cited.

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In this section, the results of experiments conducted should be detailed. The results should not be discussed at length in

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In this section, the results of the experiments conducted can be discussed in detail. Authors should discuss the direct and indirect implications of their findings, and also discuss if the results obtain reflect the current state of research in the field. Applications for the research should be discussed in this section. Suggestions for future research can also be discussed in this section.

Ⅸ. Conclusion

This section offers closure for the paper. An effective conclusion will need to sum up the principal findings of the papers, and its implications for further research.

Ⅹ. References

References should be included as a separate page from the main manuscript. For parts of the manuscript that have referenced a particular source, a superscript (ie. [x]) should be included next to the referenced text.

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Ⅺ. Glossary of Publication Type

J = Journal/Magazine

M = Monograph/Book

C = (Article) Collection

D = Dissertation/Thesis

P = Patent

S = Standards

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Kindly note that the order of appearance of the referenced source should follow its order of appearance in the main manuscript.

Graphs, Figures, Tables, and Equations

Graphs, figures and tables should be labelled closely below it and aligned to the center. Each data presentation type should be labelled as Graph, Figure, or Table, and its sequence should be in running order, separate from each other.

Equations should be aligned to the left, and numbered with in running order with its number in parenthesis (aligned right).

Ⅻ. Others

Conflicts of interest, acknowledgements, and publication ethics should also be declared in the final version of the manuscript. Instructions have been provided as its counterpart under Cover Letter.

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- Examination and evaluation
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