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Determinants of Educational Quality in UAE Universities: A Factor Analysis of Undergraduate Student Perceptions Across Demographic Groups

Mohammed Alnahhal^{*} , Lina Hamed , Sana Shibli ,

Shahad Alkeebali , Mazen Eltawil 

School of Engineering and Computing
 American University of Ras Al Khaimah
 Ras Al Khaimah, United Arab Emirates

Mosab I. Tabash 

College of Business, Al Ain University
 Al Ain, United Arab Emirates

Zokir Mamadiyarov 

Mamun University, Khiva, Uzbekistan;
 Alfraganus University, Tashkent, Uzbekistan

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Abstract. This study examines the factors influencing undergraduate students' perceptions of educational quality at a university in the United Arab Emirates (UAE). Previous research about educational quality in the UAE did not focus on a comprehensive structure for quality indicators or the effect of demographic factors on them. A quantitative cross-sectional survey design was employed, and the effects of student characteristics such as gender, study level, and faculty were also investigated. A survey of 117 undergraduate students from three faculties assessed 28 literature-derived quality indicators using a convenience sampling technique. Statistical analysis using R was conducted using methods appropriate for the Likert-scale data used in the survey, such as Wilcoxon signed-rank test, Mann-Whitney U test, and Kruskal-Wallis test. Factor analysis revealed that these 28 factors can be grouped into three categories: Teaching and Curriculum Quality, Institutional Policies and Resources, and Student Support and Outcomes. The three categories were generally found to be important indicators of educational quality, explaining 57.8% of the variance. Regardless of the characteristics of students, 27 out of 28 indicators were rated as important, while only higher tuition fees were found not to be important as an indicator of educational quality. The

*Corresponding author: Mohammed Alnahhal; mohammed.alnahhal@aurak.ac.ae

findings suggest that teaching quality is the most influential dimension of educational quality, and that students' perceptions are largely consistent across demographic groups. This study contributes to the literature by identifying three underlying dimensions of educational quality in a UAE university and examining how students from different demographic groups perceive these dimensions.

Keywords: education quality; factor analysis; higher education; institutional policies; outcome-based evaluation; SERVQUAL; UAE universities; undergraduate students

1. Introduction

Recent studies have investigated the factors that shape students' perceptions of educational quality (Ali, 2021; Ismailova et al., 2025; Sameena, 2020). However, students' perception can be affected by many factors including the institution under consideration. Students from different universities may have different perceptions of education quality (Dodeen, 2013). This is especially important when the students and faculty members are from so many different countries with different cultures. Educational quality has a strong influence on student performance and building the skills and knowledge students need to face future challenges (Ashour, 2020a). A good education focuses not only on classroom learning, but also on well-developed curriculum, practical teaching approaches, and guidance from faculty. These aspects help students develop critical-thinking skills, problem-solving skills, and a solid understanding of their subjects (Kafri, 2022). Educational quality affects a university's reputation, which in turn attracts talented instructors and students, producing graduates who are ready for their future career and serve the community (Soysal et al., 2024).

Students' perceptions of educational quality have not been sufficiently investigated in the literature. Several factors affect this perception across different demographic groups. These factors are yet to be explored so that decision makers can respond to enhance the education quality (Grudowski & Szczepańska, 2021). Specifically, two methodological gaps remain in the literature in the context of the United Arab Emirates (UAE). First, while certain dimensions of educational quality such as technology adoption (Ashour, 2020b), sustainability awareness (Al-Naqbi & Alshannag, 2018), and service quality (Datta & Vardhan, 2017) were investigated, no previous study examined a full set of dimensions of educational quality in bachelor's degree programs in the UAE. Second, the effect of demographic variables on these dimensions was not investigated in a systematic way. The current study addresses these gaps by adopting factor analysis of 28 quality dimensions found in the literature. It also considers the effect of demographic variables such as gender, study level, and faculty on these dimensions. This means that our study moves beyond isolated quality dimensions into a comprehensive framework.

Biases in student evaluation, such as the halo effect and leniency bias, further complicate the work of researchers in this field. The halo effect is when a positive impression in one area affects the perception of students regarding another

unrelated area. An instructor who is approachable may be perceived by students as having high teaching effectiveness. Similarly, leniency bias leads to overly positive evaluations because students avoid criticizing. This means we need to use diverse evaluation metrics, including both quantitative and qualitative methods (Dodeen, 2013). Demographic factors such as gender, age, Grade Point Average (GPA), and nationality also contribute to biases in student evaluations (Guillén Perales et al., 2024). To mitigate these biases, this study employs a systematic set of 28 indicators of educational quality, derived from the literature, instead of using a single quality measure. This approach reduces the halo effect by asking the students to evaluate different measures separately. The use of anonymous surveys also mitigates leniency bias, as students provide honest answers without fear of repercussion.

These biases and demographic influences are particularly important in the context of the UAE, where students and faculty members have diverse nationalities, understanding student perceptions of education quality is very important (Abu-Rumman & Qawasmeh, 2022). The UAE's higher education sector has witnessed a 13% increase in student enrolment across 66 institutions during the 2024-2025 academic year (Ministry of Higher Education and Scientific Research, 2025). Factors such as faculty roles, mentorship, guidance, and demographic variability have not been sufficiently investigated; therefore, it is important to examine them.

Moreover, recent research in the UAE has demonstrated that quality measures significantly influence students' perceived usefulness, satisfaction, and actual use of learning management systems (Aldabbas et al., 2025). Recent empirical research in the UAE has extended the investigation of education quality to the vocational education and training sector. Aldabbas et al (2026) examined how program quality, instructor quality, and support service quality affect student satisfaction among 112 students. They found that instructor quality was the most important predictor. However, these studies focused on specific bounded contexts and not the comprehensive structure of quality indicators in undergraduate education. In contrast, our study examines a broader set of 28 quality indicators across three faculties in a UAE university.

The research questions are:

- RQ1:** How do demographic factors such as gender, study level, and faculty influence students' perceptions of educational quality?
- RQ2:** What specific factors and indicators do undergraduate students consider crucial in defining educational quality?
- RQ3:** How can the 28 quality indicators be grouped into meaningful constructs, and how do students rank these dimensions?

