Article

Comparison of Higher Education in Pakistan and China: A Sustainable Development in Student's Perspective

Hasnain Raza [1], Anwar Ali [2], Nazia Rafiq [3], Liu Xing [1], Tahseen Asif [4] and Chengjie Jing [1,*]

1 Department of Social Sciences, Yangzhou University, Yangzhou 225009, China
2 Department of Epidemiology and Health Statistics, Xiangya School of Public Health,
  Central South University, Changsha 410083, China
3 Department of Anthropology, PMAS-Arid Agriculture University, Rawalpindi 43600, Pakistan
4 Department of Ideological and Political Education, Shanghai University, Shanghai 200444, China
* Correspondence: chengjj1967@163.com

Abstract: Education has played a central role and has had cross-cutting impact on all aspects of human life. China–Pakistan friendly relations have a long history. They cooperate in many parts of life, especially education, i.e., beneficial for better future education exchanges between countries. This study was conducted on the education systems of China and Pakistan to understand the higher education system through a student questionnaire. This research work aimed to investigate the perceptions of Pakistani and Chinese university students on sustainable development in higher education institutes (HEIs). HEIs and universities perform a unique and vital role in society by acting as intellectuals, entrepreneurs, and problem solvers. This section presents state of the art in sustainable development, the role of sustainable development in higher education, and the students' perspectives. There were 327 questionnaires out of 400, with 27 incomplete replies being discarded, leaving us with 300 complete surveys. The literature and research theme were used to construct the hypotheses of this study. PLS-SEM, a statistical approach that utilized the partial least squares to model structural equations, was used to evaluate the hypotheses. The analysis must take into consideration all parameters. Smart PLS 3.3.9 was used for PLS-SEM analysis in this study. The results showed that quality assurance and students' satisfaction were significant factors related to sustainable university development programs. Moreover, there was a good correlation between technological improvements in education institutes, teachers' capacity-building programs, and student–teacher (learning–teaching) relationships. Pakistani institutions comprised 50% of the study's participants, while students from Chinese universities comprised the remaining 50%. Among all participants, 9.66 percent of respondents were enrolled in Ph.D. programs, 37.67 percent were enrolled in an MS/M.Phil. programs, and 52.67 percent were undergraduate students. Moreover, this study also indicated that technical improvements and advancements positively correlated with sustainable development programs for Pakistani students.

Keywords: students' perspective; quality assurance; sustainability; capacity building; higher education; Pakistani and Chinese universities

1. Introduction

Sustainability refers to the management of resources without diminishing them for coming generations. This idea encompasses not just environmental sustainability, which is concerned with the earth's natural resources, but also socioeconomic sustainability, which is concerned with serving the present socio-economic demands of individuals without sacrificing the quality of life for coming generations [1–3]. Sustainable development refers to the procedures that aim to improve long-term financial stability and good quality of life without sacrificing the capacity of coming generations to satisfy their requirements [4,5]. The concept of sustainability receives much attention because of its importance. It is significant not only for industries and society but also for higher education institutions and

universities [6,7]. Young adults have been attending universities for decades to acquire an education and develop knowledge via academic life. Universities have spawned and shattered a slew of paradigms. Universities provide a unique opportunity for students to interact with seasoned professionals and learn from their peers. The majority of today's educational systems are hyper-specialized and have a restricted emphases; they do not sufficiently handle the interdisciplinary and trans-disciplinary aspects of sustainable development [8]. Sustainable development must be incorporated into the education sector in multidisciplinary and trans-disciplinary contexts to confirm that current and coming generations of "students" will be provided with comprehensive understandings and values that will aid them in helping their societies to transform into sustainable societies [9]. Higher education institutions (HEIs) worldwide are currently restructuring their areas of influence to contribute to the overarching agenda of sustainable development. This type of development satisfies the requirements of the present without compromising the capacity of coming generations to fulfill their requirements [10]. Higher education institutions in China are still developing their sustainable development programs. As a result, achieving campus sustainability is an essential and time-sensitive challenge for these institutions [11]. Therefore, higher education institutions in China actively engage in sustainable development via their campus's operations, and sustainability-based education is being offered to students. The Higher Education Commission (HEC) of Pakistan has started many projects to move toward integrating sustainable development. As a result of this action, several universities have reported these practices [12]. China and Pakistan are reliable and steadfast allies who have always stood by each other and supported each other [13]. The educational systems of Pakistan and China are very comparable to one another in several ways. Both China and Pakistan have universities, colleges, and technical schools. Therefore, their higher education systems are very comparable to one another. A study indicates that China has 8 million graduates per year, of whom most can find employment [14].

On the other hand, Pakistani graduates are forced to deal with financial difficulties owing to the limited number of career prospects [15]. The situation is the same in many areas, including sustainable development. As a result, there is a need for a comparative study among university students in Pakistan and China to determine what students' perspectives are on sustainable development, and whether they are satisfied with the sustainable development program at their respective institutions. It is necessary to research because it will give future guidelines that may be used to change the sustainable development program.

The proposed research is aimed to determine Pakistani and Chinese students' perspectives on sustainable development in higher education universities and institutes. The work has the following innovation, concerning previous work:

1. This is the first attempt to find student perspectives on sustainable development in higher education, especially concerning universities in China and Pakistan.

2. Second, this is the first study in this domain in which PLS-SEM is used for analysis.

The rest of the article is organized as follows: The theoretical background is discussed in Section 2. Details about higher education in Pakistan and China and hypotheses development are discussed in Section 3, followed by Research methodology in Section 4. Results are presented in Section 5. Some discussions about the results are presented in Section 6. Finally, Section 7 concludes this article.

2. Theoretical Background

HEIs and universities perform a unique and vital role in society by acting as intellectuals, entrepreneurs, and problem solvers. As institutions, they contribute to shaping the worldviews and objectives of the next generation of leaders in higher education, business, and government. The development of present and future leaders in creating sustainable communities occurs primarily at higher education institutions, particularly universities. Universities in China and Pakistan have made some headway, but they still have a long way to go before they can be considered leaders in sustainable development. This section

presents the state of the art in sustainable development, the role of sustainable development in higher education, and the students' perspectives concerning this topic.

