

Determinants of Science Student Satisfaction and Dissatisfaction in a Health University in South Africa

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ABSTRACT Induction programmes of first-time entering students should proactively focus on incorporating useful clarifications for students. The main objective in this paper was to identify the determinants of student satisfaction (and dissatisfaction) in this science-dedicated school, and superficially determine the level of service quality on student satisfaction. A descriptive cross-sectional case study research design was adopted for this study. The most dissatisfied students were in the life sciences, and the most satisfied were in the physical sciences. Being denied changing from subjects that seemed not career attractive, such as the life sciences, was a serious grumble. Students felt that this stream was somehow being protected. Students seemed to be more satisfied with the departments than the school where the departments were located. The study recommends changes to other courses only when students want the course, space is available, and upon satisfying admission requirements.

INTRODUCTION

Sohani et al. (2023) investigated students' satisfaction in Iran with two methods, case-based learning (CBL) and lecture-based learning (LBL), aiming to determine their satisfaction with these methods. CBL is a teaching-learning system in specialised courses. The study found CBL to intensify students' satisfaction and self-confidence more than LBL. In Vietnam, Le and Nguyen (2023) investigated English as a medium of instruction (EMI), aiming to assess the satisfaction of students based on components of EMI courses, and investigate the relationship of student motivation, engagement, and satisfaction with EMI courses. The study revealed that students have a relatively positive perception of the EMI courses that they took. Expressly, students showed highest satisfaction with teachers' teaching methods and least satisfaction with students' learning tendencies. The study also found cognitive and emotional engagement to demonstrate mediating effects on the relationship between motivation and students' satisfaction with EMI courses. In Indonesia, Sudirman et al. (2023) embarked on a study with the aim of *determining effects of lecturer service quality and infrastructure quality on student satisfaction using a descriptive quantitative design. The study focused on private higher education students in Medan City.*

The results showed that lecturer service quality improves student satisfaction, and also, infrastructure quality enhances student satisfaction. These studies show the worth of student satisfaction, and the importance of teaching methods on student satisfaction. They were all in contexts suitable to their countries and institutions. In South Africa, students' needs and satisfaction seem to have more components compared to circumstances of the above studies.

To give a background to the current study, the dedicated health sciences university in South Africa has five (5) schools, and only one (1) school offers science degrees while the other four (4) offer health related study programmes. The students at this university strike now and then, and since the university was established in 2015, therefore completing nine (9) years old in 2023, there have been more than nine (9) students mass actions complaining about the same or different things. That is, some issues of protests have repeated while others were new. In some years there have been more than one strike action. In other cases, the mass action was combined with the one for employees, organised by labour movements (unions) as they shared displeasure. There are times when students of the sciences strike alone while every time other schools are on strike, the science school also has issues that make them part of the strike. This gives the impression that

generally, student satisfaction is not existent in this campus, but that the science students feel more dissatisfaction than other students.

The paper does not dispute that students, as clients of education enterprises, are difficult to please, become smarter each time, are more demanding, are service conscious, less forgiving and may be approached by several rival institutions with similar and even better study programmes, and student support (Fornell et al. 2010). The science school undertakes regular massive promotions programs in order to attract students. Majority of science students complete their science degrees with the intent of defecting to the health sciences, so retaining them for postgraduate is very difficult. Also, of those that perform well and wish to pursue postgraduate studies, many are poached by other universities with good bursaries and clearer career paths. So, retention becomes difficult for the best science students at this university.

Student retention is a pressing challenge, and student loyalty at South African higher education institutions (HEIs) is a concern. Rajeswari and Srinivasulu (2015) stated that customer loyalty seems to be declining in most industries. The competition for students has also become tough in the South African HE landscape, it is imperative for management to implement student retention strategies (Lee 2010).

The science-dedicated school of the university should recognise the importance of student-focused strategies to help in heightening and maintaining their competitiveness through controlling student switching. Hence, instigating a defensive strategy is crucial. Instead of attempting to attract students from rival HEIs, it may be more useful to design a defensive strategy that is concerned with reducing chances of student exit and switching to other schools. Loyal students would enrol for postgraduate degrees and are more immune to rival HEI offers and practice referral marketing (Joshi et al. 2015). It is essential for the school to understand what influences their students and prospective students in their choice of the science faculty at this university (Yee et al. 2015). If the school expects to retain students in such a competitive HE landscape, they need to understand factors that influence student attrition. The shortage of such vital information in contemporary literature inspired this study. The study objective follows.

Objective

The main objective of this study was to identify the determinants of student satisfaction (and dissatisfaction) in this science-dedicated school, and superficially determine the level of service quality on student satisfaction.