This study seeks to provide insights for decision-makers to enhance educational quality and meet the expectations and needs of diverse student population. Given the UAE's national development goals, including UAE Vision 2031 and Centennial 2071, understanding educational quality indicators is not an option but a strategic imperative.

2. Literature Review

This section examines the concept of educational quality, its theoretical foundations, key dimensions, demographic and contextual influences, and the specific characteristics of the UAE higher education environment. Finally, it identifies gaps in the existing literature and explains the contribution of the present study.

2.1 Defining Educational Quality in Higher Education

Educational quality in higher education is a multidimensional concept. There is no single definition for educational quality. Instead, different stakeholders (students, faculty, employers, and others) take into consideration different aspects of quality (Anis et al., 2014). There are three approaches to defining educational quality. The first approach focuses on inputs and resources such as faculty qualifications, libraries, and laboratory equipment (Suleiman, 2023; Ullah & Usman, 2023). The second one focuses on processes, teaching effectiveness, curriculum design, and student engagement (Ali, 2021). The third one focuses on outcomes such as graduate employability, student satisfaction, and contributions to society (Goel, 2026). However, many researchers prefer multidimensional definitions that integrate inputs, processes, and outcomes (Rahman & Nasrin, 2024).

The present study adopts this multidimensional perspective. So, educational quality can be defined as the extent to which an institution's inputs, processes, and outcomes meet or exceed the expectations of its students and other stakeholders. However, some dimensions are more important than others. The literature consistently identifies teaching effectiveness and faculty quality as the most influential dimensions of educational quality (Ali, 2021; Sameena, 2020; Wilkins et al., 2012). However, other indicators such as student learning outcomes and graduate employability are also widely recognized in the literature (Goel, 2026; Rahman & Nasrin, 2024). Input factors such as facilities and resources are viewed as less critical to students' overall quality perceptions (Ashour, 2020b). Therefore, this study examines the most important dimensions based on the perceptions of students.

2.2 Theoretical Framework

This study is based on three theories: service quality theory (SERVQUAL), Total Quality Management (TQM) principles, and stakeholder theory. Together, they justify examining student perceptions of educational quality. The SERVQUAL model was developed by Parasuraman et al. (1988), and it considers service quality through five dimensions: tangibility, reliability, responsiveness, assurance, and empathy. In the context of higher education, these dimensions can be measured through tangible resources such as classrooms, libraries, and laboratories (tangibility); consistent academic processes and timely feedback (reliability); responsive administrative and support services (responsiveness); competent and qualified faculty members (assurance); and personalized guidance and mentorship (empathy) (Krsmanovic et al., 2014; Saliba & Zoran, 2018). The basic idea is that customers evaluate service quality by comparing expectations and actual perceptions (Ismailova et al., 2025). The present study takes into

consideration that quality is multidimensional. This study employs factor analysis to measure educational quality using student responses to 28 specific indicators.

Although SERVQUAL has been widely applied in previous research to assess service quality, some researchers argue that it was originally developed in Western service settings. Different regions with different cultures and conditions may affect how educational quality is perceived. For example, in the UAE, diverse student backgrounds and technology-enhanced learning may go beyond the traditional dimensions of SERVQUAL. Therefore, it is considered a foundational framework rather than a stand-alone model. To address this limitation, we have considered Total Quality Management (TQM), which focuses on continuous improvement, and Stakeholder Theory, which recognizes students as key stakeholders, to complement SERVQUAL.

TQM started in manufacturing as a philosophy for quality management and was then employed in the service industry (Jasti et al., 2022), where quality is the responsibility of everyone. Customer satisfaction, continuous improvement, and data-driven decision-making are key elements of TQM. Many educational institutions have employed TQM principles, where students are considered the primary customers or stakeholders. Student satisfaction is a top priority for the successful implementation of TQM. However, some researchers argue that students should not be considered customers in the traditional way because their satisfaction should not come at the expense of performance. Course evaluations, student satisfaction surveys, and alumni feedback are examples of TQM practices in higher education because they provide data that support continuous improvement (Dallashah, 2026). This study aligns with TQM principles because it focuses on students' feedback as customers to enhance performance, leading to continuous improvement. The study also investigates which determinants are necessary for enhancing educational quality.

There are some differences between SERVQUAL and TQM. Both approaches prioritize students, but TQM places greater weight on the processes through which quality is built and achieved, and on the root causes of quality problems that should be discovered and solved. For example, a delay in fulfilling a student's request is perceived as lower quality. TQM focuses on the steps to reduce the student's waiting time. Therefore, the two approaches complement each other.

Stakeholder theory focuses on the interests of all stakeholders and not just customers (Langrafe et al., 2020). For example, in education, the customers are the students, and the other stakeholders are faculty, employers, accreditation bodies, government agencies, and society (Marshall, 2018). The interests of these stakeholders might conflict. For example, students prefer easy assessments, but faculty members prefer higher-quality assessments and academic rigor. This study focuses on student perceptions, and therefore, future research should focus on the perceptions of other stakeholders.

Together, SERVQUAL, TQM, and Stakeholder theory provide a comprehensive foundation for this study. SERVQUAL explains the multidimensional nature of educational quality, TQM emphasizes the use of stakeholder feedback for continuous improvement, and stakeholder theory justifies the importance of understanding students' perceptions as very important stakeholders. The model proposed by Rahman and Nasrin (2024), which organizes quality dimensions into categories, serves as the framework for implementing these theoretical principles in the context of UAE higher education in the current study. However, the model by Rahman and Nasrin (2024) was implemented in a different country, and not in the UAE. Given the unique context of the UAE, such as the international and diverse student backgrounds, the use of international branches of universities, and specific governmental regulations, different results may emerge in this study.

2.3 Key Dimensions of Educational Quality

Based on SERVQUAL, TQM, and stakeholder theory, prior research suggests that students evaluate educational quality through several interrelated dimensions, including faculty quality, academic processes, institutional resources, support services, and institutional reputation.

Faculty and teaching quality are identified as among the most important determinants of educational quality. Three dimensions are found in the literature about faculty and teaching quality, which are faculty characteristics, teaching effectiveness, and curriculum quality. For example, some researchers emphasize instructional competence, including teaching methods, subject expertise, and qualifications (Ali, 2021; Sameena, 2020), whereas others highlight interpersonal aspects such as faculty support, accessibility, and student-faculty relationships (Wilkins et al., 2012). Research on engineering students also suggests a preference for smaller class sizes that facilitate individualized attention (Shehnaz & Sreedharan, 2011). The academic environment and processes significantly impact quality perceptions. Ali (2021) and Sameena (2020) highlight the importance of high-quality teaching.