2.1. Sustainable Development

Defining sustainability is among our age's most pressing translational research issues [16]. According to Moore et al. [2], the two major issues are the absence of a standard definition of sustainability, and the profusion of synonyms used to allude to it in the literature. Sustainability is challenging to define, assess, investigate, and implement, even though over 100 documented definitions exist. Many academic and professional disciplines have used the phrase differently, giving it various possible meanings [2,3,17]. The even more ambiguous phrase "sustainable development" has been added to this list. There is a shortage of precise, simple definitions in the literature on sustainable development. Sustainable development has many different names and concepts [18]. Researchers trace the origins of sustainability as far back as Thomas Malthus (1766–1834) and William Stanley Jevons (1835–1882), who first identified the link between population expansion and resource scarcity in their works [19]. On a more recent occasion in the 1950s, Fairfield Osborn wrote on human population increase and consumption's impact on Earth's carrying capacity, natural resources, and species variety [20]. In 1969, the International Union for Conservation of Nature (IUCN) proclaimed that economic progress could be achieved without damaging the environment, thus the three-pillar idea of sustainability was formed [21]. Brundtland Commission's 1987 report on sustainable development defined it as "development that fulfills the requirements of the present without compromising future generations' capacity to satisfy their own needs" [22].

The Brundtland Commission is also known as UNCED or the Brundtland Commission. The Brundtland Report's concept of sustainable development is likely the most commonly recognized term [23]. The Rio Summit was held in Rio de Janeiro in 1992. Three accords were endorsed at the Summit: Agenda 21, the Rio Declaration on Environment and Development, and the Statement of Forest Principles. The Brundtland Report's five-year-old idea of sustainable development was endorsed by the Rio Declaration, while Agenda 21 was the first text to advocate for the formulation of sustainability performance [24,25]. Even though social justice was a significant issue in the 1990s, sustainable development progressed from focusing on upcoming generations to a more strategic approach that concurrently addressed economic growth, social fairness, and the environment. Over the next decade, the idea that sustainable development comprises three distinct pillars or dimensions—namely, the economy, society, and the environment—became more prevalent. The integrative "Triple Bottom Line" method was introduced at the Johannesburg Summit in 2002 [26]. At the Johannesburg Summit, one of the primary goals was to identify practical solutions to address regional and worldwide environmental deterioration. In order to accomplish this goal, participants formulated essential aspects of sustainability and pertinent goals for future action [27]. Another name for the Johannesburg Plan of Implementation of the World Summit on Sustainable Development was produced as a direct outcome of the summit. It reaffirmed the need to fully put Agenda 21's recommendations into action regarding sustainability. The implementation of sustainability in higher education institutions throughout the globe was recognized during the Johannesburg Summit, even though it was not the main focus of the summit's discussions [28].

Sustainable development has not lost sight of the three pillars of economic, environmental, and social well-being two decades after the Rio Earth Summit in 1992. Rio+20's General Assembly underlined the need for sustainable development to be achieved via sustained, equitable social and economic progress [29]. Increased equality, higher living standards, and expanded possibilities for everyone are urged in the Rio+20 declarations. To accomplish this, the text recommends devising specific and workable solutions to global problems. Sustainable Development Goals (SDGs) were outlined in the exact text by the UN General Assembly to address the three facets of development: economic growth, social inclusion, and environmental sustainability. There were 17 Sustainable Development Goals

(SDGs) proclaimed by the UN General Assembly in 2015, with a deadline of 2030. All 17 objectives of the 2030 Agenda for Sustainable Development were agreed upon by all UN Member States [30,31]. Sustainable development integrates economic growth, or development, with environmental protection and human well-being. More succinctly, we might say it combines the goal of economic success, environmental quality, and social equality. Societies increase their standard of living while simultaneously safeguarding, caring for, and enhancing the natural environment via implementing sustainable development. This way of balance and integration must be taught and passed down from one generation [5,32].

2.2. Sustainable Development in Higher Education

HEIs play a crucial and influential role in society because they offer the framework and principles necessary for sustainable development [18,33–36]. Protection of the environment has become a societal norm [37]. This is because the public expects HEIs to contribute to sustainable development, regulate their environmental and social impacts, and be held responsible for this. HEIs also have a social purpose and play a public role in teaching, research, and volunteerism in their local and global communities. As a result, according to Ferrero-Ferrero et al. [38], student involvement should be established to link the HEI's responsibilities to students' expectations. As a result, pupils are more likely to embrace sustainable development-related ideas, techniques, and tactics. To be sustainable, HEIs must have social/ethical responsibility, expertise, accountability in the issue, reputational advantages, and must function as a model institution [39,40]. HEIs may use these declarations, charters, and collaborations to better incorporate sustainability into their operations. Student–faculty cooperation, involvement, and outreach are all critical components of advancing sustainable development at HEIs. The sustainability of HEIs, according to Filho et al. [41], is still a work in progress. Over the past two decades, there has been a great deal of progress in incorporating sustainability into the systems of HEIs and into sustainability integration in research and curriculum. University service quality has become vital in addition to long-term viability [42–44]. When it comes to higher education, the service quality of an institution may be described as the discrepancy between students' expectations and what they receive. Keeping an eye on service quality and ensuring that students' interests are protected may be performed by meeting their actual wants and wishes. Quality and excellence management may also be utilized to improve student, academic, and nonacademic staff satisfaction since they are all participants in the process. A higher education institution's service quality may be judged to be good, which might contribute to student satisfaction. In addition, the staff, processes, procedures, and support mechanisms of the HEI that the student attends are the primary contributors to the student's level of satisfaction [45]. However, the student's perspectives on the education they receive and their experiences in the classroom are also critical factors in the student's overall level of satisfaction. Furthermore, academic programs are the primary product HEIs employ to recruit and retain students. According to De Jager [46], location and logistics, sports facilities and reputation, and safety and security affect student happiness and academic excellence. Academic and non-academic staff engagement is critical to university sustainability [37]. This is because they are both members of an HEI and have the opportunity to participate in the organization's democratic governance system. When students are required to take part in activities that promote sustainable development, it is essential that they be made aware of the many advantages of taking part in such activities and that they have sufficient background knowledge [47]. In addition, Perello-Marín et al. [47] asserted that the most effective strategy for motivating students to engage in socially responsible behavior is to include them in sustainable development efforts.

