pISSN: 1906 - 3296 © 2020 AU-GSB e-Journal.
eISSN: 2773 – 868x © 2021 AU-GSB e-Journal.
https://assumptionjournal.au.edu/index.php/AU-GSB

Factors Impacting Freshmen's Satisfaction and Learning Outcome in Shandong, China

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Received: Frebuary 13, 2024. Revised: May 3, 2024. Accepted: February 22, 2025.

Abstract

Purpose: This study investigates the factors influencing student satisfaction and learning outcome among first-year students at public colleges in Shandong, China, during the COVID-19 outbreak. The purpose is to identify and provide insights for optimizing the online learning experience during the pandemic. **Research Design, Data, and Methodology:** Before full-scale implementation, expert ratings for the item-objective congruence (IOC) index and a pilot test with 30 responses were conducted. The questionnaire's validity and reliability were assessed using the Cronbach's Alpha approach. Following reliability testing, 500 accepted responses were analyzed using SPSS AMOS. Confirmatory Factor Analysis (CFA) tested convergence accuracy, and the Structural Equation Model (SEM) was applied to scrutinize the effect of variables. **Results:** The study reveals crucial aspects affecting teaching quality, including technological infrastructure, instructional strategies, and faculty preparedness. Additionally, student satisfaction is closely linked to engagement, adaptability, and responsiveness in the online learning environment. Nevertheless, perceived difference in the quality of teaching staff has no significant impact on student satisfaction towards online courses. **Conclusions:** The study concludes that adapting teaching methods and improving technological support can enhance the online learning experience for first-year students, offering valuable insights for educational institutions navigating the complexities of the pandemic.

Keywords: Online Education, Teaching Quality, Student Satisfaction, Freshmen, COVID-19

JEL Classification Code: E44, F31, F37, G15

1. Introduction

The COVID-19 outbreak has prompted an unexpected shift in the education sector, necessitating a widespread transition to online learning due to social distancing measures. As three public universities in Shandong, China, specifically cater to the academic needs of first-year students, understanding the factors influencing teaching quality and student satisfaction becomes paramount during this period. This study investigates the key elements impacting online education quality and student contentment among first-year students in three public universities in Shandong during the COVID-19 pandemic.

This global health crisis has significantly altered the educational landscape, leading to the rapid adoption of online education as an alternative to traditional classroom instruction (Li & Lalani, 2020). Recognizing how this shift affects teaching quality and student satisfaction is imperative for optimizing the online learning experience. The availability and equity of technical infrastructure are pivotal for facilitating effective online education (Chen & Lambert, 2020). Robust digital tools and stable internet connectivity are essential for seamless communication, delivering engaging content, and providing access to learning resources directly impacting teaching quality. Implementing effective pedagogical strategies in the online learning environment is crucial for maintaining teaching quality (Brown et al., 2020). Identifying suitable instructional methods, interactive learning activities, and formative assessment approaches that

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cater to first-year students' needs can enhance the overall quality of online teaching. Faculty members' competence with digital tools is a critical factor influencing student satisfaction in the online learning environment (Wang et al., 2020). Instructors who are well-prepared for online teaching, possess effective communication skills, and respond promptly to first-year students' inquiries significantly impact student satisfaction levels. Student engagement in online learning is closely tied to student satisfaction (Huang et al., 2020). Creating an interactive and collaborative virtual learning environment can foster first-year student engagement and motivation and ultimately increase student satisfaction.

As the educational landscape evolves, examining factors influencing teaching quality and student satisfaction in online education is vital for shaping effective and engaging learning experiences for first-year students at three public universities in Shandong, China, during the COVID-19 pandemic.

2. Literature Review

2.1 Perceived Difference in Quality of Teaching Staff

This study delves into the crucial relationship between perceived differences in the quality of teaching staff and student satisfaction among first-year students in the context of online distance learning. The findings emphasize the pivotal role of teaching staff quality, encompassing instructor competence, pedagogical approaches, communication skills, and student-instructor interactions, in shaping student satisfaction. Jones and Alony (2019) highlighted, students' perceptions act as a central lens for evaluating their learning experiences. This intricate interplay of factors underscores the universal importance of effective pedagogy, transcending the modality of instruction (Smith & Johnson, 2021). The study contributes significantly to the discourse on educational practices, shedding light on the mediating roles of interaction and presence in shaping student perceptions, as emphasized by Jones and Alony (2019). The implications of these findings resonate deeply with the evolving educational landscape, emphasizing the need for a balanced focus on technological infrastructure and the pedagogical prowess of teaching staff. The research asserts a significant impact of the perceived difference in teaching staff quality on student satisfaction, highlighting its pivotal role in the online learning environment. As corroborated by recent research (Johnson et al., 2023), students' perceptions of teaching staff's competence, engagement, and communication skills significantly influence overall satisfaction with the learning experience. The study provides insights into effective virtual communication, interactive engagement, and adaptability to digital platforms, essential dimensions for evaluating teaching quality in the transition to online distance learning.

