Understanding Service Quality in Higher Education Institutions Through Customers' Multivariate Lenses

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Abstract
Research on customers' perceptions of service quality has become ubiquitous, from manufacturing to service industries, including students' perceptions of service quality in Higher Education Institutions. Overall, findings about students' perceptions of service quality in Higher Education Institutions (HEIs) are contextualised. The current study focuses on understanding perceptions of service quality in Higher Education Institutions as experienced and perceived by first- and third-year students in Tanzania. The study investigated the influence of multiple demographic characteristics on students' perceptions of service quality through multiple linear regression analysis. A quantitative approach and a cross-sectional survey guided the study. A sample frame of around 2,236 students from three clusters (School of Law, College of Natural and Allied Sciences, and School of Education) was randomly selected for sample size calculation from a target population of undergraduate students studying in their first- and third-years. A sample size of 328 students was obtained using the Cochran formula. Questionnaires with a Likert-type scale and rating scales of 1 strongly disagree to 7 strongly agree were used. Two factors (academic and consultation and technical and residential services) were extracted by Confirmatory Factor Analysis (CFA), with a Kaiser-Meyer Olkin Measure of Sampling Adequacy of 0.914 datasets. The findings revealed that only the year of study and degree program were statistically significant for all correlations. The findings show that experiences with the overall service quality fluctuated among students in terms of their specialisation and the number of years spent receiving services. Institutional policies should stipulate how students' affairs and services should be planned according to the specific requirements based on specialisation and years of study. Institutional quality assurance policies should incorporate students' feedback into the HEIs' overall institutional planning. Quality assurance units should have improved students' assessment and feedback in place and be able to provide academic support to enhance students' personal development.

Keywords: *Service quality, higher education institutions, SERVQUAL, students, customers, multiple demographic characteristics, multiple linear regression analysis*

Introduction

Understanding service quality in Higher Education Institutions (HEIs) has become a necessary strategy for improving and managing service delivery to ensure students' satisfaction (Saravanan & Rao, 2007). The prime accountability of service providers in HEIs to internal customers (students) is to safeguard continued and sustained academic services. Such services include teaching quality, qualified academics, friendly student consultation, community engagement, classrooms, library, laboratories, and technical associated services such as cafeteria, accommodation, security, social activities, sports and transport services (Abbas, 2020; Kutlu et al. al., 2019).

Service quality (SQ), as a means to improve quality management and service delivery, has been studied extensively to determine the level of service delivery in service industries in the past thirty years since the introduction of the SERVQUAL scale by Parasuraman and colleagues in 1985. Service quality (SQ) is one of the important "statistical measures of competitiveness" (Abbas, 2020) and has widely been studied in the service industries and broadly adapted in the study of higher education institutions to understand customer satisfaction (Caruana, 2002; Wei & Ramalu, 2011; Ham, 2003; Joseph et al., 2005; Laroche et al., 2013; Orsingher & Marzocchi, 2003; Quinn et al., 2009; Rowley, 1997; Saravanan & Rao, 2007). Recent studies on service quality have adapted SERVQUAL tools to measure the difference between expected service encounter and the perception of the actual service encounter in Higher Education Institutions, arguing that students' perceptions and expectations are habitually influenced by their cultural orientation (Abbas, 2020; Cronin & Taylor, 1994; Julia Vauterin et al., 2011; Laroche et al., 2013; Min et al., 2012; Quinn et al., 2009; Rowley, 1997). Considering that service quality is the difference between customers' perceptions of service delivered and their expectations of the service (Farrell et al., 2001; Grazhdani & Merollari, 2015; Tam, 2001), students' demographic characteristics have been used as independent variables to investigate customer satisfaction with service delivery in HEIs (Appiah, 2015; Clemes et al., 2007; Grazhdani & Merollari, 2015). The influence of students' demographic characteristics such as gender, academic major,

age, race, and ethnicity has revealed different levels of impact on perceptions (Appiah, 2015; Geringer, 2013; Grazhdani & Merollari, 2015; Mason et al., 2018). The focus of the current paper is to investigate the influence of students' multiple demographic characteristics, on their perceptions of service quality in higher education institutions.

The Historical Context of Service Quality

Service quality is an extension of the Total Quality Management (TQM) philosophy introduced by USA citizen, Edward Deming while working with statistical sampling to improve the quality of products and services (Anderson et al., 1995; Neave, 1987; Neyestani, 2017; Petersen B., 1999; W.E Deming, 2010). Deming has immensely influenced the study of organisational management from the perspective of customers' satisfaction with products and service delivery. Although Deming seems to have been neglected in his own Country (Neave, 1987), his contribution to quality products and services in Japanese industry is creditable (Rabiatul Adawiyah et al., 2020), because his philosophical thinking has transformed and improved the practice of quality management (Anderson et al., 1994b, 1995). According to Neave (1987), Deming, who is regnonised as "the Father of the Third Wave of Industrial Revolution" was initially inspired by Shewhart, while working at the Quality Assurance Department of the Bell Telephone Laboratories (Alghamdi, 2016). In the experimental design and analysis of manufacturing processes, Shewhart introduced the concepts of statistical control of processes (Neave, 1987), to remove the variability of products and services (Alghamdi, 2016), intending to lower costs while safeguarding the quality of goods or services (Klein, 2000; Littauer, 1950). When Edward Deming embarked on the principles of Total Quality Management (TQM), the focus was to satisfy the customers with the quality of goods or services that could outperform the First Industrial Revolution led by classical management theorists (Schachter, 2016; Schachter, 2010; Simha & Lemak, 2010). The primary focus of classical theorists, such as Frederick Taylor (Schachter, 2016), and Henry Fayol (Smith & Boyns, 2005) was on increased productivity (Petersen B., 1999), ignoring human behaviour and quality in the management of products and services. On the other hand, Deming philosophy hinged on statistical sampling to improve the quality of the products and services (Neyestani, 2017), lowering the costs of products and services (Klein, 2000; Littauer, 1950), including the aspect of quality training, process improvement, benchmarking, open culture, employee empowerment

executive commitment, and customer satisfaction (Neyestani, 2017; Prakash, 2018; Stock et al., 2007; Sureshchandar et al., 2002).
In his 1950s exegesis, Deming attributed the defects of goods and services to the seven deadly diseases or sins, introducing the concept of variance with a systematic cycle of Plan, Do, Check, and Act (PDCA) (Neyestani, 2017). Other classical gurus working along this line of quality management were Feingenbaun in 1961, Ishikawa in 1979, Crosby in 1979, and Juran in 1988 (Neyestani, 2017). The landscape of quality in both manufacturing and service industries has been transformed ubiquitously. In 1946, when Deming first visited Japan in 1946, under the sponsorship of the Economic and Scientific Section of the US Department of War (Neave, 1987), the emphasis of quality management and improvement of service delivery within the framework of the fourteen principles was on organizational system that fosters cooperation and learning to simplify management practices, ensure continuous improvement of processes, products, services, customer satisfaction, and survival of organisation (Anderson et al., 1994b, 1995).