2.3. Students' Perspective on Sustainability in Higher Education

The last several decades have seen a rise in the amount of research conducted on sustainable development, as well as the involvement of the HEI stakeholders' viewpoints (including students, academic staff, and non-academic personnel). This has resulted in

several intriguing discoveries [47–49]. This section examines the literature on students' contentment with their studies, ability to identify with the topic, and readiness to participate in sustainable development. The research that has been performed so far reveals that these attitudes are associated with sustainability for workers (for example, [50–53]. However, the findings of this research have not yet been proven for students. It is known from prior research that the quality of service is significant for educational institutions of higher learning and determines students' attitudes [54]. Because of this, it is anticipated that sustainability will contribute substantially to students' perspectives, in addition to the quality of the perceived research, education, campus, and environment. The degree to which students are fulfilled by their educational experience is reflected in their study satisfaction level. Suppose a student is experiencing pleasant emotions that correlate with the qualities and prerequisites of their studies. In that case, this indicates that the student is experiencing an elevated level of study pleasure. A relatively limited amount of research is available on how satisfied students are with their education concerning sustainable development [55]. According to Gautam et al. [56], a student's identity inside the institution, a particular sort of social identification, is an essential factor in academic success. Students can identify with a school when they believe and appreciate the same things that the school does. When students have a stronger connection to the institution they are enrolled in, they are more likely to think about and participate in activities that contribute to the institution's advancement and rating. The identification is incredibly near to the commitment. However, studies have been performed that indicated that most of the studies that are accessible are connected to other organizations. For instance, research conducted by Zhen et al. [57] reveals that an individual's views of sustainable development may positively impact their level of identification with the business for which they work. Casey and Sieber [58] inferred that a socially and environmentally conscious corporate culture might be developed when individual and organizational visions align. It is reasonable to anticipate that the degree to which an organization's workers identify with and are motivated by the organization will increase if the company seeks to achieve the condition described above. It is reasonable to assume that sustainability communication will have the same impact on an organization's level of identification with itself, as will the quality of its sustainability efforts. The purpose of an organization's communication regarding sustainable development is to educate participants about the organization's many sustainable development-related activities. As a result, it is reasonable to anticipate that continual sustainable growth at a university will positively influence the identification of students and improve the quality of research, teaching, campus life, and the environment. Research has not demonstrated the hypothesis, particularly in Pakistan and China. Because students are the "enactors" of sustainable development, educational institutions must ensure that their student body is eager to participate in sustainable development initiatives whenever the university undertakes such endeavors. A student must have a particular drive in order for them to take part in and contribute to the sustainable development activities that are being undertaken by an institution [59]. Hackman and Oldham's research on motivation identified the probable relevance of providing meaning and purpose to this context as a motivating element [60]. According to Pink [61], one of the three necessary components to drive a person is purpose, which can be defined as having a more significant reason to perform the task. This finding is consistent with what Hackman and Oldham [60] claimed. Take, for example, the possibility of referring to this as sustainable development or sustainability activities. On the other hand, there is a dearth of studies on students' desire to contribute to the long-term viability of higher education institutions at the present time.

3. Higher Education in Pakistan and China

The connection between Pakistan and China is honest and trustworthy, similar to good brothers, and they cooperate in many different areas, including education [62]. Pakistan and China operate under distinct administrative structures, and the two nations' higher education systems diverge significantly. If we compare the two countries' higher education

policies and aims, and the obstacles and difficulties each country faces, it would be favorable to improve educational exchanges between the two nations in the future. The relationship between Pakistan and China began in 1948 and has continued for more than 70 years; even though Pakistan is the most trustworthy nation to China, it is also much more critical to the region and the globe. The relationship between China and Pakistan is comparable to that of a good neighbor, good friends, excellent partners, and good brothers. Chinese President Xi Jinping initiated the "One Belt, One Road" program in 2013 to improve ties between his country and Pakistan through CPEC [13]. In light of this initiative, examining the many similarities and differences between the higher education systems in China and Pakistan is inevitable.

3.1. Quality Assurance

The Quality Assurance Parameters (QAPs) in HEIs are regarded as the foundation for expansion within the education sector, with the goals of fostering quality education and maintaining students' levels of contentment. People living in many parts of Pakistan have voiced their dissatisfaction with the stagnant growth of their education standards and the necessity for further development of the challenges associated with the enhancement of quality assurance frameworks in educational institutions [63]. The HEC management has started to focus on the control of quality parameters, and they have performed this by increasing the number of quality factors in the institutes. This is being performed to make Pakistan's education department sustainable and to bring it up to international standards. As a result, Pakistan's education standard is improving [64]. According to Shabbir [65], only a small number of educational establishments have begun recruiting an acceptable number of Ph.D. professors, which reveals a severe absence of quality assurance in Pakistan. It has been noted that Ph.D. instructors working in educational institutions in Pakistan have begun to place more emphasis on creating new and better changes. These changes include working on new projects and producing papers of high quality. In China, the State and local Councils are responsible for administering HEIs. These Councils also oversee the facilities offered in each department [66–68]. According to Hu et al. [69], higher education institutions in China emphasize a wide variety of criteria to enhance the quality of education. Two of them are increasing accessibility for the students and improving the overall quality of distributed work [70]. As a result of China's continued educational reforms, the country is now competitively positioned to recruit students from across the world [13]. According to Xiong et al. [71], many Ph.D. instructors have, lately, been employed in China at a beginning wage similar to 10,000 USD per month on average in the United States of America.

Based on these facts, the first hypothesis is formulated as under:

Hypothesis 1 (H1). *The improved quality assurance parameters (such as the research, education, and campus atmosphere) of an HEI have a positive effect on the study satisfaction of students.*

3.2. Technological Advancement

The Pakistani government cites "techno-centric", "skills-based", and "economic logic" as the justification for incorporating technology into the educational system there [72]. The bulk of Pakistan's population resides in rural regions, where computer knowledge is not necessary for obtaining a job. Using technology to develop only a few technical skills does little to encourage reflection on the power issues that underlie decisions made by a small ruling minority (bureaucracy and military) that affect the majority of the population. These decisions affect the majority of the population [73,74]. A careful examination of the current IT strategy in education indicates that Pakistan is continuing to follow an imitative course on the problem of adopting educational technology in the public sector of Pakistan. Recent efforts in Pakistan to integrate technology into educational settings are examples of concerned parties. However, stakeholders were not consulted throughout the decision-making process for matters about either the community or the educational