Curriculum design and breadth are found to be very important by studies such as Wilkins et al. (2012) and Ali (2021). Moreover, Kafri (2022) emphasized the importance of better integrating critical thinking skills into the curriculum. This highlights the need for problem-solving abilities to deal with complex issues effectively. Moreover, Ashour (2020b) found that traditional teaching methods remain highly preferred despite recent technology. Previous studies often examine these dimensions separately. This makes it difficult to understand how they collectively influence students' perceptions. Therefore, to address this limitation, factor analysis was used to identify the constructs that organize quality indicators.

Based on students' perceptions, resources and facilities play an important role in education quality in the UAE. Ashour (2020b) and Shehnaz and Sreedharan (2011) emphasize the significance of enhanced resources to support learning experiences. This includes access to modern equipment, libraries, laboratories, and other educational tools. However, the literature suggests that the availability

of resources alone may not be sufficient. For example, Datta and Vardhan (2017) found gaps in assurance and responsiveness to student needs concerning resources and facilities. While resources may be available, there might be problems related to their accessibility, maintenance, or adequacy. The infrastructure and learning environments also significantly influence students' opinions toward education quality (El Alfy & Abukari, 2020). Factors such as the physical condition of classrooms, availability of study spaces, and technological infrastructure contribute to students' overall perception of quality. The view towards resources and facilities might be affected by culture. Students in the UAE are from different cultural backgrounds. Therefore, a balanced evaluation of different types of resources and facilities is expected.

Student services significantly influence students' perceptions of education quality (Ismailova et al., 2025). Wilkins et al. (2012) emphasize the importance of enhanced counseling services. Administrative and admissions processes also affect perceptions (Sameena, 2020). Some students may stop their studies in a certain institution if they feel that its administrative and admission processes are too difficult. Additionally, scholarships and financial aid are critical factors for ensuring quality education and for influencing enrollment decisions (Nuseir & El Refae, 2022). Therefore, enhancing student services play a very important role in improving overall quality perceptions among students. These findings suggest that students evaluate educational quality not only through classroom experiences but also through the broader support system provided by the institution.

Institutional reputation plays a crucial role in affecting perceptions of education quality. Wilkins et al. (2012) found that students place high value on international branch campuses because they enhance the university's reputation and perceived quality. Furthermore, Nuseir and El Refae (2022) underscored the significance of academic reputation in influencing students' choices of universities. Al Hassani and Wilkins (2022) found that institutional reputation has great impact on students' satisfaction. However, they considered both quality and reputation as inputs in their model. The response variable was students' satisfaction. In the UAE culture, the reputation and ranking of an institution are the basic way to perceive quality. This is at least the way most parents consider educational quality. Students are usually affected by their parents' views.

2.4 Demographic and Contextual Factors

The previous subsection discussed the dimensions that students typically value and consider important for educational quality. However, research suggests that perceptions of educational quality are not uniform across student groups. For example, different perceptions can exist between males and females, or between engineering students and non-engineering students. For example, for engineering students, there is a clear preference for smaller class sizes (Wilkins et al., 2012). This is because of the technical and hands-on nature of engineering education, where interaction with instructors is very important. Additionally, postgraduate students emphasize the importance of academic services (El Alfy & Abukari, 2020). Postgraduates often require more specialized resources for advanced

studies and research. For example, they need more access to research resources such as the full texts of journal papers. Postgraduates also value the interaction with industry and more practical case studies, as the lessons learned from these can be directly applied in their workplaces.

Sociopolitical forces play a significant role in students' perceptions of education quality. Ashour (2020b) highlights that despite the use of technology in modern education, students in the UAE generally prefer traditional classroom settings. They value face-to-face interaction and direct engagement with instructors. This is especially important for students who register for courses with a lot of mathematics and calculations, which is usually the case for engineering students. The COVID-19 pandemic has also affected the adaptability and resilience in learning. Deveci (2022) found that the pandemic negatively affected students' adaptable learning skills, highlighting the importance of flexibility in educational approaches to address unforeseen challenges.

Furthermore, Al-Naqbi and Alshannag (2018) identified a high level of environmental awareness among students in the UAE. This awareness may influence perceptions of educational institutions' commitment to eco-friendly practices. This is because of the great attention paid by the UAE government to sustainability values. Moreover, the sustainability goal was considered in a study by Elmassri et al. (2023). They found that further work is needed by the business school they investigated. Matsumoto (2019) examined the challenges of bringing Western teaching methods into the UAE's unique cultural setting. The study highlights how important it is to respect local customs and values when planning education. This means adjusting how instructors communicate, how lessons are taught, what content is included, and how students are assessed. Local universities also try to obtain Western accreditations to attract more students, even though many students do not understand the importance of such accreditations.

2.5 The UAE Higher Education Context

The UAE has a strategy to host many international university branches of international universities from the United States, the United Kingdom, Australia, India, and other countries (Wilkins et al., 2012). These branches have diverse pedagogical methods and assessment systems. Therefore, the student and faculty populations are very diverse. Some UAE universities have students from over 100 nationalities in a single institution. Faculty members are also diverse, and they are often recruited from around the world. Students from different educational backgrounds may hold different expectations about educational quality (Matsumoto, 2019). Recent research has also examined educational quality from the perspective of instructors. Al Mohsen and Mohebi (2024) found that stakeholders perceived gaps in mentoring quality, technology integration, and engagement with parents and communities.

The Ministry of Higher Education and Scientific Research recently introduced an updated Outcome-Based Evaluation Framework (OBEF) for higher education institutions (Ministry of Higher Education and Scientific Research, 2022). This

framework focuses on outcome-based indicators. The six pillars of OBEF are: Employment Outcomes, Learning Outcomes, Industry Collaboration, Research Outcomes, Reputation, and Community Engagement. The UAE government has made substantial investments in education as part of its national development strategies, including UAE Vision 2031 and Centennial 2071. The OBEF framework's emphasis on employment outcomes and learning outcomes aligns with the present study's finding that students prioritize job prospects, graduate readiness, and student support. These priorities correspond to the 'Student Support and Outcomes' construct, as will be shown later in this study. The development of the 28 indicators considered several OBE-related aspects, including job prospects, guidance and counselling, students' participation in research, curricular design and planning, students' evaluation system, and extra-curricular activities.