In 1985, thirty years later after Deming, the idea of service quality was introduced and popularised by Parasuraman and colleagues, spanning wider issues of organisational structure, philosophy, and culture, which had a probable influence on service delivery, and customer expectations and perceptions of service quality (Berry & Parasuraman, 1991; Cronin & Taylor, 1994; Parasuraman et al., 1985, 1994). Arguably, under the new framework, service quality is statistically measured by comparing customers' prior expectations of quality and actual perceptions of service delivery by service providers (Parasuraman et al., 1985). Therefore, service quality and quality improvement have received attention in managing organisations and institutions, including Higher Education Institutions (HEIs) (Anderson et al., 1994a, 1995; Petersen, 1999).

It should be noted that, in the early years of the first Industrial Revolution, the central focus of managing organisations and institutions was on increased productivity with minimal costs based on the factory system, ignoring quality factors of the inputs and outputs. Since the focus of management was driven by a desire to utilise the human workforce to maximise profit, it offered a partial solution to the existing institutional problems. This is due to the reason that human behaviours were compared to machines (Kuznetsova, 2013; Mahmood & Basharat, 2012; Wren et al., 2002), which cannot experience the feeling of others suffering. In the case

of the expectations and perceptions of service quality, human behaviour needs to be investigated scientifically by isolating and separating them from the system they are subjected to. This is because human decisions are bounded and have causal reasoning (Ferris et al., 1998; Kalantari, 2010). Efforts have been made over the years; management practices have changed severally from the scientific school of thought (Schachter, 2016; Nhema, 2015) to human relations school of thought, translating the dominant context to satisfy influential employees in the organisation (Bruce & Nyland, 2011; Kahn et al., 2009). All have been transformed into complexity and competitive institutions imbued with quality demand from the customers' perspectives (Uhl-Bien et al., 2007). In recent years, in Tanzania, the demand for service quality and products from organisations, including HEIs, has amplified its pressure from all customers, i.e., primary customers (students), governments, private employers, individuals, and society. Therefore, the concern for quality service is fundamental in the transformed world of technology, where complexity, creativity, enabling learning, and flexibility within knowledge-producing institutions have become apparent (Uhl-Bien et al., 2007).

The desire for quality improvement has continued to receive top-most priorities when organisations and institutions plan and make decisions to increase productivity and want to remain on the competitive edge (Sureshchandar et al., 2002). For nearly four decades, the paradigm of quality education concerning graduates has been investigated from the perspectives of employers' or society's satisfaction in the labour market, ignoring the perceptions of HEI service quality from the perspective of learners. The premise is that students' perceptions of service quality in HEIs are likely to be influenced by multiple demographic characteristics rather than providers' actual delivery of service. Students' multiple demographic characteristics such as gender, parenting mode, parent education, parent occupation, school ownership, type of former school, year of study, and degree programme (specialisation) are presumed to influence their perceptions of service quality in HEIs. Therefore, this paper investigated how students, as primary customers of education services, perceive service quality in HEIs through lenses of multiple demographic characteristics. The main research objective was to examine the influence of students' multiple demographic characteristics on their perceptions of service quality and delivery in HEIs. The main question was: How do the students' multiple demographic characteristics influence their perceptions of service quality and delivery in HEIs?

The Theoretical Foundations of Service Quality

Since HEIs and affiliated colleges operate in an increasingly competitive higher education marketing, examining service quality becomes critical for the improvement of quality (Gonu et al., 2023; Mc Dougall & Levesque, 1995; Sharabi, 2013). Given the significance of service quality in ensuring the smooth journey of higher education students, higher education institutions must implement quality assurance measures to maintain and enhance service quality (Prakash, 2018; Sureshchandar et al., 2001, 2002). Since students are primary customers of higher education institutions, their perceptions towards service quality provision are paramount to understanding the appropriate ways of managing different service affairs that directly impact their academic journey and future career in the labour market.

Although students' perceptions of service quality are significant in judging institutional competitiveness in offering university education, they can often be influenced by their attitudes towards service affairs offered by higher education institutions. Nevertheless, attitudes are complex connections between personality, beliefs, values, behaviours, and motivations (Ajzen et al., 2004; Ajzen & Driver, 1991). Students with different beliefs will likely demonstrate different attitudes towards service quality. Students' beliefs are influenced not only by family, religion, and culture but also by gender, parent education, and the socioeconomic status of their families. A complex interplay of various factors shapes students' beliefs. For example, family plays a significant role in shaping a student's beliefs, which can occur at "*the individual (personality) level, at the social system (group or organisation) level, and the cultural (normative) level*" (Hofstede, 2011, p. 4). This suggests that perceptions about quality differ invariably at the individual, social system, and cultural levels. Therefore, the concept of quality is fluid and amoebic to different people, and one thinking from quality scholars is that:

> *Quality stares at you. You recognize it, but you cannot define it. ……. Quality lies in the perception of the consumer. What is 'great' for one may not be good enough for another (Pour & Yeshodhara, 1999, p. 1).*

That said, human beings tend to experience dissimilar perceptions of services because of differences in beliefs, values, behaviours, and motivations (Laroche et al., 2013; Tedja et al., 2024; Wang et al., 2020), which are themselves affected by individuals' multiple demographic characteristics. It can be inferred that students' perception of service

quality in HEIs is affected by the characteristics of perceivers, services, and characteristics of the individuals (Camilleri, 2021; Silva et al., 2017; Silva et al., 2020; Ranain–Abdulah, 2021) (see Figure 1). The perceivers' characteristics refer to the service's familiarity, attitudes/dispositions, self-concept of service, and cognitive structure of the service (Lin, 2020). The service quality characteristics depend on physical appearance, verbal communication about the service, nonverbal signals, and intentions towards the service (Buck & VanLear, 2002; Burgoon et al., 2014; Floyd & Erbert, 2003).