system [75]. Users of digital technology in Pakistan, their skills in technologies, particularly digital media usage, and the new media learning and teaching methods that use new media tools such as mobile devices, tablets, and social media networking, all of which require new technical and technological frameworks. Literacy in the context of digital education is at the center of this trend. This refers to the competencies that digital media students need to acquire to advance and the training that educators, particularly faculty members, need to receive regarding various media technologies [76]. Modern technologies have ushered in revolutionary shifts in China's educational technology advancements and paved the way for the country's traditional education system to transform and be created. However, the purpose of education is to grow individuals, whereas the purpose of technology is to serve topics related to technology. A good teaching ecosphere should be constructed in a way that makes acceptable use of the benefits offered by the development of technology and promotes the general development of individuals working in the education sector in the future [77]. The China education development has found that new technology development, namely information technology represented by 5G, has a beneficial impact on class instruction [78]. Similar to the evolution of online education, the growth of design education has been intricately intertwined with the history of technological advancement. The process of education technology has an impact on design education that might be seen as having trans-disciplinary implications. A good education ecological construction should make fair use of the benefits offered by technology development to foster the general growth of individuals working in the education sector in the future [79]. The higher education system in Pakistan is in a state of disrepair due to a deficiency in financial resources, the quality of education, the execution of plans and policies, and inadequacies in monitoring and management. The purpose of this research is to investigate the paths that Chinese institutions of higher education are taking to keep pace with advances in the field of higher education. As a result, this research's results may give the Pakistani government the chance to gain knowledge from its neighboring nation, China, which has made significant advancements in recent decades and is now competitive with the world's most prestigious educational institutions. In addition, the education system in the west cannot be compared to Pakistan's, but China is a country that has similarities with Pakistan. China gained its independence two years after Pakistan, and both countries have experienced difficulties. However, China has demonstrated a dramatic increase in the higher education system over the last two decades.

Keeping given above facts, the second hypothesis is formulated as under:

Hypothesis 2 (H2). *The technically advanced teaching system of an HEI has a positive effect on the study satisfaction of students.*

3.3. Sustainable Development Program

Universities are places where innovative research, high-quality education, and pioneering innovation can all be found. Universities play a critical role in civil society, effectively facilitating international and regional collaborations. Universities, in particular, help students cultivate a rigorous scientific mentality and the spirit of curiosity and entrepreneurialism, which are all necessary to provide the answers required for sustainable development. In order to produce answers, researchers, lecturers, and students at universities collaborate with people, businesses, and the public sector. The sustainable development program has been adopted by several institutions in both administration and teaching and research [80,81]. Many universities now consider sustainable development management an essential aspect of their social obligation [67]. Efforts to save energy and resources, reduce waste, and reduce the number of resources used may all be part of a university's commitment to sustainability.

A poll indicated that more than 90% of individuals had a reasonable opinion regarding sustainability, deeming it a "good thing" or claiming to be strong champions for sustainability. On the other hand, most students admit that they pay little attention to

sustainable development efforts and that when presented with sustainability concerns, they find them intimidating, impersonal, or both [82]. Kouzer et al. [83] claimed that implementing sustainable practices on campus and presenting improved management of activities that comply with sustainability regulations provides a HEI the chance to utilize their facilities to teach the general community about advanced development models. This opportunity arises as a result of the fact that higher education institutions can demonstrate their commitment to sustainability. Numerous educational institutions participate in a wide range of eco-friendly extracurricular pursuits and community service projects to cultivate environmental consciousness among their student body, faculty, and staff. According to the findings of Su [84], students are in reality aware of the significance of sustainability and generally support it. Even more encouraging, 61 percent of students surveyed said that they would be ready to pay a nominal charge to support school sustainability initiatives. In addition, university community members do not always engage in individual acts of conservation, but they would be ready to accept collective initiatives to save resources. According to the findings of Filho et al. [80], implementing sustainable development in educational institutions is hampered by several challenges. Higher education institutions' administration and management departments are where the most significant barriers to sustainable growth may be located.

Taking into consideration the information presented above, the following hypotheses have been developed:

Hypothesis 3a (H3a). *The improved quality assurance parameters (such as the research, education, and campus atmosphere) of an HEI positively affect sustainable development program.*

Hypothesis 3b (H3b). *An HEI's technically advanced teaching system has a positive effect on sustainable development program.*

Hypothesis 3c (H3c). *The students who have a good perception of sustainability have a positive attitude toward sustainable development programs.*

Figure 1 depicts the hypotheses model that was developed for the purpose of answering the questions raised in this study. This model was developed in light of the aforementioned research discussion.
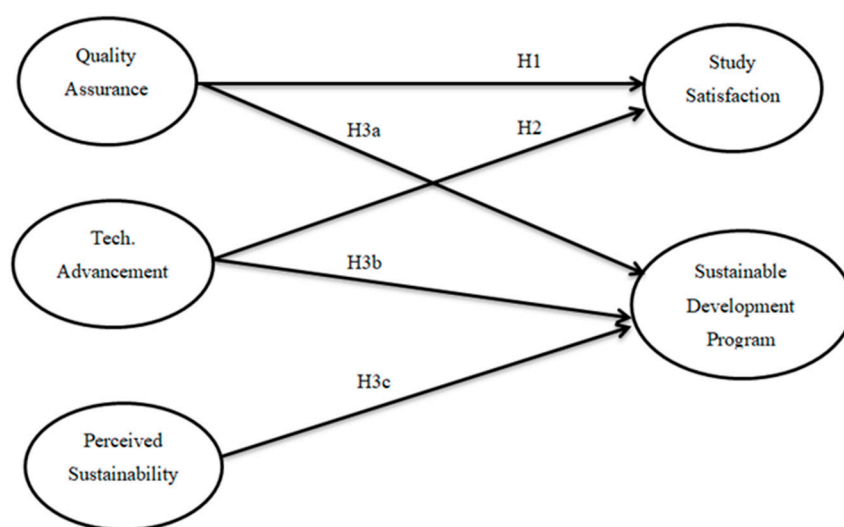

Figure 1. Hypotheses model for the study.

4. Methods

This research is based on the perspectives of university and HEI students towards sustainable development. This study has three independent variables (quality assurance,

technical advancement, and perceived sustainability) and two dependent variables (study and research satisfaction and sustainable development program). The analysis must take into consideration all parameters. In order to comprehend the interactions between these constructs, we employed the Partial Least Squares Structural Equation Modeling (PLS-SEM) method. SmartPLS 3.3.9 was used for PLS-SEM analysis in this study. PLS-SEM assumes that the observed variables are unreliable measures of the concepts under discussion. Observed variables are often referred to as manifest variables or indicators, whereas unseen variables are typically latent variables or constructs. The PLS-SEM model comprised two parts. The measuring model examines the relationships between manifest and latent variables. The second, the inner structural model, displays the relationships between the latent variables.