2.6 Research Gap and Contribution of the Present Study

Usually, research in the UAE focuses on specific aspects of higher education, such as technology adoption (Ashour, 2020b), sustainability awareness (Al-Naqbi & Alshannag, 2018), and cultural adaptation (Matsumoto, 2019). Factor analysis has been used in educational quality research. However, few studies have applied it to a comprehensive set of indicators within the UAE higher education context. Moreover, prior research has not systematically tested the combined influence of demographic variables using appropriate non-parametric statistical techniques. The present study addresses these gaps in three ways. First, it uses factor analysis to identify the underlying constructs that organize 28 quality indicators. Second, it focuses on the UAE higher education context. Students from three faculties (engineering, business, and arts and science) at a UAE university participated in the study. Third, it tests how demographic variables affect perceptions of each indicator and construct. These variables include gender, study level, faculty, financial support, research participation, advertisement exposure, and medium of previous education.

3. Methodology

This study employed a quantitative, cross-sectional survey research design. The analytical model adopted in this study is grounded in the theoretical framework proposed by Rahman and Nasrin (2024), with tailored modifications to the indicators influencing educational quality and their respective construct assignments. Based on the authors' interpretation of this framework, the 28 indicators can be organized into eight categories: (1) Institutional and Environmental Factors, (2) Financial and Resource Factors, (3) Faculty-Related Factors, (4) Curricular and Academic Factors, (5) Student-Related Factors, (6) Support and Guidance Factors, (7) Career and Admission Factors, and (8) Flexibility and Scheduling Factors. The detailed indicators will be shown later in the results section.

We developed a survey consisting of 36 questions (28 adapted from the framework of Rahman and Nasrin [2024] and 8 demographic questions) to assess students' perceptions of educational quality in a UAE university. A 5-point Likert scale was chosen over a 7-point scale to reduce respondent burden and cognitive

fatigue, as the survey consisted of 28 quality-related items. Among these questions 8 are about information of respondents such as gender and faculty. We asked if they did any research at the university, if they saw advertisements for the school, and what they think about the school's status. The remaining 28 questions are about the factors affecting the quality perception of students. We tried to avoid any bias by using a reasonable sample size and including students from different majors and different levels. Our survey targeted the undergraduate students. The objective was to ensure the sample represents students from the three schools (engineering, business, arts and science). We randomly distributed the survey in classes, targeting larger classes held during the middle of the day, to obtain a diverse and representative sample.

The population in this study is the total number of undergraduate students in a university in the UAE, which is approximately 1,400. Convenience sampling was used, where the survey was distributed during regular class sessions across the three faculties (Engineering, Business, and Arts & Sciences). The survey was distributed to 200 students, and a total of 117 responses were collected, yielding a response rate of 58.5%. The sample size is crucial for ensuring the reliability and validity of survey results. A sample size above 100 is generally acceptable for exploratory research (Hair et al., 2010). The collected responses provide a sufficient basis for identifying key patterns and relationships because the aim of the study is to explore student views within a single institution.

Ethical approval for the study was secured through the university's institutional review process, guaranteeing adherence to research protocols and ethical standards. The statistical analysis was performed through the following ten steps:

1. Data suitability checks: suitability for factor analysis (Kaiser-Meyer-Olkin (KMO) test and Bartlett's test)
2. Determine number of factors (scree plot- visual "elbow" check and parallel analysis- compare eigenvalues to random data)
3. Run factor analysis: Assigned factors for each indicator based on loadings
4. Naming the different constructs
5. Validate constructs (internal consistency: Cronbach's alpha for each construct)
6. The analysis for the variance explained by each factor and its relative importance
7. Normality test
8. Testing the importance of indicators and constructs (including group differences)
9. Wilcoxon signed-rank test
10. Kruskal-Wallis test

R software was used in this study to analyze the results. Before performing factor analysis, we checked if our data were suitable for this method using two tests. The first one is KMO Test. This test measures how well the variables in our data relate to each other. The KMO value ranges from 0 to 1. A value above 0.6 is acceptable, and above 0.8 is good. The second one is Bartlett's test of sphericity, which checks

if the variables are correlated enough for factor analysis. A significant p-value ($p < 0.05$) means the data are appropriate.

To decide how many factors (constructs) to keep, we used a scree plot (visual “elbow” check). A scree plot was used to identify the point at which eigenvalues began to flatten (the “elbow”), indicating that subsequent factors contributed less. The number of factors before the elbow was selected. We compared our eigenvalues to those from random data with the same number of variables. Only factors with eigenvalues higher than random data were kept, as they contain meaningful information.

After confirming the number of factors, we performed factor analysis to group the indicators into meaningful constructs. Each indicator was assigned to a factor based on its factor loading (a number between -1 and 1 that shows how strongly it belongs to a factor). We kept loadings above 0.4 (a common rule) to ensure clear connections. We examined the indicators in each factor and gave them logical names based on their shared meaning. If an indicator loads strongly on more than one factor, we examine its theoretical meaning to determine where it fits best. This step helps us organize many indicators into a few key constructs for further analysis.

After grouping indicators into factors, we tested how consistent the indicators were within each factor using Cronbach’s alpha. It gives a score (from 0 to 1) to show if indicators in the same factor measure the same idea. Higher scores indicate greater reliability and internal consistency. The rules for reliability state that ≥ 0.7 means good consistency. After finding the factors, we checked how much each factor contributes to explaining the overall data. Factor analysis calculates how much variance in the data is captured by each factor. This is shown as a percentage. The higher the percentage, the more important the factor is in explaining the data. We listed factors from most to least important based on their variance percentages.

Before we get into hypothesis tests of the indicators, the following normality tests were performed for each indicator: Shapiro-Wilk test, Kolmogorov-Smirnov test, and Anderson-Darling test. The near-zero p-values from all three normality tests strongly reject the null hypothesis of normality for our data dimensions, which is common for ordinal Likert-scale data. We tested two types of hypotheses to understand the overall importance of each indicator/construct (compared to a neutral value), and differences in perceptions based on student characteristics (e.g., gender, study level).