Individual perception of service quality is contingent on the social perception in interpreting available information about another person or surrounding objects, reflecting on reliability, responsiveness, assurance, and tangibility as crucial determinants of service quality (Ganesan-Lim et al., 2008; Oyatoye et al., 2014; Tedja et al., 2024). In addition, social perception is understood as constructing an understanding of the social world from the data retrieved from the senses (Michener et al., 2004). Therefore, perception is the process whereby people select, organise, and interpret sensory stimulations into meaningful information about human surroundings. Students' interpretations of service quality in higher education institutions depend on familiarity with the service, attitudes towards the service, self-concept of the service, and cognitive structure of the perceiver of the service provided (Abbas, 2020; Cinkir et al., 2022; Del Río-Rama et al., 2021; Onditi & Wechuli, 2017). Students' interpretations of service quality are also likely to vary due to differences in multiple demographic characteristics, including gender, mode of parenting, parent education, parent occupational status, schooling background, years of study, and degree programme.

In the past four decades, Parasuraman et al. (1985, 1994) developed a framework called the Perceived Quality Component (PQC) concerning the perceptions of quality, where perceived quality differs from objective quality because perceived quality is the customer's (student's) judgment about a product's overall excellence or superiority. On the other hand, objective quality is a measurable and verifiable superiority of some determined ideal standard (Cronin & Taylor, 1994; Parasuraman et al., 1994). It is argued that objective quality may not exist because all the qualities are perceived by an individual, either by customers or service providers (Cronin & Taylor, 1994; Parasuraman et al., 1985, 1994). Consequently, perceived quality represents the higher-level abstractions

of quality, whereas objective quality represents the lower-level abstractions (Clemes et al., 2007), which only a modified model of social perceptions can explain. If adapted to HEIs, the Perceived Quality Component (PQC) model (Cronin & Taylor, 1994; Parasuraman et al., 1985, 1994) could explain two levels of students' quality abstractions. The first level is perceptions of a lower-level attribute, which in HEI includes an abstract dimension, perceived monetary price, and reputations of HEIs. The second level is a higher-level abstraction that reflects the individual's construction of quality because an individual perceives quality. As the proportion of attributes increases, quality tends to be a practical judgment (Berry & Parasuraman, 1991; Cronin & Taylor, 1994).

In HEIs, extrinsic attributes are used as quality indicators when students operate without adequate information about intrinsic attributes. Thus, extrinsic attributes or signals will likely include the appearance, cleanability, and durability (Rahaman et al., 2011; Zeithaml, 1988) of infrastructures such as classrooms, laboratories, libraries, and residential facilities (Ramos & Carvalho, 2010). These extrinsic attributes may also include the availability of lecturers and administrative personnel when students need their attention (Luhanga, 2010; Mkude, 2003; Omari & Mihyo, 1991). Thus, students are more likely to judge the quality of the HEIs by reflecting on extrinsic attributes (Ajzen et al., 2004; Ajzen & Driver, 1991)University students are likely to use lower levels of abstraction, such as perceived monetary price (loans/fees) and reputations, to judge the quality of HEIs.

Contemporary Relevancy to the Conceptualisation of Higher Education Institutions

The ongoing literature reviews seemingly link between the Clemes et al. (2007) modified model of social perception and the perceived quality component (PQC) framework proposed by Parasuraman et al. (1994), which explains the relationship between perceptions and quality. Studies in perceptions and the perceived quality in HEIs show the shifting of students' demands from the traditional system of educational services to perceiving educational institutions as a consumer-led market (Petruzzellis et al., 2006). As HEIs have several stakeholders involved, ranging from one student as a primary customer (Hill, 1995) to the entire community, i.e., students, lecturers, parents, employers, the business community, and even lawyers (Rowley, 1996, 1997), HEIs need to focus on investigating

perceived service quality among primary customers to identify their level of satisfaction with service provided.

Therefore, the current study is an extension of various studies on service quality, which also applied marketing concept, emphasising the satisfaction of students and organisational needs (Chandra et al., 2019; Daniel et al., 2017; Htang, 2021; Perera et al., 2020). However, these authors intermittently contrast certain service quality perceptions with apparent departure from independent variables. Perception of service quality is contextual, reflecting unique variations among perceivers. Caruana (2002) argued that service quality is the result of the comparison that the customers develop for the services and their real perceptions of the service performance by the service providers (Chatterji et al., 2020; Clark et al., 2017; Petruzzellis et al., 2006). Petruzzellis et al. (2006) explicitly argue that service quality emanates from a cognitive process, considering the relationship between sensational and the evaluation of external stimuli.

However, both sensational and the evaluation of service quality as perceptions through external stimuli depend on the subjective appraisal of the service experience (Orsingher & Marzocchi, 2003). The subjectivity of the service quality is arguably contextual, and it all depends on individual differences and consequential variations in perceptions of service quality received by students of HEIs.

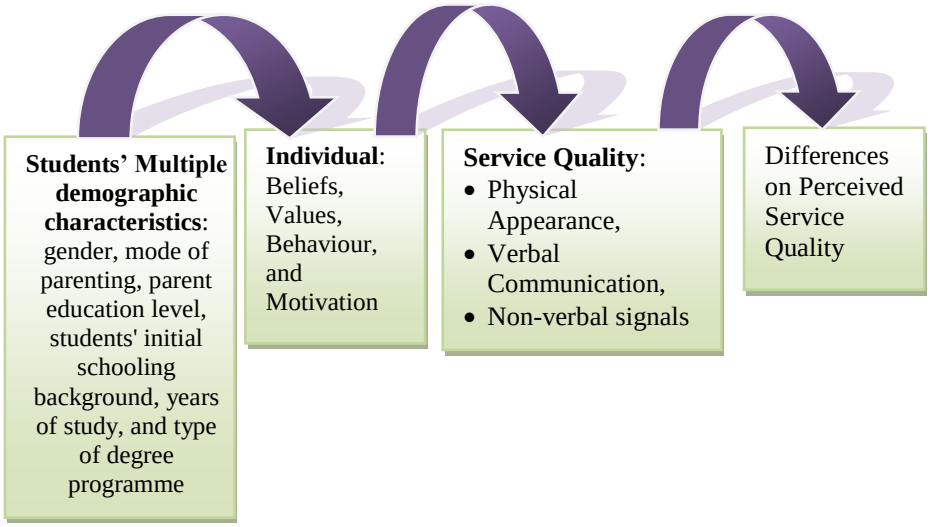

Figure 1: Author's Conceptualisation of Students' Perceptions of Service Quality Reflecting Individual differences