The following justifications may be given for selecting the PLS-SEM algorithm:

1. This technique needs a few statistical requirements to satisfy the model's variables.

2. This strategy is appropriate for use with limited samples and intricate relational models (up to several hundred variables).

3. The values of both the measurement and the structural models are calculated concurrently using this methodology.

4. The partial least square is a sophisticated approach that combines single and multiple regressions in a single analysis [85].

The PLS-SEM approach may be broken down into three distinct stages. In the first phase of the process, the scores of the latent variables are iteratively estimated for each instance in the sample. Using these scores as the input, the second step of the process involves calculating the measurement model parameters. Analogously, structural factors are ultimately examined in the third step of the process.

4.1. Data Collection and Sampling

In order to gather the data needed for this study, the researchers used a question-naire based on indigenously developed instruments. A total of 400 Chinese and Pakistani students were given the questionnaire in 2021. Because they are heavily involved in the sustainable development initiative, university students were hand-picked to answer the survey questions. Students at the undergraduate, graduate, and doctoral levels provided the information. The researcher collected responses himself as well as by the means of an online survey. Before collecting data, authorization was obtained from the relevant departments of chosen institutions. After authorization was given, the researcher distributed the questionnaire personally. In addition, the same questionnaire was produced online and sent to online educational groups to gather online replies. The research aimed to acquire the opinions of students enrolled in Bachelor's, Master's, and Ph.D. programs; hence, a purposive sample was utilized. We received a total of 327 questionnaires, of which 27 were discarded because they were incomplete. To guarantee that each country is represented equally, the final sample size consists of 300 students, 150 from each country.

4.2. Study Context

The participants in this study were university students from Pakistan and China. These countries were chosen for two different reasons. First, China and Pakistan have had a relationship in the past. Both nations collaborate in a variety of areas, including education. Second, the educational systems of Pakistan and China are similar, and Pakistani students make up the vast majority of international students studying in China. In this study, six universities are selected from China and Pakistan, i.e., Yangzhou university, Zhenjiang university, Nanjing university from China, Quaid-e-Azam university Islamabad, Faisalabad university, and Lahore University from Pakistan. A total of 30 undergraduates, 15 postgraduates, and 5 PhD students from each university were chosen for final data selection. The demographics of participants are shown in Table 1:

Table 1. Demographic of participants.

	Pakistani Students		Chinese Students	
	n = 150	Sample %	n = 150	Sample %
Gender				
Female	73	48.67	52	34.67
Male	77	51.33	98	65.33
Education level				
Undergraduate	90	60	90	60
Graduate (Masters)	45	30	45	30
PhD	15	10	15	10
Age				
Range (18–25)	109	72.67	121	80.67
Range (26–35)	36	24	27	18
Range (35–40)	5	3.33	2	1.33

4.3. Measurements of Variables

The following self-developed instruments were used in this study. All the items were evaluated using Likert scales with five points, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) (Strongly Agree).

4.3.1. Measurement of Quality Assurance (QA)

The quality assurance was measured using following questions:

1.   I really enjoy being in the University.
2.   The University provides all the desired services to students.
3.   The University makes the environment unique.
4.   The University is a pleasant place to study.
5.   The institution provides innovative education.
6.   During their studies, the University offers students with personalized assistance.
7.   Compared to other institutions, the quality of education at the University is superior.
8.   The University ideally prepares students for their respective fields of employment.

4.3.2. Measurement of Study and Research Satisfaction (SRS)

The study and research satisfaction was measured using following questions:

1.   I am very content with my study.
2.   My study is very valuable.
3.   I like studying at university
4.   The university conducts ground-breaking research.
5.   The university conducts innovative research.
6.   The University's research is distinct from the research conducted at other institutions.
7.   The research conducted at the university has a significant influence on society.

4.3.3. Measurement of Technological Advancement (TA)

The technological advancement was measured using following questions:

1.   The technology used in the study is groundbreaking.
2.   The University's technology endeavors are innovative.
3.   The University's technical approaches are distinctive compared to other institutions.
4.   University technical breakthroughs have a significant influence.

4.3.4. Measurement of Perceived Sustainability (PS)

The perceived sustainability was measured using following questions:
I believe it is essential to strive towards being more sustainable.
I believe it is worthwhile to strive towards being more sustainable.
I am inspired to include sustainability into my work.

I am interested in sustainability and activities towards sustainability.
I would want to participate in sustainable efforts.
I consider environmental sustainability while making choices.
Sustainability plays a significant part in my everyday life.

4.3.5. Measurement of Sustainable Development Program (SDP)

The sustainable development program was measured using following questions:

1. I am familiar with sustainable development program of my university.
2. I am fully agreed with mission/vision of sustainable development program.
3. I consider it very important that sustainable development should be taught in universities.
4. University's academic and non-academic staff is fully aware of sustainable development knowledge.
5. I think there is no future of university without sustainable development program.

5. Results

5.1. Descriptive Statistics

As stated, students from Pakistani institutions made up fifty percent of the study's participants, while students from Chinese universities made up the remaining fifty percent. Among all participants, 9.66 percent of respondents were enrolled in a PhD program, 37.67 percent were enrolled in a MS/M.Phil. program, and 52.67 percent were undergraduate students.

Table 2 provides information about the descriptive statistics of the instruments used in this study. The results clearly show that mostly students were positive about the study and sustainable development program, which is evident from plausible values of mean and standard deviation.

Table 2. Descriptive Statistics.

No.	Instrument	Mean	SD	Variance
1	Quality Assurance	4.008	0.714	0.51
2	Study and Research Satisfaction	3.748	0.574	0.33
3	Technological Advancement	3.742	0.509	0.26
4	Perceived Sustainability	4.39	0.331	0.11
5	Sustainable Development Program	3.840	0.648	0. 42

5.2. Measurement Model

Analysis of the data using Principal Components Analysis (PCA) was used to refine the measurement scale. To conduct the study, there was no preconceived notion of what would be found or how important each aspect was. After that, the observed variables' dimensions were determined using factor analysis and Cronbach's alpha values. The primary goal was to determine the dimensions of the structures. Consequently, we kept only the variables with an eigenvalue of larger than 1 and explained at least 60 percent of the variation.