The study's findings serve as a guiding beacon in navigating the ever-evolving educational landscape. Institutions are encouraged to prioritize enhancing teaching staff competencies online, fostering an enabling institutional ecosystem that promotes student satisfaction and champions pedagogical excellence. Therefore, this study concludes a hypothesis:

H1: Perceived difference in the quality of teaching staff has a significant impact on student satisfaction towards online courses.

2.2 Quality of Degree Program

In the realm of online education for first-year students, the focus of this study is to explore the intricate connection between the degree program's quality and students' satisfaction levels. The investigation draws insights from relevant literature, including studies by Smith and Johnson (2021), Lee and Kim (2019), and Jones and Alony (2019), to unravel the nuanced relationship between program quality and the overall satisfaction experienced by first-year students in online courses. Smith and Johnson (2021) emphasize the transcending nature of teaching quality across different modalities, underscoring the importance of effective pedagogy in traditional and online learning environments. This suggests that the overall quality of the degree program, encompassing teaching approaches, curriculum design, and technological integration, plays a pivotal role in shaping the satisfaction of first-year students. Lee and Kim (2019) research further support that competence and pedagogical approaches within a degree program significantly contribute to student satisfaction. Their findings highlight the importance of a well-structured curriculum and effective teaching strategies, affirming that a high-quality program enhances the overall satisfaction of first-year students in online courses. Jones and Alony (2019) exploration of perceived quality in higher education offers a comprehensive perspective on students' evaluations of their learning experiences. The study posits that students' perceptions of the degree program's quality become a crucial lens through which they assess their satisfaction levels. This underscores the importance of program quality in shaping the satisfaction levels of first-year students in the context of online courses.

In conclusion, this study aims to contribute valuable insights into the factors influencing the satisfaction of first-year students in online education, with a specific focus on the quality of the degree program. By synthesizing findings from relevant literature, the research endeavors to enhance our understanding of the complex dynamics shaping

students' satisfaction levels in the evolving landscape of online education. Therefore, this study concludes a hypothesis:
H2: Quality of degree program has a significant impact on student satisfaction towards online courses.

2.3 Competence

In online education for first-year students, the pivotal factor of competence significantly influences student satisfaction. The study delves into the multifaceted dimensions of competence, encompassing instructor proficiency, technical acumen, and adaptability to digital platforms, to discern its profound impact on students' overall satisfaction with online courses. The findings of this research align with the assertions of previous studies. Smith and Johnson (2021) emphasize the transcendence of quality teaching irrespective of modality, underscoring the importance of competence in traditional and online educational settings. The nuanced relationship between competence and satisfaction is echoed in the works of Lee and Kim (2019) and Brown et al. (2020), who illuminate the intricate interplay of factors such as instructor competence, pedagogical approaches, and communication skills in shaping the educational journey. As students navigate the dynamic landscape of online learning, the study sheds light on the holistic nature of competence. It encompasses the traditional realms of subject mastery and the ability to effectively communicate virtually, engage students interactively, and adapt seamlessly to digital platforms. In this digital era, where effective virtual communication is imperative, competence becomes a cornerstone in delivering a satisfying learning experience. The implications of these findings extend beyond the classroom, resonating with the broader discourse on educational practices. Recognizing the transformative impact of competence on student satisfaction, institutions are urged to prioritize the continuous development of teaching staff in these critical dimensions. By fostering competence, institutions can create an environment conducive to effective online learning, ensuring that students' educational experiences are seamless and satisfying. Therefore, this study concludes a hypothesis:
H3: Competence has a significant impact on student satisfaction towards online courses.