Variations in perceptions of service quality among students probably come from individual beliefs, values, behaviour, motivation, and differences in service quality perception, which ultimately depend on individual interpretation of service quality because of physical appearance, verbal communication, and nonverbal signals from colleagues. Figure 1 represents a simple relationship between students' multiple demographic characteristics (gender, parenting mode, parent's education, parent occupational status, schooling background, years of study, and type of degree programmes). Taking into account the relationship between Clemes et al. (2007) modified model and Zeithaml's (1988) framework, it appears that students' perceptions of service quality are likely to occur when they compare the provided services in HEIs with prior beliefs, values, behaviours, and motivation (Ramos & Carvalho, 2010). Thus, students' perceptions about service quality in HEIs are likely influenced by their prior experiences, based on family background, beliefs, values, attitudes, colleagues' word-of-mouth, and other social parameters. The premise of the current study is that a subjective appraisal of service experience and students' perception of service quality is likely to differ from one student to another because of their differences in multiple demographic characteristics (Orsingher & Marzocchi, 2003). Different variables from students' multiple demographic characteristics could operate at different aggregation levels. These characteristics can be influenced by individual cultural norms, values, beliefs, work ethics, and attitudes toward education, which are transmitted within families. For example, family upbringing can often influence students' perceptions, which are influenced by individuals' multiple demographic characteristics (gender, parenting mode, parent education, parent education level, students' schooling background, years of study, and type of degree programme).

Methodology

The primary unit for data collection and analysis for this study is the first- and third-year university students from a tertiary education institution in Tanzania, established in the 1970s. A quantitative approach was used in a cross-section survey, using self-prepared questionnaires with seven Likert-like scales. Data were collected from first- and third-year students in the second week of the first semester of the academic year. Timing on data collection was done to discriminate perception scores between first- and third-year students. Students' multiple demographic characteristics were used as independent variables to determine their influences on

perceptions of service quality provided by surveyed HEI. The target population for this study encompassed all registered students, a total population of 13,532, and the sampling frame of 2,236 students was obtained from the Directorate of Undergraduate Studies (DUS) from the surveyed HEI. The higher education institution selected for this study had the unique characteristics of having more seasoned and adequate instructors, adequacy of learning facilities, isolated accommodation facilities located five kilometres from the main campus, old-fashioned laboratory services, and being located in an urban city centre with high traffic jams. First- and third-year students from the three cluster-degree programmes: Law, Bachelor of Science, and Bachelor of Education Psychology, were sampled for inclusion in the study. The three-cluster degree programmes as representative of diverse views of students based on specialisation. Law students were included to represent students specialising in legal issues, political science, and public administration. Science students were included in the sample to represent all other fields of studies related to hard science (i.e., engineering, computer science etc.). On the other hand, students specialising in educational psychology were sampled to represent other teaching and training specialisation.

Ethical issues were strictly maintained to form a critical research process for this study, from the commencement of literature reviews, proposal writing, data collection, interpretations, and reporting of the research findings. Permission to conduct this study was approved through a channel of jurisdictions, from university management to Regional, District, and Institutional levels. An approval letter secured from the University management was submitted to the regional administrative and district administrative secretaries of the study location. Permission to collect data from the selected HEI was finally obtained from the Directorate of Undergraduate Studies (DUS) and instructors of respective students' cohorts were asked to provide support in the distribution and collection of filled questionnaires. In the briefing sessions, respondents were informed about the importance of the study their involvement, and how their demographic information would be made anonymous and confidential. Specific information that could influence respondents was deliberately omitted, while strict avoidance of interfering with the individual's responses was adhered to avoid undermining the validity of the research.

Sampling Procedure

The representative sample frame was drawn from the target population of around 13,532 undergraduate students in their first- and third-years of study. Random sampling was used to retrieve three clustered samples of first- and third-year undergraduate students (bachelor of law, bachelor of science, and bachelor of education in psychology). Only three-degree programmes were chosen from clusters using random sampling from the population of interest.

Calculation of Sample Size

The sample size for the study was calculated from a sample frame of around 2,236 students from the School of Law, College of Natural and Allied Sciences, and Education Psychology using Cochran's formula (see Equation 1).

$$n = \frac{\mathrm{NZ}\alpha/2^2\,\mathrm{pq}}{(N-1)e^2 + pqZ\alpha/2^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

$Z_{\alpha/2}$ in equation 1 represents a constant associated with the confidence level used in the study. The significance level α is 5%, and e the margin of error is 5%. Where p= sample proportion (the percentage of clusters involved in the study). While q= 1-p (those not involved), where the value of p=0.5 provides the optimal value for the sample size adapted.

$$Z_{\alpha/2} = Z_{0.05/2} = 1.96, \quad e = 0.05$$

$$n = \frac{2,236x1.96^2x0.5x0.5}{(2,236-1)x0.05^2 + 0.5x0.5x1.96^2} = 327.9657 \approx 328$$

Data Collection Techniques

Data for this study were collected using a modified SERVQUAL scale with six service quality dimensions, i.e., assurance, reliability, accessibility, responsiveness, empathy, and tangibility. The six service quality dimensions comprised 36 items for perceptions. The modified SERVQUAL scale contained students' multiple demographic characteristics and a section on Likert-type ratings of perceived service quality by the students from the surveyed HEI. While the original SERVQUAL had five dimensions of service quality with 22 items, the modified SERVQUAL scale had six dimensions with 36 items for both expectations and perceptions. The original SERVQUAL scale was

adapted by adding new items, dropping some of them, and restating others to operationalize it in HEIs' context. While the items used in this study were framed differently from the original SRVQUAL scale, the nomenclature of the three concepts: expectations, perceptions, and satisfaction as well as the discrepancy between perceived quality minus expected quality was retained , to discriminate the predictive power of expectations and range of service performance, considered satisfactory by a customer as well as understanding construct of service quality (Parasuraman et al., 1994).

Reliability Test

A reliability test was conducted to determine the instrument's repeatability in a study with different respondents and contexts. Initially, 48 usable questionnaires were distributed to the first and final-year students studying in a Public Higher Education Institution in central Tanzania Mainland. The forty-eight samples of usable questionnaires were entered and run in the IBM SPSS AMOS data package. A Cronbach's Alpha (α) of 0.948 above the recommended index level of 0.60 was produced, indicating that the instrument was suitable for final data collection. Table 1 shows the reliability report of the pilot study.