To check if each indicator and construct (group of indicators) truly matters in our study, we used statistical tests. For individual indicators, the null hypothesis (H_0): “This indicator does not affect perceived education quality.” We used Wilcoxon signed-rank tests for Likert-scale data to compare each indicator’s median score to a neutral value (e.g., 3 on a 1-5 scale). If we have significant p-value ($p < 0.05$), then the indicator is important (reject H_0).

To analyze the effects of the demographic/background variables on students' perceptions of indicators and constructs, we have binary variables (2 groups) such as gender (male/female), getting financial support (yes/no), participated in any research (Yes/No). There are also multi-category variables (>2 groups) such as level of study (second year/third year/fourth year), school of study (Engineering/Art and Science/Business), and age (18-20/21-23/24+). The hypothesis can be as follows: Students' perceptions of [indicator/construct] differ significantly by [variable] (e.g., gender). In the first case, Mann-Whitney U test, which is non-parametric alternative to t-test for Likert data, is used. In the second case, the test is Kruskal-Wallis test (non-parametric ANOVA). The results of these analyses, including the factor analysis and differences in students' perceptions across demographic groups, are presented in the following section.

4. Results and Analysis

A total of 117 undergraduate students participated in this study. Table 1 shows the demographic characteristics of the students. There is a good balance between males and females. The majority of the students are from the Faculty of Engineering. This is because this faculty in this university has the largest group of students among the three faculties. About 37% of the students who shared in the survey are from level 1 because usually this level has large classes.

Table 1: Demographic characteristics of participants (N = 117)

Characteristic	n	%
Gender		
Male	56	47.9
Female	61	52.1
Faculty		
Engineering	78	66.7
Business	15	12.8
Arts & Sciences	24	20.5
Level of study		
Year 1	43	36.8
Year 2	31	26.5
Year 3	25	21.4
Year 4	18	15.4
Financial support		
Yes	75	64.1
No	42	35.9
Research participation		
Yes	23	19.7
No	94	80.3
Medium of previous education		
Arabic	24	20.5
English	91	77.8
Both	2	1.70

Before performing factor analysis, we first needed to confirm whether our data were appropriate for this method. We used two important statistical tests. The first is KMO test which checks how well the variables in our data relate to one another. Consistent with Aldabbas et al. (2025), who reported a KMO value of 0.947 for their quality measures construct, our analysis yielded a KMO of 0.92, indicating excellent suitability for factor analysis. As a rule of thumb, if it is ≥ 0.90 , it is marvelous. Table 2 shows the results for each indicator. The second test is Bartlett's test of sphericity, which examines whether the correlations between variables are strong enough for factor analysis. The p-value was less than 0.001, confirming suitability. Table 3 shows the detailed results. The results of Bartlett's test of sphericity provide further strong evidence that the data is highly suitable for Factor Analysis (FA). Combined with excellent KMO (0.92), this p-value confirms data is ideal for FA.

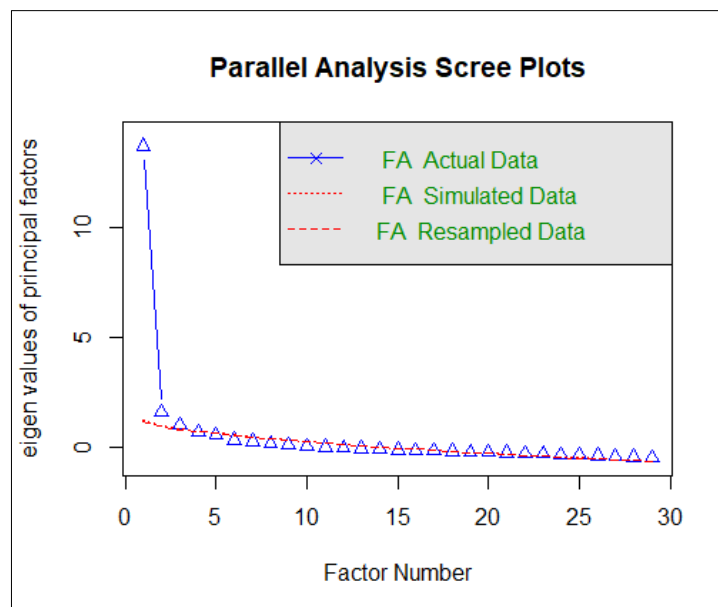
Table 2: KMO test for each indicator

Indicator	KMO
Institutional status	0.88
Environmental influences	0.93
Higher tuition	0.83
Scholarships	0.91
Smaller student-faculty ratio	0.91
Supporting human resources	0.94
Promotional activities	0.85
Flexible marks	0.88
Class preparation	0.91
Teaching methods	0.93
Knowledge of faculty about subject	0.93
Faculty relationship with students	0.92
Faculty training	0.95
Curricular design and planning with broad coverage	0.93
Curricular design and planning with up-to-date information	0.93
Students' evaluation system	0.89
Faculty evaluation system	0.93
Guidance and counseling	0.92
Admission procedure	0.88
Infrastructure and resources	0.94
Flexible class and exam schedule	0.91
Previous results of students	0.91
Medium of previous education	0.94
Students' participation in different research	0.92
Job prospective	0.94
Educational qualifications of faculty	0.87
Presentation skill of faculty	0.94
Extra-curricular activities	0.9

Table 3: Bartlett's test of sphericity

Statistic	Value	Interpretation
Chi-Square (χ^2)	2554.9	Extremely large value, indicating strong deviations from an identity matrix.
<i>p</i> -value	<0.00	Statistically significant ($p \ll 0.05$). Rejects the null hypothesis of Bartlett's test of sphericity.

The optimal number of constructs representing the 28 indicators was determined. Figure 1 shows the scree plot. We looked for the point where the line starts to flatten (the "elbow"), as factors after this point are less important. The first three factors have high eigenvalues (13.30, 1.59, 0.91). After the 3rd factor, the eigenvalues dropped sharply (0.67, 0.54, ...), suggesting that three factors are meaningful. Parallel analysis compares the eigenvalues to those from random data. The rule is to keep factors where the eigenvalues are higher than the random data's eigenvalues. The first three eigenvalues (13.30, 1.59, 0.91) were higher than the random data's (1.15, 0.90, 0.79). From the 4th factor onward, the eigenvalues were lower than random. The conclusion is to keep 3 factors.