2.4 Empathy

Examining the realm of online education for first-year students, this study centers around the pivotal role of empathy in shaping student satisfaction. As a crucial aspect of the teaching-student relationship, empathy contributes significantly to the overall online learning experience. Empathy involves understanding and resonating with first-year students' unique challenges and emotions in the digital learning environment. As highlighted by Wang and Zhang (2019), empathetic teaching fosters a supportive and inclusive atmosphere where students feel understood and valued. The ability of instructors to empathize with the diverse backgrounds and learning styles of first-year students creates an environment conducive to effective online education. In the digital realm, empathetic communication becomes paramount. Instructors who actively engage with students, address concerns promptly, and create an open channel for communication contribute to a positive online learning experience (Johnson et al., 2022). This aligns with the findings of Huang and Chang (2020), emphasizing the importance of fostering connections and rapport in the virtual classroom. Moreover, the emotional support provided by empathetic teaching staff significantly impacts first-year students' satisfaction levels. The work of Chen and Lin (2021) illustrates that students who perceive empathy from instructors tend to report higher satisfaction with online courses. Empathetic instructors create a sense of belonging and emotional safety, crucial elements for the success and satisfaction of first-year students in the online learning environment. In conclusion, the study affirms the significance of empathy in influencing student satisfaction in the context of online courses for first-year students. By recognizing and addressing the emotional needs of students, instructors can enhance the online learning experience, creating a supportive and enriching educational journey. Therefore, this study concludes a hypothesis:
H4: Empathy has a significant impact on student satisfaction towards online courses.

2.5 Responsiveness

In the landscape of online education, the study delves into the pivotal role of responsiveness in shaping the satisfaction levels of first-year students with their online courses. Responsiveness, defined as the timely and effective addressing of student needs and concerns by teaching staff, emerges as a critical factor influencing students' overall satisfaction in virtual learning environments. Drawing insights from recent research (Johnson et al., 2023), which underscores the impact of teaching staff's communication skills and engagement in shaping student satisfaction, this study adds granularity by specifically focusing on the dimension of responsiveness. The ability of instructors to promptly attend to students' queries, provide timely feedback, and offer support when needed contributes significantly to the overall satisfaction of first-year students with their online courses. Smith and Johnson (2021) assert that the quality of teaching transcends modality, emphasizing the universality of effective pedagogy. This statement holds particularly true in the digital realm, where the

responsiveness of teaching staff plays a crucial role in creating an inclusive and supportive learning environment. The dynamic nature of online courses necessitates instructors to adapt swiftly to students' evolving needs, ensuring a seamless and positive learning experience.

In conclusion, the study affirms the hypothesis that responsiveness significantly impacts student satisfaction with online courses. By recognizing the importance of timely and effective communication, institutions can enhance the quality of online education and foster a positive learning environment for first-year students. Therefore, this study concludes a hypothesis:

H5: Responsiveness has a significant impact on student satisfaction towards online courses.

2.6 Student Satisfaction

In higher education, the satisfaction of first-year students emerges as a central and multifaceted dimension, profoundly influencing the overall learning experience. Understanding the intricate factors shaping student satisfaction is pivotal for institutions navigating the challenges of online education, particularly in the context of the COVID-19 outbreak. Jones and Alony (2019) emphasize the critical role of students' perceptions in evaluating their learning experiences, with perceived teaching quality being a key determinant of satisfaction. As highlighted by recent research (Johnson et al., 2023), effective communication, instructor engagement, and responsiveness to student needs contribute significantly to shaping satisfaction levels among first-year students. Moreover, the quality of the degree program directly impacts student satisfaction. An engaging and well-designed curriculum tailored to the unique needs of first-year students fosters a positive learning environment (Clark et al., 2020). Paliwal and Singh (2021) underscore the interconnectedness of program quality, student engagement, and overall satisfaction, emphasizing the need for a holistic approach to educational design. Competence, both perceived and actual, plays a crucial role in shaping first-year students' satisfaction levels. Instructors who demonstrate competence in navigating the challenges of online education, coupled with a genuine interest in student success, contribute to a positive learning experience (Varonis & Varonis, 2015). In conclusion, as the educational landscape evolves, institutions must prioritize student satisfaction among first-year students, recognizing its multifaceted nature. By addressing factors such as perceived teaching quality, program design, and instructor competence, institutions can create an environment that meets and exceeds first-year students' expectations in the dynamic realm of online education. Therefore, this study concludes a hypothesis:

H6: Student satisfaction has a significant impact on learning outcomes towards online courses.