Finally, we have a five instruments structure. The elements that did not significantly contribute to the quality of the structure were deleted, allowing for the refinement of the questionnaire. Table 3 provides information about PCA. Convergence validity of the constructs is clearly shown by this table, which indicates that the constructs can explain over 80% of the variation in indicators.

Table 3. Principal Component Analysis.

	QA	SRS	TA	PS	SDP
	Quality Assurance (α = 0.701)				
QA1	0.781				
QA2	0.843				
QA3	0.795				
QA4	0.631				
QA5	0.683				
QA6	0.658				
QA7	0.884				
QA8	0.876				
	Study and Research Satisfaction (α = 0.888)				
SRS1		0.850			
SRS2		0.862			
SRS3		0.894			
SRS4		0.747			
SRS5		0.734			
SRS6		0.954			
SRS 7		0.848			
	Technological Advancement (α = 0.746)				
TA1			0.888		
TA2			0.819		
TA3			0.860		
TA4			0.632		
	Perceived Sustainability (α = 0.765)				
PS1				0.892	
PS2				0.776	
PS3				0.661	
PS4				0.897	
PS5				0.755	
PS6				0.873	
PS7				0.855	
	Sustainable Development Program (α = 0.918)				
SDP1					0.934
SDP 2					0.951
SDP 3					0.931
SDP 4					0.907
SDP 5					0.923

Reliability tests were carried out so that the measurement model may be fine-tuned. The reliability maximization iterations were carried out with the items, which sufficiently contributed to an internal consistency reliability level (with a minimum alpha threshold at 0.50). In addition, the construct dependability is investigated to discover the level of internal consistency present in the instrument's components. In order to verify the convergent validity, the Average Extracted Variance (AVE) was also calculated. Table 4 shows the model's validity as measured by the abovementioned metrics. A review of Table 4 shows that all requirements are met to support the validity of constructs. Cronbach's alpha values for constructs are more significant than 0.5, which ensures overall homogeneity. In line with Nunnally's guidelines [86], this number falls within the acceptable range of values of 0.5 to 0.9. According to the table, all elements must construct reliability of more than 0.70, which is regarded as good and enables us to infer that the scale is trustworthy due to its internal consistency.

The correlations between constructs were examined and found to be adequate in determining the discriminant validity. As a result, all scales contribute more to their own constructions than to those of their neighbors. According to Tables 5–7, there is a difference between the variance shared by a particular indicator (the root square of AVE) and the variance shared throughout all of the constructs (correlations between constructs). On the diagonal, each value is the square root of the variable's AVE.

Table 4. Model validity and reliability.

	QA	SRS	TA	PS	SDP
AVE	0.64	0.71	0.59	0.62	0.74
Construct Reliability	0.740	0.847	0.735	0.784	0.945
Cronbach's Alpha	0.701	0.888	0.746	0.765	0.918

Table 5. Correlations (Latent variable), Combined.

Correlation	SDP	PS	QA	SRS	TA
SDP	0.860				
PS	0.626	0.787			
QA	0.609	0.555	0.800		
SRS	0.697	0.651	0.677	0.842	
TA	0.678	0.571	0.381	0.582	0.768

Table 6. Correlations (Latent variable), Pakistani Universities.

Correlation	SDP	PS	QA	SRS	TA
SDP	0.848				
PS	0.237	0.774			
QA	0.511	0.196	0.787		
SRS	0.846	0.537	0.425	0.830	
TA	0.272	0.120	-0.275	0.431	0.754

Table 7. Correlations (Latent variable), Chinese Universities.

Correlation	SDP	PS	QA	SRS	TA
SDP	0.871				
PS	0.707	0.800			
QA	0.864	0.801	0.812		
SRS	0.796	0.786	0.862	0.854	
TA	0.706	0.768	0.799	0.807	0.781

The constructs' multi-collinearity was examined in accordance with [87]'s suggested technique for examining a constructs' multi-collinearity. An inverse correlation matrix may be examined using it. Variance Inflator Factors (VIF) exist in the matrix's diagonal. These ratios indicate how much of a variable's variation may be attributed to the other variables in the study. A VIF value more significant than 10 is often considered to indicate the existence of collinearity for the variable under investigation; this assumption is also used in current research. There is no multi-collinearity issue in this model, according to Table 8.

Table 8. Multi-collinearity analysis.

	SRS			SDP		
	Total	Pakistani Univ.	Chinese Univ.	Total	Pakistani Univ.	Chinese Univ.
SRS						
SDP	2.646	1.813	3.957			
QA	1.758	1.839	6.239	1.458	1.148	3.628
TA	2.016	1.461	3.168	1.497	1.120	3.164
PS	1.940	1.084	3.198	1.849	1.076	3.195

5.3. Structural Model

In order to discover the existing linkages between constructs, the structural model is assessed by determining the interactions between the latent variables. Figure 2 depicts