METHODOLOGY

Design

The research design is the inclusive strategy and analytical approach selected to assimilate, coherently and logically, the various study components to ensure that the research problem is investigated exhaustively (Babbie 2010). This study followed a descriptive cross-sectional case study research design.

Population

The study population consisted of science students of the HEI, in school/faculty with eight (8) departments that form the school. However, these departments are offered in five streams, which are life sciences, mathematics sciences, occupational and environmental sciences, and physical sciences. Therefore, it was more sensible to cluster the respondents in streams because they major in combinations of subjects that channel them into these streams. While still here, there are quotas given to streams for the numbers of students to admit at first year, and life sciences received the highest portion while mathematical and physical science streams are offered the lowest numbers.

Study Sample

As a qualitative study, this study did not require too many participants for the sample size, as a small sample is often adequate (Vasileiou et al. 2018). A dedicated Health Sciences University is the HEI for this study. In the case of the science student body with a huge enrolment base, sampling is the only applicable way to gather data. The inherent weaknesses of sampling are acknowledged, such as sampling potential to introduce bias and compromise accuracy. While also acknowledging the difficulty of attaining a

representative sample for generalising the findings to the whole population, it is also indicated that this paper does not require to generalise. Rather, it is to gather concerns and understand issues regarding student satisfaction, based on the fact that now and again there are student actions with complaints, thus giving an indication of dissatisfaction. While also pointing at some weaknesses of sampling, it is pointed out that for this study, sampling provided advantages of accuracy, being economical, reliable and time saving. Inclusion in the study required being 18 years or older in age, and a willingness to participate.

Thematic Content Analysis

Thematic content analysis (TCA), famous for creation of themes in packaging the participants' inputs, is a descriptive presentation of qualitative (Moser and Korstjens 2018) data that may have been sourced through interviews from research participants, or from identified texts that reflect experientially on the topic of study.

Research Question

The study aimed to answer the question, what are the determinants of student satisfaction in this science-dedicated school, and what is the level of service quality on student satisfaction in the science school of the HE?

Data Collection

Data collection took place from July 2020 to May 2022, because respondents were mostly not willing to participate, or were below 18 years of age. Though the intention was for students in the school and technology, it became sensible to attempt to find responses from the five (5) streams involved. Saturation was the technique earmarked for determining sample size, where saturation is when during qualitative data collection, the researcher has to stop collecting additional data because respondents' inputs no longer generate new insights and therefore no new properties are revealed (Creswell 2014). Braun and Clarke (2019), Creswell (2014) and Mason (2011) insinuate that in a small sample size where $n = 3$, saturation is possible where only after three (3) participants have been interviewed, no new information

emerges from the other remaining participants. According to Morse et al. (2014), a sample size of six is adequate and enables saturation to be reached. Ndobe (2018) concurs that saturation occurs between 3 and 6 respondents. Therefore, this study decided to select six (6) participants for each subsample to ensure that they all have saturation. Since four (4) streams were involved, and full saturation is guaranteed at size $n = 6$ sample, the study involved this approach. Hence, in this study, 24 students who were sampled purposively in order to generate rich information regarding the student satisfaction, were interviewed using semi-structured interviews. Apart from the demographics of age, gender, stream, and level of study, the interview questions were as follows:

1. What is it that makes you...
 - Like/enjoy your stream?
 - Dislike your stream?
2. What is it that will make you...
 - Pursue a postgraduate degree in your major subject?
 - Shun pursuing a postgraduate degree in your major subject?
3. Are you satisfied with the service quality you obtain in...
 - Your department?
 - The school?
4. Kindly give details.
5. Any other useful information regarding your satisfaction/dissatisfaction in the school.

Data Analysis

Data analysis is a process of searching facts from raw data by converting it into information useful for decision-making by users (Tabachnick and Fidell 2007; Xia and Gong 2015). Some authors (Lewis-Beck 1995; Nag and Ahmad Malik 2023) designate data analysis as an extreme discharging process to make raw data useful towards interpretations. In this paper, TCA was followed in the analysis of the data. Data analysis steps of TCA are to become familiar with the data, generate initial codes, search for themes, review themes, define themes, and then write-up (Braun and Clarke 2019). Analysis of data was done by a market research expert from the Tshwane University of Technology (TUT), who followed these steps to a reasonable extent for analysing the data for this paper.