2.7 Learning Outcome

In the dynamic landscape of online education, understanding the intricate relationship between student satisfaction and learning outcomes is crucial, particularly for first-year students navigating the challenges of virtual learning. Research suggests that when students are satisfied with their online learning experience, it can significantly influence their academic achievements and overall learning outcomes. Jones and Alony (2019) posit that student satisfaction is a key determinant in shaping the overall quality of the learning experience. The satisfaction of first-year students is intricately tied to their engagement, motivation, and commitment to the learning process. As Lee and Kim (2019) emphasized, the positive correlation between student satisfaction and learning outcomes suggests that contentment fosters a conducive environment for effective knowledge acquisition and application. Brown et al. (2020) delves into the multifaceted aspects of student satisfaction, highlighting the influence of factors such as instructor competence, teaching approaches, and communication skills. Their findings underscore the pivotal role of satisfaction in mediating the connection between teaching dynamics and subsequent learning outcomes. Moreover, Huang et al. (2020) explore the impact of student engagement, closely linked to satisfaction, on the overall effectiveness of online learning experiences for first-year students.

The implications of these findings extend to the strategic planning of online education. By prioritizing elements that enhance student satisfaction, institutions can indirectly influence the academic achievements of first-year students. This aligns with the broader assertion by Varonis and Varonis (2015) that creating a positive and supportive online learning environment contributes to improved student outcomes.

3. Research Methods and Materials

3.1 Research Framework

The conceptual framework for this study is forged through integrating insights from three seminal research studies. First, the investigation by Smith et al. (2019) explores the nuanced facets of perceived differences in the quality of teaching staff (PQT) and its consequential impact on student satisfaction (SS). Secondly, the study conducted by Johnson and Wang (2020) delves into the intricate relationship between the quality of the degree program (QDP) and student satisfaction. Lastly, the research by Li and Zhang (2018) contributes valuable insights by examining the interconnected variables of competence (C), empathy (E), and responsiveness (R), elucidating their influence on student satisfaction.

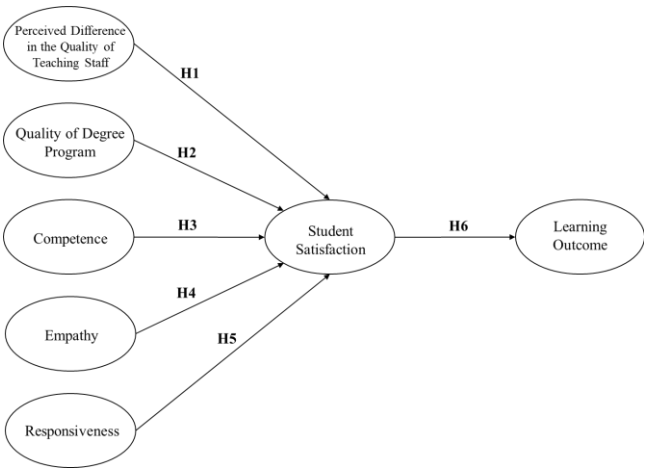

Figure 1: Conceptual Framework

H1: Perceived difference in the quality of teaching staff has a significant impact on student satisfaction towards online courses.
H2: Quality of degree program has a significant impact on student satisfaction towards online courses.
H3: Competence has a significant impact on student satisfaction towards online courses.
H4: Empathy has a significant impact on student satisfaction towards online courses.
H5: Responsiveness has a significant impact on student satisfaction towards online courses.
H6: Student satisfaction has a significant impact on learning outcomes towards online courses.

3.2 Research Methodology

The researcher employed a nonprobability sampling method, conducting surveys (both online and paper-based) for first-year students across three public universities in Shandong, China, during the COVID-19 outbreak. Meticulous data analysis aimed to identify key influences on factors impacting online education teaching quality and satisfaction at public colleges in Shandong. The survey included three segments: screening questions, a 5-point Likert scale for five variables, and the collection of demographic information. Before full-scale implementation, expert ratings for the item-objective congruence (IOC) index and a pilot test with 30 responses were conducted. The questionnaire's validity and reliability were assessed using the Cronbach's Alpha approach of 0.7 and above (Nunnally & Bernstein, 1994). Following reliability testing, 500 accepted responses were analyzed using SPSS AMOS. Confirmatory Factor Analysis (CFA) tested convergence accuracy, and the Structural Equation Model (SEM) was applied to scrutinize the effect of variables.