the prototype. The PLS commonly employs two non-parametric model testing approaches (1) the jackknife method and (2) the bootstrap method [88]. It was decided to employ the bootstrap method rather than one of the others since it is generally regarded as more efficacious [89]. It provides the structural model with two essential characteristics: the t value (similar to the t-test) and R^2. Therefore, one may evaluate the capacity of a model to forecast using the R^2 value, which is produced by the bootstrap. The model is a good match for the data according to the R^2 values for each dependent variable, shown in Table 9.
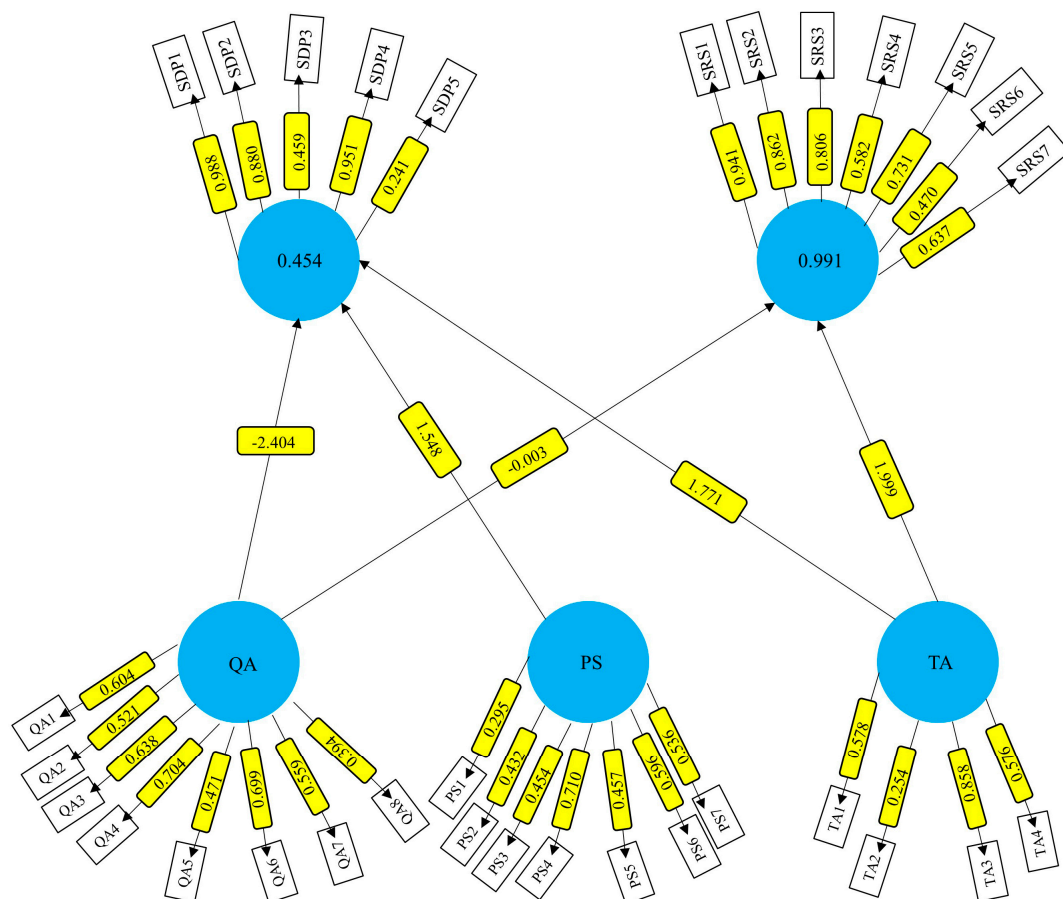

Figure 2. Proposed PLS Model based on QA, SDP, PS, TA, and SRS.

Table 9. Model Evaluation.

Dependent Variables	R^2			R^2 Adjusted			t-Statistics		
	Total	Pakistani	Chinese	Total	Pakistani	Chinese	Total	Pakistani	Chinese
SRS	0.617	0.639	0.791	0.573	0.540	0.734	36.102	24.455	26.280
SDP	0.622	0.448	0.747	0.578	0.298	0.678	28.795	25.894	27.930

Table 9 shows that all central R^2 values, except the R^2 of the Pakistani Universities' SDP (0.448), are above the minimum threshold of 0.50. On the other hand, we can observe that the SRS has the greatest R^2, which accounts for Chinese institutions. The contribution of QA and TA, the only factors that have a substantial correlation with this construct, is the reason for this high score.

5.4. Hypotheses Testing

For this study, Chin's [89] approach was used for this study to validate or invalidate a hypothesis. The bootstrapping method was performed, and significant values of Student's t were used to determine whether or not a hypothesis should be supported or rejected. As a consequence of this, the hypotheses are considered to be statistically significant at the $p < 0.01$ threshold, the $p < 0.05$ threshold, and the $p < 0.1$ thresholds if, and only if, their Student's t is more significant than or equal to the threshold value of 2.575, 1.96, and 1.645, respectively. After conducting experiments to investigate how the various aspects of the model interact, the following results were discovered (Tables 10–12).

Table 10. Structural model estimation on total sample.

Hypotheses	Relationships	Original Sample (O)	Sample Mean (M)	Standard Deviation (SD)	t Statistics	p Values	Hypothesis Status
H1	QA -> SRS	0.582	0.568	0.153	3.810	0.000	Accepted
H2	TA -> SRS	0.352	0.363	0.163	2.154	0.031	Accepted
H3a	QA -> SDP	0.432	0.413	0.144	2.995	0.003	Accepted
H3b	TA -> SDP	0.387	0.373	0.135	2.867	0.004	Accepted
H3c	PS -> SDP	0.180	0.225	0.136	1.326	0.185	Rejected

Table 11. Structural model estimation for Pakistani students.

Hypotheses	Relationships	Original Sample (O)	Sample Mean (M)	Standard Deviation (SD)	t Statistics	p Values	Hypothesis Status
H1	QA -> SRS	0.674	0.587	0.336	2.006	0.045	Accepted
H2	TA -> SRS	0.482	0.405	0.317	1.520	0.129	Rejected
H3a	QA -> SDP	0.828	0.772	0.241	3.430	0.001	Accepted
H3b	TA -> SDP	0.652	0.584	0.339	2.023	0.043	Accepted
H3c	PS -> SDP	0.082	0.094	0.214	0.383	0.702	Rejected

Table 12. Structural model estimation for Chinese students.

Hypotheses	Relationships	Original Sample (O)	Sample Mean (M)	Standard Deviation (SD)	t Statistics	p Values	Hypothesis Status
H1	QA -> SRS	0.702	0.695	0.243	2.887	0.004	Accepted
H2	TA -> SRS	0.345	0.357	0.171	2.020	0.044	Accepted
H3a	QA -> SDP	0.852	0.808	0224	3.802	0.000	Accepted
H3b	TA -> SDP	−0.108	−0.155	0.213	0.506	0.613	Rejected
H3c	PS -> SDP	0.187	0.193	0.234	0.796	0.426	Rejected

This finding supports Hypotheses 1, 2, 3a, and 3b. Results show that for all student's, perceived sustainability does not have an impact on the sustainable development program; hence, hypothesis H3c cannot be supported, as shown in Figure 1. The findings make it abundantly evident that quality assurance has a significant and beneficial influence on the study and research satisfaction. In a similar vein, it is abundantly evident that both improvements in quality assurance and technical advancement will have a favorable influence on the sustainable development program.

5.4.1. Pakistani Universities

This study found that quality assurance had a good influence on the study and research satisfaction, as well as the sustainable development program. Additionally, technological advancement has been found to impact sustainable development programs positively. As a result, Hypotheses 1, 3a, and 3b were found to be supported by the findings of this study. On the other hand, technological advancement does not have a beneficial impact on study and research satisfaction. It was also shown that perceived sustainability has no link to the sustainable development program. As a result, Hypotheses H2 and H3c are refuted by the research findings. The result for H2 is different from the sample of all students,

indicating that Chinese students' responses had a stronger influence than those of Pakistani students. The availability of research facilities and presence of a good research environment in Chinese institutions as opposed to universities in Pakistan supports the rationale.