Table 1: Reliability Test in a Pilot Study

		N	%	Cronbach' Alpha	Number of Items
Cases	Valid	48	81.4	0.948	69
	Excluded[a]	11	18.6		
	Total	59	100.0		

Source: Data Collected during the pilot study

Validity Report from Instructors' Feedback

Despite the reliability of the new study instrument due to its internal consistency of Cronbach's Alpha (α) of 0.948, respondents in the pilot study pointed out the difficulties in understanding some item statements. A request letter was attached along with questionnaires, and were submitted to 15 instructors working in a pilot HEIs, to check for wording and language phrasing. After one week, comments and suggestions from 15 instructors were received, compiled, and incorporated into the final version of the SERVQUAL scale. Therefore, the modified SERVQUAL scale was considered suitable for investigating the discrepancy between students' expectations and perceptions about service quality in the context of HEIs in Tanzania. Table 2 indicates the aim of validation, activity, instructor, and outcome of received comments.

Table 2: Validity Report from Instructors' Feedback

Step	Aim	Activity	Instructor	Outcome
1	To seek expert comments on the final version of research instruments on the validity of the research instruments.	Questionnaires were rinted and submitted to 12 University instructors, who were requested to comment on the validity of the instruments.	Comments were received from 15 instructors of the piloted HEI.	Critical comments from instructors were deliberated and incorporated to match the rating scal es of the instruments with SERVQU AL.
2	To assess the respond ents' understanding of both items and rating scales through a pilot test.	Questionnaires were distributed to 60 undergraduate students from 3 Colleges of the University of D odoma. Twenty respondents from each college were subjected to both fill-in questionnaires and focused group discussions.	Thirty finalists and 30 first-year students from 3-degree programmes were ident ified to participate in the pilot test. Respondents were d ivided into six groups. Four re spondents from each group vo lunteered for the Focused Group Discussions.	Difficulties experienced by the respondents while filling out questionnaires were noted for deliberation, and corrections were incorporated in the final version. Questionnaires were modified to reduce and eliminate the noted ambiguities in the item statements.
3	The pilot test results	After almost 1-hour of filling in questionnaires, only 48 usable que stionnaires were obtained for anal ysis from the 60 distributed to respondents.	10 first-year, and 10 Final-year students, for each of the three-degree promgramme were involved in the pilot exercise.	After the pilot exercise, an analysis was run using SPSS Version 20 to te st for reliability. Necessary changes were made to the questionnaire to eli minate ambiguous concepts. The reli ability of Cronbach's alpha of 0.948 was obtained.
4	Incorporating changes	Three instructors, including the supervisor, were given questionnaires to validate.	The supervisor, Director of Po stgraduate Studies, and one committee member ve rified the final version.	Minor changes were suggested about the demographic profiles of respondents in the final version for data collection.

Source: Compiled comments from pilot study and instructors

The adapted scale varied from the original SERVQUAL by the number of service quality dimensions, number of items, and wording of the items. While the original SERVQUAL had five dimensions of service quality with 22 items, the modified SERVQUAL scale had six dimensions with 36 items for both expectations and perceptions. Exploratory and Confirmatory Factor Analysis were performed using Principal Component Analysis (PCA) in a Varimax rotation to construct a comprehensive modified SERVQUAL scale. However, the modified SERVQUAL scale retained all the service quality gap characteristics, i.e., the number of expectation items and calculations of the gap scores.

Validation and Dimensionality of Research Instruments

Since the instrument for this study was adapted from the SERVQUAL scale and items were self-constructed, it was necessary to explain how the items were selected and how the statement of items was phrased with the reflection of the service quality management paradigm. The content validity and reliability testing were initially carried out using data collected from the pilot study. The validation of the research instruments focused on the construct validity (dimensionality test) of perceptions items and a reliability test. Two types of validity (content were considered while developing the questionnaire items and justifying the usability of the collected data for the final analysis.

Content Validity

The purpose of carrying out content validity in this study was to specify precisely the operational terms used in the service quality perspective as a separate domain in developing quality management theories to phrase the questionnaire items of this study. The content validity was obtained by reviewing quality management theories by classical gurus such as Deming and Crosby (Alghamdi, 2016; Anderson et al., 1994a, 1995; Neyestani, 2017; Petersen B., 1999) and service quality perspectives . Content validity is imperative to understand the concept of service quality and the constructs related to service quality discourses because content validity helps understand how much a measure covers the range of meaning included within the concepts in content (Fitzpatrick, 1983; Yusoff, 2019).

The preparation of questionnaires was guided by four theoretical assumptions. The first assumption is that SQ can be understood directly by calculating prior expectations scores of students concerning service

delivery in the enrolled HEI. The second assumption is that SQ can be realised by calculating the perception scores of students' experiences with service delivery in HEI. The third assumption is that SQ can be obtained by deducting prior expectations scores from perceptions scores of students' experiences with service delivery. The fourth assumption is that SQ can be understood by calculating scores of student intention to re-join the same HEI for higher degree studies. The current paper is focused on investigating students' perceptions of SQ as reflected by their multiple demographic characteristics of gender, mode of parenting, parent education, parent occupation, former school ownership, type of former school, year of study, and type of degree programme among first year and finalist students.

Dimensionality test for the Perceived Service Quality (PSQ) Item Statements

The perceived service quality on item statements in the questionnaires was evaluated by using 1 to 7-point Likert-type rating scales. For each 36-item statement, students were asked to rate their experience with service quality performance by ticking on the predefined number of Likert-type scales from 1 to 7. Number 1 represented *strong disagreement* with a given statement, while number 7 represented *strong agreement* with the statement of a particular item. A principal component analysis (PCA) was conducted in the dimensionality test for the perceived service quality (PSQ) to determine the number of factors retained from the questionnaire items. Two dimensions were retrieved after running PCA, and the nomenclature for each dimension was determined by the nature of the loaded items. The name of the first dimension was identified as Academic and Consultation Services (ACS), with a factor loading of items characterised by soft-related services of teaching, learning, and student consultation. The name of the second dimension was determined by the characteristics of the factor loading of items. It is identified as Technical and Residential Services (TRS), and characterised by hard-related services of accommodation, cafeteria, transport services, accessibility to residential halls, lecture rooms, laboratories, computer rooms, and other technical-related services. Table 3 shows factor loadings for perception items after Varimax rotation with Kaiser Normalization.