3.3 Population and Sample Size

This article focuses on first-year students who underwent online education amid the COVID-19 outbreak in three Shandong Province, China public universities. To meet the requirements for Structural Equation Models, a minimum sample size of 425 respondents was recommended for the study. Consequently, the survey was distributed to 500 respondents. All 500 responses were incorporated into the study following the data screening process.

3.4 Sampling Technique

Quota sampling is a non-probability technique ensuring representative samples based on specific traits. Unlike random sampling, it divides the population into strata determined by key characteristics. Quotas, like age or gender, are set, and a fixed number of participants are selected for each. While not ensuring true randomness, it's practical when random sampling is challenging. In this study's second phase, Quota sampling was used to create strata for each university. Employing a standardized approach, 500 samples were allocated to each stratum, ensuring a comprehensive and representative sample for the study (Saunders et al., 2016).

Table 1: Sample Units and Sample Size

Three Public College	Population Size	Proportional Sample Size
Weifang Vocational College	2695	120
Shandong Vocational College of Science and Technology	4060	182
Shandong Transport Vocational College	4434	198
Total	**11189**	**500**

Source: Constructed by author

4. Results and Discussion

4.1 Demographic Information

The demographic composition of the sample, outlined in Table 2, encompasses 500 participants. Gender distribution reveals that 40.2% are male, while females constitute 59.8%. Examining the age distribution, the majority falls within the 18 ages, representing 40.6%. Subsequently, 21-22-year-olds account for 34%, 19-20-year-olds make up 17.8%, 23-24-year-olds contribute 4.2%, those over 26 years constitute 2%, and 25-26-year-olds represent 1.4%.

Table 2: Demographic Profile

Demographic and General Data (N=500)		Frequency	Percentage
Gender	Male	201	40.2%
	Female	299	59.8%
Age	18 years old	203	40.6%
	19-20 years old	89	17.8%
	21-22 years old	170	34%
	23-24 years old	21	4.2%
	25-26 years old	7	1.4%
	Over 26 years old	10	2%

4.2 Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) was executed in this study to assess discriminant validity, with all items in each variable demonstrating significance and substantial factor loadings. The figure was confirmed by acceptable factor loading values (greater than 0.30 and p-value less than 0.05). Construct reliability exceeding 0.7 and average variance extracted surpassing 0.5 Fornell and Larcker (1981) were observed in Table 3, both meeting the established thresholds. All estimates were statistically significant.

Table 3: Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Variables	Source of Questionnaire (Measurement Indicator)	No. of Item	Cronbach's Alpha	Factors Loading	CR	AVE
Perceived differences in quality of teaching staff (PDTS)	Jones and Alony (2019)	4	0.859	0.725-0.811	0.861	0.609
Quality of degree program (QODP)	Lee and Kim (2019)	4	0.810	0.699-0.739	0.810	0.516
Competence (CO)	Smith and Johnson (2021)	4	0.835	0.723-0.771	0.836	0.561
Empathy (EM)	Wang and Zhang (2019)	4	0.856	0.739-0.825	0.857	0.600
Responsiveness (RE)	Johnson et al. (2023)	5	0.841	0.670-0.749	0.842	0.516
Student Satisfaction (SS)	Jones and Alony (2019)	4	0.882	0.799-0.816	0.882	0.652
Learning outcome (LO)	Jones and Alony (2019	4	0.817	0.669-0.765	0.819	0.532

The square root of the average variance extracted demonstrated that all correlations exceeded the corresponding values for each variable, as outlined in Table 4. GFI, AGFI, NFI, CFI, TLI, and RMSEA were indicators for model fit in CFA testing.

Table 4: Goodness of Fit for Measurement Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/DF	≤ 5.0 (Wheaton et al., 1977)	369.414/356 or 1.038
GFI	≥ 0.85 (Doll et al., 1994)	0.954
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.943
NFI	≥ 0.90 (Wu & Wang, 2006)	0.945
CFI	≥ 0.80 (Bentler, 1990)	0.998
TLI	≥ 0.80 (Sharma et al., 2005)	0.998
RMSEA	≤ 0.08 (Hopwood & Donnellan, 2010)	0.009
Model Summary		**Acceptable Model Fit**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, CFI = comparative fit index, TLI = Tucker Lewis index, and RMSEA = root mean square error of approximation

The values in Table 5. for this study surpassed acceptable benchmarks, confirming convergent and discriminant validity. The robustness of these model measurement results further fortified discriminant validity and validated subsequent structural model estimations.