5.4.2. Chinese Universities

This result provides support for Hypotheses 1, 2, and 3a. As shown in Figure 1, the results indicate that technological advancement and perceived sustainability have a negligible effect on the sustainable development program among Chinese students; thus, Hypotheses H3b and H3c cannot be supported. The results make it clear that quality assurance significantly and positively affects study and research satisfaction. Similarly, quality assurance positively affects the sustainable development program. The outcome for H3b differs from the sample of all students, proving that Pakistani students' comments had a greater impact than Chinese students' responses. The majority of Pakistani students do not have access to technologically advanced equipment in institutions, and they believe that using such equipment is essential to sustained development. On the other hand, Chinese students do not hold this idea to be true, as evidenced by the outcome.

6. Discussion

The proposed study aims to establish the perspectives of Pakistani and Chinese students on sustainable development in higher education institutions and universities. For this goal, a comprehensive literature review was performed, and a number of characteristics that significantly influence students' study and research satisfaction and the sustainable development of higher education institutions were discovered. These elements include quality assurance, technical advances, and the perception of sustainability. Quality assurance relates to the university's infrastructure, atmosphere, education quality, and support services. Technical advancement refers to the implementation of new technology initiatives and teaching strategies. Finally, perceived sustainability is intended to explain student participation in sustainability and sustainability projects. The first hypothesis was based on the premise that enhanced quality assurance criteria at a university or institution benefit student study satisfaction. The hypothesis has been tested on Pakistani and Chinese students from various institutions and has been confirmed for the overall student population and for Chinese and Pakistani students individually. The results are also validated by the research of Faizan et al. [90] on Malaysian students. The findings are similar to another study conducted on Iraqi students [91], which emphasized that quality assurance is vital in improving the university's research productivity system and ranking. The second hypothesis is based on the idea that students will be more satisfied with their study and research with an improved technological teaching method. This research backs up the hypothesis for the selected combined student population and Chinese student population. This study supports the hypothesis of the total student population and Chinese students. However, Pakistani students who participated in this study did not support the hypothesis. The findings are also supported by recent research conducted in Vietnam [92], which concluded that access to technology is directly proportional to students' ability to use technology. The study found that the factor of ability to use technology has a significant impact on satisfaction. Therefore, students will have higher satisfaction in geographical areas with easy access to technology. The third hypothesis is subdivided into three sub-hypotheses to examine the influence of characteristics such as quality assurance, technical progress, and perceived sustainability on the sustainable development program of the prospective institution. This research rejects the influence of perceived sustainability on a sustainable development program. It denies any correlation between how students perceive sustainability and the effectiveness of a university's sustainable development program. According to Kagawa's study [93], the correlation between students' positive responses and their acquaintance with the principles of sustainable development is not very strong. The influence of quality assurance on sustainable development is endorsed by all students, as well as Chinese and Pakistani students individually. The results are comparable to

those of Stukalo and Lytvyn [94], who found that quality assurance plays a vital role in accomplishing sustainable development objectives. The influence of technological growth on sustainable development programs is generally recognized and supported by Pakistani students, but Chinese students oppose it vehemently. Nonetheless, the concept is reinforced by regional research by Li and Liu [95–97], which found a continuous linkage between higher education, technological innovation, and sustainable development. The results of this investigation have several theoretical and methodological repercussions. The fact that it is the first study to investigate the students' perspective on a sustainable development program in the context of Pakistani and Chinese universities is the most significant theoretical implication. This suggests that students in Pakistani and Chinese universities have pretty different perspectives on the subject. According to the findings, the degree to which sustainability was regarded did not impact the sustainable development program. The study found a favorable association between quality assurance and students' satisfaction with their studies and research. According to the results, technical progress impacts the sustainable development program; nevertheless, the effect is not in the excellent direction anticipated. PLS-SEM is the approach used to explore students' perspectives on the sustainable development program. That is the methodological implication. PLS-SEM has not been used in this study area very often since most of the studies in this field have been qualitative. When specific effect predictions are required in a research model, PLS-SEM is beneficial since it can provide such predictions. This work has the potential to serve as a roadmap for future research that is relevant to this field. Briefly, the findings of this research have made it feasible to conclude that there is a connection between quality assurance, technical advancement, and study satisfaction in a sustainable development program context. However, the impact of perceived sustainability has not been established.

Limitations and Future Directions

This study can act as a guide for related research in the future. In a nutshell, the research's findings have made it possible to conclude that there is a relationship between quality assurance, technical advancement, and study satisfaction in the framework of a sustainable development program. The effect of perceived sustainability has not yet been shown, however. The established relationship can be used as a guideline for implementation of sustainable development programs in the regional institutions. The study has certain shortcomings. First, the study's results might be biased toward one group due to the unequal sample size of respondents from different colleges. Second, only universities in Yangzhou, Zhenjiang, and Nanjing (China), as well as Lahore, Faisalabad, and Islamabad (Pakistan), were included in the research. Thus, the population is majorly from South China and North Pakistan.

7. Conclusions

This work presented a comparative analysis of Pakistani and Chinese students' perspectives on sustainable development programs in higher education institutions. To investigate the influence of quality assurance, technical progress, and perceptions of sustainability on study and research satisfaction and the sustainable development program, hypotheses were developed. The background knowledge and current state of the art have been thoroughly covered. The PLS-SEM approach was used to determine the relationship between suggested study variables. The results revealed a good correlation between quality assurance and study/research satisfaction for Pakistani and Chinese students. In addition, the research found a strong correlation between quality assurance and sustainable development programs for all student populations. Moreover, this study also indicated that technical improvements and advancements has a good correlation with sustainable development programs for the Pakistani students. Furthermore, the findings revealed that technological growth/innovations have a reasonable correlation with study/research satisfaction but no correlation with a sustainable development program for the Chinese students. The outcomes of this study gave impetus for future studies that might confirm these findings

on a large sample of Pakistani and Chinese students. There are a few flaws in the research. First, the sample size of responders from various universities is uneven, which may skew the study's findings toward one group. Second, the research was limited to universities in Yangzhou, Zhenjiang, and Nanjing (China), Lahore, Faisalabad, and Islamabad (Pakistan).

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