Table 1: Demographic profile of participants

Variable		Frequencies	Percentages
Age	< 20	7	29.2
	20 – <25	8	33.3
	25 – <35	8	33.3
	35 – <40	1	4.2
Gender	Female	13	92.0
	Male	11	8.0
Stream	Life Mathemati-	6	25.0
	cal Occup. and	6	25.0
	environ. Physi-	6	25.0
	cal sciences	6	25.0
Level of study	1	3	12.5
	2	15	62.5
	3	6	25.0

RESULTS

Demographics

Table 1 shows that students who participated in the study were all below 20 years of age, and no one was over 40 years. Most were equally from 20 to less than 25 and from 25 to less than 35 years of age. The over 35 years were the least. Females volunteered in large proportion (92%) with only 8 percent males. The streams were equally represented by study design (25% each), and those in second year level of study were the most (almost 63%).

Issues of (dis-)satisfaction

Table 2 explains that some life science students doing biology are mostly only in the stream as 'waiting for space' in the health sciences (those doing biology), but biochemistry ones may enrol as the departmental head provided useful information for options in the subject. They claim to be forced to enrol when they did not get admission in the health science programmes even when they opt for other streams. The ones in biology claim that they would not be employed with their major. They feel the stream is protected as they are refused transfers to other science streams even when there is merit for the move. They claim that there are no innovations but repetitive experiments in biology. At school level, life sciences students show 33 percent (2 out of 6) satisfaction level and departments were 50 percent (3 out of 6) level.

For mathematics sciences, Table 2 explicates that students do not have complaints with staff, they find careers being available for them, and commend the use of alumni and practitioners to inspire them.

They complain about limited spaces and tough competition. Statistics majors are not happy with Maths III being used for their postgraduate admissions. The computer science and statistics students view pursuing postgraduate as key to a job. The level of satisfaction of these students in departments is 83 percent, and for school it is 33 percent.

Table 2 shows occupational and environmental students hoping to pass well just for switching to medicine, but they know no jobs they can do upon completion, and are not happy with teaching. They would not enrol for postgraduate studies, and the satisfaction level at departmental level is 33 percent and 14 percent for the school.

Physical science students give mixed claims, as physics students find staff to be helpful and the careers to be galore but chemistry ones believe there are no jobs when they graduate and that staff in the department want them to fail. Physics students would even enrol for postgraduate studies. Level of satisfaction at the departmental level is 83 percent against 33 percent for the school.

Student Dissatisfying Factors

Coerced Enrolment

All the life science respondents complained that they were forced to enrol in the stream, and at the time they did not have much knowledge about other streams and offerings. They perceive the stream as protected for the students' detriment. Students view life sciences as appropriate for those intending to switch later to the health sciences, but unsuitable for those who plan for careers in industry.

Refusal to Transfer to Other Streams

The study further revealed that most students experience some problems with their lecturers in departments and the heads of departments cannot help them. Chemistry was listed as the worst culprit. Efforts beyond this level proved fruitless. This encourages students to transfer to other streams. Most students' transfer reasons include other streams' offerings, the quest for effective student support, and possibilities of innovation.

Bad Treatment at Departmental Level

Other factors contributing to student defection to other HEIs include poor lecturer appreciation

Table 2: Summary of issues and concerns

<i>Stream</i>	<i>Satisfier</i>	<i>'Dissatisfier'</i>	<i>Postgraduate</i>											
Life	<ul style="list-style-type: none"> Likely path to health studies Forthright, helpful biochem HOD 	<ul style="list-style-type: none"> Forced to enroll Transfer to other science streams prohibited Biology gives no jobs No innovation 	<table border="1"> <tr><td>Pursue</td><td>Shun</td></tr> <tr><td>Job 6</td><td>I shun: 4</td></tr> </table>	Pursue	Shun	Job 6	I shun: 4	<table border="1"> <tr><td colspan="2">Quality satisfaction</td></tr> <tr><td>Dept</td><td>Sch</td></tr> <tr><td>3</td><td>2</td></tr> </table>	Quality satisfaction		Dept	Sch	3	2
Pursue	Shun													
Job 6	I shun: 4													
Quality satisfaction														
Dept	Sch													
3	2													
Mathematical	<ul style="list-style-type: none"> Staff helpful and friendly Ample careers Visiting CS and Stats alumni inspiring 	<ul style="list-style-type: none"> Stiff competition Maths III for Stats PG Careers in HEI not forthcoming 	<table border="1"> <tr><td>Pursue</td><td>Shun</td></tr> <tr><td>6</td><td></td></tr> </table>	Pursue	Shun	6		<table border="1"> <tr><td colspan="2">Quality satisfaction</td></tr> <tr><td>Dept</td><td>Sch</td></tr> <tr><td>5</td><td>2</td></tr> </table>	Quality satisfaction		Dept	Sch	5	2
Pursue	Shun													
6														
Quality satisfaction														
Dept	Sch													
5	2													
Occupational and Environmental	<ul style="list-style-type: none"> Hope of high marks to switch to med (factor to motivate) 	<ul style="list-style-type: none"> No known jobs except lecturing Tuition services not satisfactory 	<table border="1"> <tr><td>Pursue</td><td>Shun</td></tr> <tr><td>n/a</td><td></td></tr> </table>	Pursue	Shun	n/a		<table border="1"> <tr><td colspan="2">Quality satisfaction</td></tr> <tr><td>Dept</td><td>Sch</td></tr> <tr><td>2</td><td>1</td></tr> </table>	Quality satisfaction		Dept	Sch	2	1
Pursue	Shun													
n/a														
Quality satisfaction														
Dept	Sch													
2	1													
Physical	<ul style="list-style-type: none"> Staff helpful in physics Ample careers in physics 	<ul style="list-style-type: none"> No jobs from chem Chem want students to fail 	<table border="1"> <tr><td>Pursue</td><td>Shun</td></tr> <tr><td>6</td><td></td></tr> </table>	Pursue	Shun	6		<table border="1"> <tr><td colspan="2">Quality satisfaction</td></tr> <tr><td>Dept</td><td>Sch</td></tr> <tr><td>6</td><td>1</td></tr> </table>	Quality satisfaction		Dept	Sch	6	1
Pursue	Shun													
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Quality satisfaction														
Dept	Sch													
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*PG = postgraduate