**Figure 1: Scree plot showing eigenvalues for the 28 quality indicators**

Factor analysis was used to calculate loading scores for each indicator across the three constructs. Indicators were then assigned to their respective construct based on their highest factor loading values, as presented in Table 4. For example, Institutional Status (ranking) should be assigned to the second construct because it has a loading of 0.71 with it. Usually, loadings greater than 0.5 are considered strong enough to assign an indicator to a factor. This ensures the indicator shares meaningful variance with the factor. Loadings greater than 0.4 may be accepted. However, three indicators have loadings below 0.5: Environmental Influences, Flexible Class and Exam schedule, and Medium of previous education. We assign

them to the constructs with the maximum loadings. For example, Environmental Influences will be assigned to the third construct.

Table 4: Assignment of indicators to constructs based on factor loadings

Indicator	MR1	MR2	MR3	Assigned factor
Institutional status	0.21	0.71	0.20	MR2
Environmental influences	0.29	0.41	0.45	MR3
Higher tuition	-0.03	0.72	0.13	MR2
Scholarships	0.41	0.57	0.20	MR2
Smaller student-faculty ratio	0.23	0.68	0.26	MR2
Supporting human resources	0.57	0.55	0.22	MR1
Promotional activities	0.19	0.55	0.19	MR2
Flexible marks	0.26	0.58	0.17	MR2
Class preparation	0.71	0.22	0.34	MR1
Teaching methods	0.74	0.27	0.29	MR1
Knowledge of faculty about subject	0.83	0.10	0.32	MR1
Faculty relationship with students	0.62	0.30	0.38	MR1
Faculty training	0.72	0.30	0.34	MR1
Curricular design and planning with broad coverage	0.74	0.33	0.31	MR1
Curricular design and planning with up-to-date information	0.79	0.26	0.32	MR1
Students evaluation system	0.24	0.34	0.57	MR3
Faculty evaluation system	0.44	0.34	0.61	MR3
Guidance and counseling	0.42	0.39	0.50	MR3
Admission procedure	0.19	0.42	0.50	MR3
Infrastructure and resources	0.52	0.36	0.53	MR3
Flexible class and exam schedule	0.28	0.27	0.48	MR3
Previous results of students	0.11	0.38	0.57	MR3
Medium of previous education	0.24	0.39	0.44	MR3
Students' participation in different research	0.40	0.13	0.60	MR3
Job prospective	0.29	0.15	0.61	MR3
Educational qualifications of faculty	0.43	0.09	0.56	MR3
Presentation skills of faculty	0.58	0.04	0.57	MR1
Extra-curricular activities	0.34	0.20	0.64	MR3

Based on the grouped items, we can set the following names for the different constructs:

1. MR1: Teaching and Curriculum Quality: All relate to faculty expertise and curriculum delivery: Class preparation, Teaching methods, Faculty knowledge, Faculty relationships, Faculty training, Curriculum design (both items), Presentation skills.
2. MR2: Institutional Policies and Resources: Reflects administrative and structural aspects of the institution: Institutional status, Higher tuition, Scholarships, Student-faculty ratio, Promotional activities, Flexible marks
3. MR3: Student Support and Outcomes: Focuses on student-centric services and post-education outcomes. Evaluation systems (student/faculty), Guidance, Admission, Infrastructure, Flexible schedules, Past results, Research participation, Job prospects, Faculty qualifications, Extracurriculars

Most of the indicators loaded on single constructs. However, some indicators, such as presentation skill of faculty, have cross-loadings exceeding 0.4. "Presentation skill of faculty" loaded on both MR1 (Teaching and Curriculum Quality, 0.58) and MR3 (Student Support and Outcomes, 0.57). It was assigned to MR1 based on its conceptual meaning, which is more related to teaching effectiveness. This theoretical justification was also applied to environmental influences, supporting human resources, and infrastructure and resources. The cross loading can occur because of the conceptual overlap between different constructs.

Table 5 shows the basic statistics of these three constructs and Cronbach's alpha. Cronbach's alpha results indicate excellent internal consistency for all three constructs, confirming their reliability. Moreover, we have the analysis for variance explained by each factor and their relative importance in factor analysis as shown in Table 6.

Table 5: Basic statistics of the three constructs and Cronbach's alpha

Construct	Mean	Median	SD	Count	Cronbach's alpha	Interpretation of Cronbach's alpha
Teaching and Curriculum Quality	4.17	4	0.950	1053	0.95	Excellent reliability
Institutional Policies and Resources	3.65	4	1.14	702	0.85	Good reliability
Student Support and Outcomes	3.95	4	0.992	1521	0.92	Excellent reliability

Table 6: Factor analysis: Variance explained by each factor

	MR1	MR3	MR2
SS loadings	6.353	5.257	4.568
Proportion Var	0.227	0.188	0.163
Cumulative Var	0.227	0.415	0.578

SS Loadings (Sum of Squared Loadings) represent the total variance accounted for by each factor. MR1 explained the largest proportion of variance (22.7%), followed by MR3 (18.8%) and MR2 (16.3%), indicating that teaching and curriculum quality was the most influential construct. Total explained variance: 57.8% (acceptable for social sciences; ideally >60%). The Wilcoxon signed-rank test showed that the median ratings for all indicators except higher tuition fees were significantly greater than the neutral value (3). Results for all the indicators (except for Higher Tuition) showed p-values of near zero (much less than 0.05). In other words, almost all the indicators mentioned in the table are generally important based on the perception of students. Table 7 shows the results. The p-values for the Wilcoxon test for the three constructs were also near zero. We used the Wilcoxon signed-rank test to compare each indicator's median rating against the neutral value of 3.