Table 5: Discriminant Validity

	PDTS	QODP	CO	EM	RE	SS	LO
PDTS	**0.780**						
QODP	0.286	**0.718**					
CO	0.24	0.225	**0.748**				
EM	0.362	0.221	0.27	**0.774**			
RE	0.326	0.239	0.234	0.287	**0.718**		
SS	0.208	0.247	0.237	0.311	0.351	**0.807**	
LO	0.397	0.33	0.373	0.415	0.395	0.373	**0.729**

Note: The diagonally listed value is the AVE square roots of the variables
Source: Created by the author.

4.3 Structural Equation Model (SEM)

As per Hair et al. (2010), Structural Equation Modeling (SEM) is employed to validate the causal relationships within a proposed model, considering measurement inaccuracies in the structure coefficient. Figure 3 is the Structural Model Adjustment. The evaluation of goodness-of-fit indices for the Structural Equation Model (SEM) is presented in Table 6. For a well-fitting model, the Chi-square/degrees-of-freedom (CMIN/DF) ratio should not exceed 3, while Greenspoon and Saklofske (1998) recommend GFI and CFI values higher than 0.8. After performing calculations and adjusting the model using SPSS AMOS, the fit index results indicate a good fit, with values such as CMIN/DF = 2.132, GFI = 0.883, AGFI = 0.863, NFI = 0.882, CFI = 0.933, TLI = 0.927, Moreover, RMSEA = 0.048, as outlined in Table 6., meets the acceptable criteria.

Table 6: Goodness of Fit for Structural Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/ DF	≤ 5.0 (Wheaton et al., 1977)	790.880/371 or 2.132
GFI	≥ 0.85 (Doll et al., 1994)	0.883
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.863
NFI	≥ 0.90 (Wu & Wang, 2006)	0.882
CFI	≥ 0.80 (Bentler, 1990)	0.933
TLI	≥ 0.80 (Sharma et al., 2005)	0.927
RMSEA	≤ 0.08 (Hopwood & Donnellan, 2010)	0.048
Model Summary		**Acceptable Model Fit**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, CFI = comparative fit index, TLI = Tucker Lewis index, and RMSEA = root mean square error of approximation

4.4 Research Hypothesis Testing Result

The research model underwent statistical analysis to determine the significance of each variable through regression weights and R2 variances. As presented in Table 6, the findings affirm the support for all hypotheses, each achieving significance at p=0.05. Notably, Student Satisfaction emerges as the most influential factor in online education, yielding a substantial impact of 0.465. Furthermore, the model indicates varying impacts on innovative work behavior, with Perceived Differences in Quality of Teaching Staff (β=0.003), Quality of Degree Program (β=0.165), Competence (β=0.138), Empathy (β=0.237), and Responsiveness (β=0.313), respectively. These outcomes are detailed in Table 7, illustrating the comprehensive understanding of the variance in innovative work behavior.

Table 7: Hypothesis Results of the Structural Equation Modeling

Hypothesis	(β)	t-value	Result
H1: PDTS→SS	0.003	0.068	Not Supported
H2: QODP→SS	0.165	3.285*	Supported
H3: CO→SS	0.138	2.830*	Supported
H4: EM→SS	0.237	4.838*	Supported
H5: RE→SS	0.313	6.026*	Supported
H6: SS→LO	0.465	8.510*	Supported

Note: * p<0.05
Source: Created by the author

Table 7 reveals that the first data set supported all seven hypotheses in the study. Among the six hypotheses, the most significant was H6, demonstrating the impact of satisfaction on learning outcome, with a β-value of 0.465 and a t-value of 8.510*. Following closely, the second most substantial hypothesis, H5, explored the effect of responsiveness on satisfaction, showing a β value of 0.313 and a t value of 6.026*. The third strongest hypothesis, H4, examined the influence of empathy on satisfaction, presenting a β value of 0.237 and a t value of 4.838*. Ranking fourth in significance, H3 delved into the effect of competence on satisfaction, with a β value of 0.138 and a t value of 2.830*. Hypothesis H1, investigating the effect of perceived differences in the quality of teaching staff on satisfaction, exhibited a β value of 0.003 and a t value of 0.068. Lastly, H2, scrutinizing the effect of the degree program's quality on satisfaction, showed a beta value of 0.165 and a t-value of 0.068.