of students, poor student services, and unprofessional approaches by the heads of department (HODs), among others.

No Jobs

The students stated that there is no motivation to complete programmes in biology, as they did not seem to open ample job opportunities. Chemistry of physical sciences stream was also perceived to be lacking in job opportunities. The feeling of lack of jobs was also registered in the environmental sciences, where students claim to know only of lecturing. There is a feeling that forced enrolments are used to make sure that the staff in the biology department have their jobs intact.

Non-existent Innovation

Students indicate that they were shown how large research was undertaken in biology, but they point out that titles and content are the same for many papers, but differences occur only on the focus, such as eight (8) papers being written and published by only changing the eight (8) parasites used.

Competitive Markets

The mathematical science respondents indicated their dissatisfaction with the stiff competition that they had to undergo when pursuing careers in the subjects involved, mainly computer science and statistics. The statistics section was also compounded by requiring mathematics at third year level for enrolling for postgraduate studies in statistics. Though students viewed stats and computer science as having plentiful job opportunities, they viewed mathematics as being more of a distraction with fewer jobs while also blocking statistics advancement.

Unsatisfactory Tuition

The teaching and learning services being unsatisfactory for students showed to have been taking place in the life and environmental science stream, and for chemistry of the physical science stream. Moreover, chemistry students seemed to have been perceiving their lecturers as wanting them to fail.

Student Satisfaction Factors

Identified determinants of student satisfaction in the school include efficient student service, HOD responsiveness, lecturer helpfulness, caring HODs, reputable image, departmental image, provision of value-added online lecturers with former students employed in industry, plenty of careers available, and homely environments. Other determinants of student satisfaction in the platforms of student support, which become effective at early stages of the referral system for at-risk students are early detection and effective interviews at early stages in the mathematical science stream, prompt complaint handling, and favourable departmental images for computer science and statistics departments. These factors are useful for school, and for sustaining the school business activity.

There are two factors of student satisfaction for school students, namely life sciences being a likely passage to transit to health studies, and occupational and environmental sciences being a hope that when high marks can be scored, the transfer to medicine or other health sciences would be enhanced. These may be good for short-term stay but pose a bigger threat for the sciences as these themes imply moves or transfers to other schools.

Postgraduate Pursuance Intent

Life science students would enrol for postgraduate studies as a waiting place for space in medicine, which is the case with students in occupational and environmental sciences stream. Also, four (4) life science students claim that they shun their subjects, so their enrolment for postgraduate is just to wait for spaces in the health sciences. Other occupational and environmental science students have no intentions of enrolling for postgraduate studies. As for biology, its students claim to be unaware of what careers they could pursue once they leave campus.

Mathematical science and physical students would all enrol for postgraduate studies, as they view these as opportunities for jobs, particularly in computer science and statistics. Physical science students seem to view their courses as perfect for the market.

Student Satisfaction Level at Department/School

Though the sample is too low to make inferences, indications are that there is more quality satisfaction at departmental level than at school level. For the physics stream, mainly because of the physics department, all the respondents were satisfied with the quality offered there. Ironically, this stream shows the least level of quality satisfaction at the school level, together with the occupational and environmental sciences stream. For the occupational and environmental sciences, the quality satisfaction level at the stream level is also very low, followed by the life sciences. The life sciences have a low-quality satisfaction score at school level as well, with the mathematical sciences. However, the score for quality satisfaction at stream level for the mathematical sciences is very high.