Table 7: Student ratings of education quality indicators

Indicator	Median	Wilcoxon statistic	p-value
Institutional status	4	3962.5	0
Environmental influences	4	3719	0
Higher tuition	3	1770	0.228
Scholarships	4	5014.5	0
Smaller student-faculty ratio	4	3156	0
Supporting human resources	4	4922	0
Promotional activities	4	2990.5	0
Flexible marks	4	3222	0
Class preparation	4	5012	0
Teaching methods	5	5372	0
Knowledge of faculty about subject	5	5346.5	0
Faculty relationship with students	4	4948	0
Faculty training	4	5014.5	0
Curricular design and planning with broad coverage	4	4478.5	0
Curricular design and planning with up-to-date information	4	5046	0
Students evaluation system	4	4110	0
Faculty evaluation system	4	4191	0

Guidance and counseling	4	4015.5	0
Admission procedure	4	3494.5	0
Infrastructure and resources	4	4403	0
Flexible class and exam schedule	4	4044	0
Previous results of students	4	3988.5	0
Medium of previous education	4	4256.5	0
Students' participation in different research	4	4429	0
Job prospective	4	4228.5	0
Educational qualifications of faculty	4	4877	0
Presentation skill of faculty	4	4749	0
Extra-curricular activities	4	3974	0

The Mann-Whitney U test found that student characteristics rarely affected perceptions ($p > 0.05$ for most indicators). The few exceptions are shown in Table 8. For instance, gender only affected views on environmental influences and infrastructure and resources.

Table 8: Impact of student characteristics on perception

Indicator	Gender	Get financial support	Participated in any research	Advertisement or promotion
Institutional status	0.29	0.11	0.57	0.01
Environmental influences	0.04	0.96	0.83	0.49
Higher tuition	0.16	0.84	0.38	0.1
Scholarships	0.12	0.19	0.37	0.9
Smaller student-faculty ratio	0.37	0.78	0.04	0.29
Supporting human resources	0.28	0.03	0.43	0.37
Promotional activities	0.65	0.86	0.03	0.6
Flexible marks	0.06	0.37	0.71	0.75
Class preparation	0.63	0.83	0.2	0.61
Teaching methods	0.6	0.29	0.47	0.65
Knowledge of faculty about subject	0.23	0.45	0.53	0.15
Faculty relationship with students	0.17	0.81	0.55	0.64
Faculty training	0.24	0.56	0.56	0.53
Curricular design and planning with broad coverage	0.66	0.48	0.36	0.64

Curricular design and planning with up-to-date information	0.07	0.19	0.53	0.59
Students evaluation system	0.05	0.47	0.76	0.42
Faculty evaluation system	0.11	0.72	0.36	0.59
Guidance and counseling	0.68	0.73	0.03	0.2
Admission procedure	0.22	0.92	0.05	0.82
Infrastructure and resources	0.01	0.48	0.76	0.56
Flexible class and exam schedule	0.17	0.87	0.12	0.7
Previous results of students	0.22	0.79	0.62	0.3
Medium of previous education	0.69	0.96	0.15	0.75
Students' participation in different research	0.17	0.54	0.36	0.37
Job prospective	0.53	0.08	0.26	0.14
Educational qualifications of faculty	0.77	0.9	0.5	0.75
Presentation skill of faculty	0.85	0.8	0.99	0.72
Extra-curricular activities	0.94	1	0.32	0.23

When there are more than two categories for the categorical variable, the Kruskal-Wallis test is used to test the effect of this variable on student perceptions. Table 9 shows only the p-values that were less than 0.05. All other p-values were above 0.05, indicating that these categorical variables had no significant effect on student perceptions. At the construct level, all p-values for the categorical variables were greater than 0.05 for both the Wilcoxon test and the Kruskal-Wallis test.

Table 9: Significant effects of multi-category variables on student perception

Indicator	Categorical variable	KW statistic	<i>p</i> -value
Previous results of students	Level of study	8.18	0.04
Previous results of students	School of study	7.65	0.02
Curricular design and planning with broad coverage	Medium of previous study	9.62	0.02
Curricular design and planning with up-to-date information	Medium of previous study	9.77	0.02

5. Discussion of Results

The results of this study provide useful insights into what students at a university in the UAE value most about educational quality. While improving the ranking of the university is important, 27 additional indicators are also important to students. Students do not perceive higher tuition fees as an important indicator of educational quality. They expect high quality regardless of cost, possibly due to scholarship availability. Offering scholarships therefore is important to attract good students.

Factor analysis grouped the 28 indicators into three categories: Teaching and Curriculum Quality, Institutional Policies and Resources, and Student Support and Outcomes. All indicators were considered important except higher tuition fees. The percentage of total variance explained by the three categories is 57.8%. This percent is acceptable in social research (Hair et al., 2010). The remaining 42.2% may be attributed to personal differences between students or external factors such as families' preferences or peer influences, which were not captured in the 28 indicators. The most important category was Teaching and Curriculum Quality, because students value how much knowledge and how many skills they acquire.

This includes the role of faculty, the structure of courses, and how clear and updated the curriculum is. Students place strong importance on how and what they are taught. This finding aligns with SERVQUAL's assurance dimension, where teaching quality inspires motivation and trust in students. The high loadings of the knowledge of faculty, teaching methods, and faculty training indicate the importance of quality assurance. Students also valued a smaller faculty-student ratio. Although we did not investigate the best ratio between faculty and students in this study, Buckner and Zhang (2021) found that over the past five decades, a ratio between 12:1 and 14:1 was maintained in high-income countries. Their findings suggest that lower ratios may serve as a benchmark for quality.

The second group focused on support services, such as mentorship, guidance, and help from faculty and staff. Students also placed considerable importance on the learning environment, which includes resources like labs and classroom facilities. This finding reflects SERVQUAL's empathy dimension and tangibility dimension (physical facilities and infrastructure). The importance of guidance and

counselling supports Stakeholder theory's emphasis on addressing diverse student needs, while infrastructure quality aligns with TQM's recognition that resources are essential for delivering quality services. This finding suggests that students evaluate educational quality beyond classroom teaching. Students consider resource quality a high priority for educational institutions in the UAE. By investing in modern facilities, ensuring accessibility to resources, and creating conducive learning environments, institutions can enhance students' educational experiences and contribute to positive perceptions of education quality.

The third group was related to institutional image and communication, such as how the university promotes itself, its reputation, and how well it shares important information with students. While students value the importance of reputation, they place greater value on the quality of teaching, which aligns with TQM in that the main emphasis should be on the core processes. While MR2 matters, it may not be the primary consideration for students when assessing education quality. MR2 includes more administrative and structural items which students may feel less connected to in their daily academic life. Furthermore, students value immediate academic experiences more than long-term institutional factors. Although reputation and ranking are important factors, there should be no gap between reputation and the actual educational quality. The use of 28 indicators, which can be grouped into three constructs, suggests that students perceive educational quality as a multidimensional construct rather than a single global impression. This finding indicates that the halo effect was mitigated, as students rated distinct quality dimensions separately.