Table 3: Rotated Factor Loadings after Varimax Rotation on Perception items

Perceptions Items	**Factors**	
	ACS	**TRS**
P1: The top management of this University instils confidence	0.73	
P2: The academicians in this University meet the promised deadlines	0.79	
P3: The academicians in this University are willing to solve problems	0.75	
P4: Academicians in the University instill confidence in future career	0.72	
P5: Academicians in this University are committed to academic needs	0.77	
P6: The administrators in this University instills confidence in me	0.73	
P9: Academicians in this University can be contacted individually	0.59	
P10: The academicians allocate adequate time for consultation	0.50	
P11: Academicians give feedback on my coursework on time	0.47	
P12: Trouble-free commuters are available in other areas		0.30
P13: Lecture rooms are easily accessible to me near my residence		0.52
P14: Stationeries are accessible to me near my residence and lecture rooms		0.33
P17: Accessible Books/Journals for free download from the internet		0.50
P18: The top management is willing to settle students' demands		0.42
P19: Administrative staff willingly to assist students in need		0.33
P21: The financial officers willingly settle financial problems		0.54
P30: This University has free e-books in the e-library		0.54
P31: The University has free internet installed in residential areas		0.65
P33: The University has free print-on-demand Printers for students		0.66
P34: The University has free photocopier services for students' work		0.53
P35: This University has spacious lecture rooms for students		0.62
P36: This University has spacious Halls for University Examinations		0.54
Initial Eiegenvalues	10.08	2.104
% of Variance	19.27	14.59
Cumulative Percent	19.27	33.86
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (MSA)	0.914	

*ACS =Academic-Consultation services, *TRS=Technical-Residential Services

Principal component analysis was performed in a Varimax rotation with a Kaiser Meyer normalization by fixing the number of factors for the perception items to determine the number of factors retained. Then, a factor rotation was performed by running reduction dimensions in the Confirmatory Factor Analysis (CFA), where two factors were extracted with equal relative importance optimized from the questionnaire's unobserved latent variables. Factor 1 accounted for 19.27%, while factor 2 accounted for 14.59% of the factor extracted, explaining an overall 33.86% of the total variance with Kaiser-Meyer Olkin Measure of Sampling Adequacy of 0.914 datasets retrieved in CFA. Table 4 shows

the nomenclature of factors retained after running CFA and the overall perceived service quality produced in the dimensionality test.

Table 4: Dimensionality Test of Perceived Service Quality by Item Statement

Dimension	No. of Items	Cronbach Alpha	Mean
Academic-Consultation Services (**ACS**)	9	0.87	4.58
Technical-Residential Services (**TRS**)	13	0.77	3.99
Overall Perceived Service Quality (**OSQ**)	22	0.80	4.28

*Cronbach Alpha Coefficient above 0.60 is considered a reliable index for retaining the two factors

Multiple Linear Regression (MLR) of the Factors Produced after CFA

Multiple linear regression models were run to examine the relationship between several demographical characteristics of respondents (independent variables) and each of the factors produced from factor analysis (dependent variables). Multiple Linear Regression (MLR) models in this study are represented by Equation 2.

$$Y_i = \beta_0 + \beta_1(x1)i + \beta_2(x2)i + \beta_3(x3)i + \ldots + \beta_k(xK)i + \varepsilon_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The multiple linear regression model was valuable in the current study due to its predictive ability to explain the relationship between several independent categorical variables and another dependent categorical variable. Since there were several independent categorical variables (multiple demographic characteristics of gender, mode of parenting, parent education, parent occupation, former school ownership, type of former school, year of study, and type of degree programme) was used to statistically control for an additional variable (or variables) to explore the model's predictive ability. MLR was relevant in this study because it could make the line of relationship between the independent and dependent variables more straightforward, making a precise, one-to-one relationship between each value of the independent variables (demographic characteristics) and a corresponding score of the dependent variable (perceptions on ACS and TRS). Therefore, the multiple linear regression equation (model) was used in the current study for two primary reasons. The first reason is that this study's independent variables comprised categorical variables. Secondly, other models do not explain a straightforward relationship between categorical variables such as students' demographic characteristics and perception scores of SQ. Therefore, MLR analysis helped investigate how students' multiple

demographic characteristics (categorical variables) explain statistically significant influence on the student's perceptions of service quality.

Hypothesis of the Study

Keeping the other covariates ceteris paribus, multiple demographic characteristics significantly influence students' perceptions about factors that determine individual service quality and the overall service quality in HEIs.

Study Results

This study hypothesized that "keeping the other covariates ceteris paribus, multiple demographic characteristics have a significant influence on students' perceptions about factors that determine service quality and the overall service quality in HEIs." It was hypothesised that since students have varying multiple demographic characteristics, their perception about service quality in HEIs would also be reflected by their differences in demographic characteristics, which could operate at different aggregation levels. These characteristics could invariably be influenced by individual cultural norms, values, beliefs, work ethics, and attitudes toward education, which are transmitted within families. Therefore, it was assumed that students' perception of service quality would be influenced by individuals' demographic characteristics (gender, mode of parenting, parent education, parent education level, students' schooling background, years of study, and type of degree programme). Two factors representing academic and consultation services and technical and residential services were retrieved after conducting a Confirmatory Factor Analysis (CFA). The factors retrieved had total variance with Kaiser-Meyer Olkin Measure of Sampling Adequacy of 0.914 datasets in CFA. Multiple linear regressions were run to investigate the influence of students' demographics on their perceptions of service quality represented by the two factors. Therefore, the study's results are presented to demonstrate how demographic characteristics explain differences in students' experiences and perceptions of each factor and the overall factor, reflecting service quality in HEIs.

Students' Perceptions of Academic and consultation Services

Gender, parenting mode, parent education, parent occupation, school ownership, type of school, year of study, and degree programme were used in a standard regression to predict students' perceptions about the academic and consultation services. The correlations of variables are

shown in Table 5. The total variance explained by the multiple regression model with all eight predictors produced $R^2 = 0.1147$, $F(11, 283)= 3.33$, $p < .0002$. The R^2 of the model was 0.1147, which means that about 11.47% of the total variability of perceptions about academic and consultation services is explained by the covariates in the model.