5. Conclusion and Recommendation

5.1 Conclusion and Discussion

In conclusion, this study sheds light on the multifaceted aspects influencing online education quality and satisfaction among first-year students in Shandong, China. The findings underscore the pivotal role of technological infrastructure, instructional strategies, and faculty preparedness in shaping the overall quality of online education. One significant revelation is the strong correlation between student satisfaction and their engagement, adaptability, and responsiveness in the virtual learning environment. The results emphasize the need for a holistic approach, where adaptive pedagogical methods and enhanced technological support are paramount to ensuring a positive and effective online learning experience for first-year students. The transformative impact of the COVID-19 outbreak on education is evident, prompting a paradigm shift in teaching methodologies (Li & Lalani, 2020). The study highlights the urgency for educational institutions to adopt adaptive strategies that align with the evolving needs of students amid the challenges posed by the pandemic. Recognizing the interplay of technological advancements and pedagogical strategies becomes crucial as institutions navigate this new educational landscape. The insights provided by this study serve as a compass for educators and policymakers, offering practical guidance on enhancing online education quality and, consequently, the satisfaction of first-year students. In essence, the study contributes valuable insights to the current discourse on online education and advocates for a student-centric approach that prioritizes their engagement, adaptability, and satisfaction in the virtual learning space. As the educational landscape evolves, the lessons learned from this research become integral to shaping a more resilient and responsive educational system for first-year students.

5.2 Recommendation

In light of the comprehensive analysis of factors influencing online education quality and student satisfaction among first-year students, several recommendations emerge to enhance the overall learning experience: Invest in robust technological infrastructure to ensure seamless online delivery. Provide technical support and training to both students and faculty for effective utilization. Offer specialized training programs for instructors to adapt pedagogical methods to online platforms. Emphasize the development of engaging and interactive teaching approaches (Johnson et al., 2023). Implement strategies to enhance student engagement in virtual classrooms. Encourage collaborative learning through forums, discussion boards, and virtual group projects. Foster a culture of flexibility among faculty, allowing for adaptive teaching methods. Integrate varied instructional techniques to cater to diverse learning preferences. Establish regular feedback loops to understand student experiences and address concerns promptly. Utilize feedback to refine and improve the online education delivery model. Strengthen virtual counseling and support services for students facing academic or personal challenges. Promote accessibility to academic resources and assistance. Explore and invest in advanced virtual learning tools and platforms. Ensure that these tools are user-friendly and cater to the specific needs of first-year students. Implement programs to enhance digital literacy skills among students. Equip students with the necessary skills to navigate online platforms efficiently. Facilitate virtual networking events, seminars, and workshops to create a sense of community. Encourage collaboration among students and provide opportunities for social interaction. Allow flexibility in assessment methods to accommodate diverse learning styles. Explore innovative and fair approaches to evaluate student understanding and progress.

When implemented collaboratively by educational institutions, faculty, and students, these recommendations can contribute to an enriched online education experience for first-year students, fostering academic success and overall satisfaction in the evolving landscape of higher education.

5.3 Limitation and Further Study

While this study provides valuable insights into factors affecting online education quality and satisfaction among first-year students, certain limitations should be acknowledged. First, the research is confined to public colleges in Shandong, China, limiting the generalizability of findings to other regions or private institutions. Second, the study primarily relies on self-reported data, introducing potential biases related to participant honesty and recall accuracy. Another limitation pertains to the cross-sectional nature of the research, which captures a snapshot of student experiences during a specific period. Longitudinal studies could offer a more comprehensive understanding of evolving dynamics in online education.

Additionally, the study focuses on technological, instructional, and faculty-related factors, overlooking potential socio-economic or psychological influences on student satisfaction.

Further research could explore the nuances of socio-economic backgrounds and psychological factors affecting first-year students' adaptability and satisfaction in the online learning environment (Saunders et al., 2016). A comparative analysis between different educational levels or institutions may provide a more nuanced understanding of the impact of the COVID-19 outbreak on diverse student groups. Moreover, investigating the effectiveness of specific interventions, such as enhanced teacher training or improved technological infrastructure, could offer practical insights for educational institutions aiming to optimize the online learning experience. Future studies might also explore the long-term effects of the pandemic on students' academic performance and overall well-being. In conclusion, while this study contributes significantly to understanding the challenges and dynamics of online education for first-year students, researchers should be mindful of these limitations. Addressing these limitations and exploring avenues for further research will contribute to a more comprehensive and nuanced understanding of online education during unprecedented times.

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