The characteristics of students such as gender, school of study, and others generally do not affect the importance of these indicators. However, there were a few exceptions. For example, students whose earlier education was in Arabic had different views about the curriculum design. Also, male and female students had slightly different views when it came to environmental influences and infrastructure. Females are more sensitive to environmental influences, with a mean of 4.08, while males have a mean of 3.66 on the Likert scale. This difference in perception between males and females aligns with previous research (Al-Naqbi & Alshannag, 2018). However, students' perceptions regarding educational quality are largely the same regardless of their demographic characteristics.

The findings of this study align with those of Aldabbas et al. (2025), who examined quality measures in the context of learning management systems at two UAE universities. In their study, eight combined quality measures explained 84.9% of the variance in students' academic performance. Similarly, our three constructs explained 57.8% of the variance in student perceptions of education quality. Moreover, the importance of smaller faculty-student ratios for individualized attention is emphasized across studies (Shehnaz & Sreedharan, 2011). Additionally, faculty relationships and support significantly contribute to quality perceptions (Ali, 2021; Sameena, 2020; Shehnaz et al., 2012). Glazzard and Stones (2019) found that students value detailed feedback and dialogue with faculty. This supports our finding that faculty relationships, teaching methods, and knowledge are key quality indicators. Academic elements also significantly influence quality

perceptions, with students valuing good teaching, well-designed curricula, and traditional teaching methods despite technological advancements (Ali, 2021; Sameena, 2020). However, variations in satisfaction levels among different academic disciplines have been reported in previous studies and need further investigation (Wilkins et al., 2012). The availability and quality of resources and facilities are also critical factors that affect students' perceptions of education quality (Ashour, 2020b; Datta & Vardhan, 2017; El Alfy & Abukari, 2020; Shehnaz & Sreedharan, 2011). Student services and processes significantly influence quality perceptions, with preferences for improved counseling and administrative processes (Nuseir & El Refae, 2022; Sameena, 2020). External factors, such as institutional reputation and academic rankings, are also important based on students' perceptions of education quality (Nuseir & El Refae, 2022).

The study's findings on demographic differences partially align with Shater et al. (2026), who found that mathematics students rated education quality significantly higher than science students in a UAE professional diploma program. While the present study found that most demographic factors did not significantly affect perceptions, there are a few exceptions. For example, perceptions of "previous results of students" varied by level of study and school of study, and perceptions of "Curricular design and planning" varied by medium of previous education. This suggests that UAE students are largely homogeneous in their quality perceptions across most demographic dimensions. Both our study and Al-Naqbi and Alshannag (2018) found that female students had greater knowledge of sustainable development than males.

However, there are some differences between our findings and those found in the literature. For example, in our study, students did not perceive higher tuition fees as an indicator of educational quality. However, Soysal et al. (2024) suggested that institutional reputation, sometimes linked with higher tuition, influences student perceptions. This may be because, in the UAE, scholarships and government support reduce the association between tuition fees and perceived quality. Another difference from the literature is that some studies such as Wani et al. (2025), found that the effect of factors such as scholarship status and age affect the perception of the quality of higher education. The differences may depend on the context of the study.

This study provides a basis for developing policies and strategies to enhance educational quality. Based on the main results of this study, the following recommendations are offered for key stakeholders. Instructors should update their teaching methods, including soft skills assessments such as critical thinking and teamwork, and enhance their relationships with students. Additionally, technical skills such as digital literacy and data analysis should be integrated into course content. Curriculum designers should revise their curricula to include current trends and align with industry needs. Institutional management should invest in faculty development and strengthen student support services. It is also important to invest in resources and develop communication strategies for better quality. Student Affairs departments should strengthen guidance and counseling

services, improve career placement support, and enhance the physical learning environment.

Universities should adopt digital transformation strategies to strengthen their infrastructure, addressing the “Infrastructure and resources” indicator. These strategies should include enhancing internet connectivity, integrate AI-powered learning tools, and expanding digital learning resources. Universities should also establish a systematic feedback loop to support continuous quality improvement. Feedback from students should be collected regularly using surveys and focus groups to enhance educational quality. Moreover, universities in the UAE should reconsider how tuition and scholarships are structured. For example, they should provide higher scholarships for programs that are in high demand by industry. Furthermore, universities should move beyond rankings by publishing more data on graduate outcomes and teaching quality to build trust. For example, data on the percentage of alumni who are currently employed can be particularly useful to parents and students.

6. Conclusion

This study evaluates students’ perceptions of educational quality. It employs factor analysis of 28 factors derived from the literature. Based on a survey of 117 students at a university in the UAE, these factors can be grouped into three constructs: Teaching and Curriculum Quality, Institutional Policies and Resources, and Student Support and Outcomes. These constructs explained 57.8% of the variance in student perceptions. Teaching and Curriculum Quality was found to be the most influential factor, explaining 22.7% of the variance. Teaching excellence, institutional support, and student outcomes were found to be important dimensions. The study also shows that university ranking is not the only indicator of quality. Instead, the other indicators also affect students’ perceptions of educational quality. Only higher tuition fees were found to be unimportant. The analysis also underscores the significance of external factors such as institutional reputation, academic rankings, and sociopolitical forces in students’ perceptions of education quality.

Moreover, most demographic factors did not significantly affect students’ perceptions of quality indicators. The students in this study generally shared similar perceptions of educational quality. This study contributes to the literature by (1) identifying three underlying constructs of educational quality in the UAE context, (2) demonstrating that teaching quality is the most important dimension, and (3) showing that tuition fees are not an important indicator of quality for UAE students. However, there are some limitations of this study such as the relatively small sample size of 117 students and the limited diversity of the sample. Future research should include a larger and more diverse group of students from multiple universities. Longitudinal data analysis could also provide valuable insights into how perceptions change over time. Incorporating more universities and student subgroups could provide a better understanding of educational quality. It is also possible to compare public and private universities models.

Conflict of Interest

There are no competing interests to declare.

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