The model results show that students studying law ($\beta = -0.6007$ p=0.0012**)** had statistically significantly lower perceptions of the academic and consultation services than students studying educational psychology. Although statistically insignificant, students studying sciences ($\beta = -0.0377$ p=0.8369) also had lower perceptions about academic and consultation services than students studying educational psychology. However, third-year students ($\beta = -0.6115$ p=0.0001) had statistically significantly lower perceptions of academic and consultation services than first-year students. Table 5 gives the parameter estimates and standard of the fitted model. Therefore, only the year of study and degree programme were statistically significant for all correlations.

Table 5: Parameter Estimates and Standard Errors of Multiple Linear Regression Model for Perceived Academic and Consultation Services

Variable	Case	Parameter Estimates (β)	Standard Error	t-Value	P-Value
Intercept		4.8813	0.243	20.09	<0.0001
Gender	Male	-0.0502	0.1538	-0.33	0.7443
Mode of Parenting	Single Parent	0.1697	0.1739	0.98	0.3301
	Guardians	0.399	0.2903	1.37	0.1703
Parents Education	Secondary	0.0916	0.1986	0.46	0.6449
	Higher	-0.0183	0.1921	-0.1	0.9241
Parent Occupation	Employed	-0.0797	0.1874	-0.43	0.6708
School Ownership	Public School	0.0087	0.1698	0.05	0.9591
Type of School	Boarding	0.2561	0.1546	1.66	0.0986
Year of Study	Third-year students	-0.6115	0.1473	-4.15	**<0.0001**
Degree Programme	Law	-0.6007	0.1831	-3.28	**0.0012**
	Science	-0.0377	0.1831	-0.21	**0.8369**

Students' Perceptions of Technical and Residential Services

Gender, parenting mode, parent education, parent occupation, school ownership, type of school, year of study, and degree programme were used in a standard regression to predict students' perceptions of technical and residential services. The correlations of variables are shown in Table 6. As can be seen, all correlations, i.e., school ownership, type of school, parent education, parent occupation, year of study, and degree programme were statistically significant except for the gender and mode of parenting. The total variance explained by the multiple regression model with all eight predictors produced R^2 = 0.1147, F(11, 283)= 3.33, p < .0002. The R^2 of the model was 0.1147, which means that about 11.47% of the total variability of perceptions about academic and consultation services is explained by the covariates in the model.

The model results showed that students of parents/guardians with higher education ($\beta = -0.4834$ p=0.0348) had statistically significantly lower perceptions about the technical and residential services than students of parents/guardians with primary/no formal education. However, although statistically insignificant, students of parents/guardians with secondary education ($\beta = -0.2964$ p=**0.2122)** had lower perceptions about the technical and residential services than students of parents with primary/no formal education.

Table 6: Parameter Estimates and Standard Errors of Linear Regression Model for Perceived Academic and Consultation services

Variable	Case	Parameter Estimates (β)	Standard Error	t-Value	P-Value
Intercept		4.8813	0.243	20.09	<0.0001
Gender	Male	-0.0502	0.1538	-0.33	0.7443
Mode of Parenting	Single Parent	0.1697	0.1739	0.98	0.3301
	Guardians	0.399	0.2903	1.37	0.1703
Parents Education	Secondary	0.0916	0.1986	0.46	0.6449
	Higher	-0.0183	0.1921	-0.1	0.9241
Parent Occupation	Employed	-0.0797	0.1874	-0.43	0.6708
School Ownership	Public School	0.0087	0.1698	0.05	0.9591
Type of School	Boarding	0.2561	0.1546	1.66	0.0986
Year of Study	Third-year students	-0.6115	0.1473	-4.15	**<0.0001**
Degree Programme	Law	-0.6007	0.1831	-3.28	**0.0012**
	Science	-0.0377	0.1831	-0.21	**0.8369**

On the other hand, students of employed parents/guardians ($\beta = 0.4393$ p= 0.0493**)** had a statistically significantly higher perception

of the technical and residential services than students of self-employed parents. Third-year students ($\beta = -0.4240$ p=0.016) had statistically lower perceptions about technical and residential services than first-year students. Regarding degree programmes, students studying law ($\beta = -0.6008$ p=0.006**)** had a statistically significantly lower perception of technical and residential services than students studying educational psychology. Although insignificant, students studying sciences ($\beta = 0.1329$ p=0.542) had higher perceptions about technical and residential services than students studying educational psychology.

Students' Perceptions of Overall Service Quality

Multiple linear regression was conducted to study the relationship between students' multiple demographic characteristics and their perceptions of overall service quality, and the results are presented in Table 7. Keeping other covariates in the model ceteris paribus, the effect of gender, parenting mode, parents'/guardians' education level, parent occupation status, school ownership, and type of school were not significantly associated with perceived overall service quality. The coefficient of multiple determination of the model (R^2=0.1160) implies that the covariates explain 11.6% of the variability in perceived overall service quality. Therefore, only students' years of study and degree programmes were significantly associated with mean perceptions about overall service quality. The parameter estimates and standard error of the fitted model are shown in Table 7.

Table 7: Parameter Estimates and Standard Errors of Linear Regression Model for Perceived Overall Service Quality

Variable	Case	Parameter Estimate (β)	Standard Error	t-Value	P-Value
Intercept		4.54938	0.23847	19.08	<.0001
Gender	Male	-0.1561	0.15048	-1.04	0.3004
Mode of Parenting	Single Parent	0.01042	0.17064	0.06	0.9513
	Guardian	0.37236	0.28373	1.31	0.1905
Parents Education	Secondary	-0.14688	0.19546	-0.75	0.453
	Higher	-0.29567	0.18792	-1.57	0.1168
Parent Occupation	Employed	0.23101	0.18346	1.26	0.209
School Ownership	Public	0.06988	0.16599	0.42	0.6741
Type of School	Boarding	0.2806	0.15119	1.86	0.0645
Year of Study	Third-year	-0.50459	0.14426	-3.5	**0.0005**
Degree Programme	Law	-0.60111	0.17899	-3.36	**0.0009**
	Science	0.05827	0.17942	0.32	**0.7456**

The total variance explained by the multiple regression model with all eight predictors produced $R^2 = 0.116$, $F(11, 282)= 3.36$, $p < .0002$. The R^2

of the model was 0.116, which means that about 11.1% of the total variability of perceptions about the overall service quality is explained by the covariates in the model. The results from the fitted model show that students studying law ($\beta = -0.60111$ p=0.0009) had statistically significantly lower perceptions of the overall service quality than students studying educational psychology. Although insignificant, science students ($\beta = 0.05827$ p=0.7456) had a higher perception of the overall service quality than students studying Educational Psychology. On the other hand, third-year students ($\beta = -0.50459$ p=0.0005**)** had statistically significantly lower perceptions of the overall service quality compared to first-year students.