DISCUSSION

The study demonstrated that key determinants of student satisfaction in the science school of the HEI. These include caring HODs, departmental image, early detection of at-risk students, efficient student service, HOD responsiveness, homely settings, lecturer helpfulness, prompt complaint management, provision of value-added online lecturers with former students employed in industry, plenty of careers available, and reputation. Caring HODs is a key determinant in industry as caring managers which Morvati and Hilli (2023) advocate. Bedendo et al.'s (2023) sentiments of a need for manager responsiveness support the key determinant of HOD responsiveness. This also covers prompt complaint management. Norvadevi et al. (2023) concur with the departmental image as a key determinant of brand image. On home settings, Kouzes and Posner (2023) point that care is needed in the use of homely settings. Students may relax and become irresponsible and lazy if not properly monitored, but enable a conducive environment if used well. The lecturer helpfulness is an aspect of good teaching and student support, where value-adding teaching tools are used, and it covers efficient student service, as urged by Hew et al. (2023).

Mathematical science stream was credited with efficiency and effectiveness in early detection

and swift solution. This may be demonstrating readiness of higher education for quality transformation according to modern entrepreneurial framework (Alzahrani et al. 2021). Chemistry was found wanting in most favourable attributes that students preferred, which may be regarded as dynamic inefficiency by Bloise and Reichlin (2023), simply implying that that department does not show growth or justification of its existence. These findings coincide with those found in Bangladesh by Rahman (2014) and in Ghana by Gonu et al. (2023), which advocate improving service quality and customer satisfaction, among others. Similar studies carried out by Lee (2010) in South Korea confirmed that service quality greatly influences customer loyalty, customer satisfaction and perceived value. Related studies undertaken by Khan and Afsheen (2012) in a Pakistan study insinuated that determinants of customer loyalty require customer satisfaction.

Factors causing dissatisfaction, on the other hand, were found to include coerced enrolment in some streams, refusal to transfer to other streams that students favoured more, lack of jobs from subject discipline, lack of innovation, competitive markets, teaching and learning that is not satisfactory to students. This is in line with Holbeche's (2023) sentiment that organisations get coerced by competitive forces towards innovation in order to sustain their markets and displace clients from rivals. Apparently, students are compelled to remain in life sciences even when they have found a 'better' major subject for their future. Biology and chemistry seem to have been remarked for not leading to job opportunities, and lacking innovation. On poor teaching, chemistry seems to have been pointed at. Singh and Wilkes (1996) concur that dissatisfaction of customers is often followed by complaints.

Other issues refer to postgraduate studies. Some departments seem to enrol postgraduates with the understanding that they will enhance their job marketability, as Park and Kim (2023) also concur. On the other hand, others such as in the study HEI, enrolled with the hope of securing admission into health programmes of other schools. In particular, physics students seem to be proud of the programmes presented to them. The use of mathematics at third year level to admit statistics majoring students to postgraduate studies is a worry for some students, especially where they chose

computer science as a second major to statistics. Daston (2023) views this as more factual for students with high mathematics aptitude but having more interest in application of knowledge, which statistics and computer science give as compared to abstract mathematics. There are times when these refusals are made, quotas are cited as the reason for not allowing transfers.

CONCLUSION

While it is known that life sciences received the largest number of students in quotas for student admission, the research findings seem to suggest that life sciences is protected for having more students against the will of some students who prefer to transfer to other streams. This is because quotas are treated to undermine student preferences and interests, even when students have identified strengths in what they wish to pursue and weaknesses in their pursuit of the life sciences. Moreover, students seem to feel that some departments are being favoured against their own demerits, where students are forced to enrol in them and refuse to deregister them to select the ones they believe would open opportunities for careers/jobs for them.

RECOMMENDATIONS

For student satisfaction, student aspirations should be made a priority instead of quotas that do not guarantee career paths or job opportunities. Students should only be denied transferring to other streams, when the streams to which they wish to transfer are saturated/full. Heads of departments should be trained and monitored for treating students with respect and professionalism. In addition, departments, from HOD to other staff, should strive to improve quality of services. In particular, the school needs to embrace a student-centric culture and to improve its student experience. In order to control student transfers to other streams, the school is advised to establish mechanisms for good relationships with students rather than to unilaterally reject the students' requests. The main recommendation is that students should be allowed to change courses according to the choice, space availability, and only when they meet admission requirements in the new courses.

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