The results from the fitted model show that law students ($\beta = -0.60111$ p=0.0009) had a statistically significantly lower perception of the overall service quality than educational psychology students. Although insignificant, Science students ($\beta = 0.05827$ p=0.7456) had higher perceptions about the overall service quality than educational psychology students. Likewise, third-year students ($\beta = -0.50459$ p=0.0005**)** had statistically significantly lower perceptions of overall service quality than first-year students. These findings implied that experiences with the overall service quality fluctuated among students regarding their specialisation and the number of years spent receiving services. Thus, educational psychology students had statistically significantly higher perceptions about the overall service quality than law students. In contrast, science students had an insignificant higher perception of overall service quality than educational psychology students, while first-year students had a higher perception of overall service quality than third-year students.

Discussion of the Results

The findings in this study concur with Joseph et al. (2005) and (Tan & Kek, 2004), who found significant differences based on the students' perception of service quality by year of study and race. Contrary to the findings in this study, Schwantz's (1996) findings unveiled insignificant differences in service quality attributes among undergraduate students. Extrapolation of findings from previous studies and the current study suggests that findings on perceptions about overall service quality are contextual. Thus, results on perceptions about overall service quality vary from country to country and from one institution to another institution, as

previously observed by (Berry & Parasuraman, 1991; Caruana, 2002; DeShields et al., 2005; Parasuraman et al., 1994; Petruzzellis et al., 2006). Second, concerning the influence of multiple demographic characteristics on students' *perceptions* of ACS, TRS, and OSQ, it was found that only two predictors, a year of study and a degree programme influenced students' perceptions of ACS. Students' gender, parenting mode, parents'/guardians' education and occupations, school ownership, and type of school seem not to influence students' perceptions concerning ACS. These results challenge Snipes et al. (2006) findings, which revealed differences in service quality ratings between male and female customers, with female customers more likely to give higher service quality ratings than male customers. In the case of the current study, only a year of study and a degree programme explained the differences of students' perceptions concerning ACS in the surveyed HEI.

Nevertheless, four predictors, parents'/guardians' education and occupations, a year of study, and a degree programme, were likely to influence students' perceptions about TRS. In contrast, students' gender, parenting mode, school ownership, and type of school did not influence students' perceptions of TRS. Thus, only parents'/guardians' education and occupations, a year of study, and a degree programme explained students' perceptions of TRS. The findings substantiate Mitchall and Jaeger's (2018) findings, revealing that when parents are involved in university planning their children, it enhances students' self-determination, serves as good examples, and sets initial high academic standards by fostering a sense of career preference among students. Furthermore, two predictors, a year of study and a degree programme, were found to have a strong influence on students' *perceptions* of the OSQ. Meanwhile, students' gender, parenting mode, parents'/guardians' education and occupations, school ownership, and type of former school did not influence students' perceptions of OSQ. Therefore, only a year of study and a degree programme explained students' *perceptions* of ACS and the OSQ.

Conclusion

This study hypothesized that "keeping the other covariates ceteris paribus, multiple demographic characteristics have a significant influence on students' perceptions about factors that determine service quality and the overall service quality in HEIs". It was hypothesised that since students have varying multiple demographic characteristics, their perception of service quality in HEIs would also be reflected by their differences in

multiple demographic characteristics, which could operate at different aggregation levels. These characteristics could invariably be influenced by individual cultural norms, values, beliefs, work ethics, and attitudes toward education, which are transmitted within families. Therefore, it was assumed that students' perceptions about service quality would be influenced by individuals' multiple demographic characteristics (gender, mode of parenting, parent education, parent education level, students' schooling background, years of study, and type of degree programme).

Although different multiple demographic characteristics were hypothesised to exert influence on students' perceptions concerning ACS, it was only two predictors, a year of study and degree programme, which influenced students' perceptions of ACS in the surveyed HEI. On the other hand, four predictors, that is, parents'/guardians' education and occupations, a year of study, and degree programme, influenced students' perceptions about TRS. In contrast, students' gender, mode of parenting, school ownership, and type of school did not influence students' perceptions of TRS. Furthermore, two predictors, a year of study and a degree programme, influenced students' perceptions of the OSQ. Meanwhile, students' gender, parenting mode, parents'/guardians' education and occupations, school ownership, and type of school did not influence students' perceptions of OSQ. Therefore, only a year of study and a degree programme explained students' perceptions of ACS and the OSQ.

Higher education institutions should devise mechanisms to regulate the offering of services to different groups of students based on their experiences and specialisations. It appears that each degree programme specialisation and duration of interaction with academic and consultation service by students, predict some specific requirements regarding offering of services by academic and administrative staff. Academic staff should demonstrate commitment to more experienced students by willingly solving their problems, providing timely feedback, regularly attending lectures, and adequately allocating more time for consultation with final-year students than first-year students. On the other hand, parents'/guardians' education and occupations, a year of study, and degree programme, influence students' perceptions about TRS. This implies that there should be a clear identification of students' background information, such as parents' level of education and occupation. It seems that students of parents with more credentials and higher occupational status need

modernised technical and residential services. Higher education institutions should, therefore, ensure adequate obtainability of computers, free internet services, an e-library with free e-books, print-on-demand printers, photocopiers, spacious lecture rooms, and the use of projectors by instructors during lectures.

Recommendations of the Study

The HEIs should direct their scarce educational resources to the most important students' affairs and services such as the installation of free internet services, online educational resources, relevant textbooks, and reference books in the library, adequate laboratory equipment, adequate lecture rooms, and spacious halls for university examinations. In addition, newly recruited instructors should have the opportunity to attend orientation and indoctrination workshops to acquaint them with consultation services in handling more experienced students. Regarding technical and residential services, the HEIs should focus on renovating residential halls, water supply, drainage systems, cafeteria and transport services, and washrooms in the residential halls.

Institutional policies should explicitly stipulate the way these students' affairs and services should be planned according to the specific requirements based on degree programmes and years of study. Institutional quality assurance policies should incorporate students' feedback into the HEIs within the framework of overall institutional planning. In this process, quality assurance units may have in place the improved students' assessment and feedback and be able to provide academic support and improve learning resources to enhance students' personal development.

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