

Data Mining to Identify Gatekeeper Courses and Determine Corrective Measures: Case of Africa University, Zimbabwe

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Abstract— Gatekeeper courses constitute a significant barrier to student success in higher education. This study sought to identify gatekeeper courses at Africa University and determine possible solutions. The study sought to identify gatekeeper courses through data-driven strategies to improve student success. The study examined views of lecturers, students and administrative staff on gatekeeper courses at Africa University in Zimbabwe. Academics who convene, teach, or have taught these courses participated in this study. This study draws on quantitative analysis of historical course performance and qualitative data of students' experience on the courses. Data mining of student records from the University's database for the five-year period from 2013 to 2018 was conducted. This data was used to screen courses and identify gatekeeper courses at the University. A survey was carried out to establish students, administrative staff and faculty's views on gatekeeper courses at Africa University in Zimbabwe. This study concludes that lecturers can adopt high impact teaching practices in order to convert gatekeeper courses to gateway courses. Providing professional development support for academic staff improves the quality of teaching and student completion rates. Africa University should introduce academic literacy and information literacy skills training courses in order to improve student success rates. This study recommends that the University should intensify research support and student advisory services in order to improve student success rates. The University should establish a Language Laboratory in the university library in order break the language barrier for international students.

Keywords— Data mining, educational data mining, Gatekeeper courses, High risk courses, Higher education, Private universities, Student success,

I. INTRODUCTION

Gatekeeper courses constitute a significant barrier to student success in higher education. Gatekeeper courses refer to historically difficult courses with high failure and withdrawal rates. A gatekeeper course is a class that many students must pass to progress in their chosen programme or major. "A gatekeeper course is one in which many students struggle to complete, and, as a result, prevents them from completing a program of study" (Nguyen, Fagioli, and Kaminsky, 2020). Gatekeeper courses at a university are foundational or introductory courses that serve as critical prerequisites for advancing within a particular academic programme or major. Eagan and Jaeger (2008) emphasise that "gatekeeper courses serve as the initial roadblock to student persistence". Extending this line of argument these authors add that "these gatekeeper courses are designed to weed out students who cannot perform at the expectations of faculty". Poor performance in gatekeeper courses may discourage students psychologically by deflating their self-confidence in their ability to succeed academically. Failing to pass these courses effectively blocks students from continuing in their chosen field. Gatekeeper courses are sometimes identified by high rates of grades such as D, F, Withdrawal, or Incomplete (DFWI), with a DFWI rate above 20% often used as a threshold for classification. Gatekeeper courses are typically prerequisites for more advanced courses and are taken by first year students from colleges across the university. Prior research that has examined the effect of gatekeeper courses on

student retention, academic achievement, and engagement has been conducted in developed countries. The current study was conducted at a private university in Zimbabwe. This study sought to identify gatekeeper courses and determine possible corrective measures at Africa University in Zimbabwe.

A. Statement of the problem

Some students from Africa University have their academic progress curtailed by gatekeeper courses. Such students delay their graduation or discontinue their studies, this has negative impacts on both the institution and the students affected due to lost time and resources.

B. Background to Africa University

Africa University (AU) is a private, higher education institution located in Mutare city in Zimbabwe. Its vision is to become a world class university for leadership development in Africa. Its mission is to provide quality education within a Pan-African context through which persons can acquire general and professional knowledge and skills, grow in spiritual maturity, and develop sound moral values, ethics and leadership qualities (Africa University Prospectus, 2005 to 2017). Since its inception in 1992, AU has progressively grown its enrolment from an initial figure of 42 students to an average of 2500 to date. To achieve its mission and vision the University should have the supporting infrastructure and staff to carry out the day to day activities of a University. Presently the University uses Student Information System Administration (SISA) database to house student grades. The university uses the semester system with two semesters per

academic year. The first semester runs from August to December and the second runs from January to May. Grade point average (GPA) and Cumulative Grade Point Average (CGPA) are used to measure student performance and progression.

TABLE 1.1 Extract from SISA 2018

Course Code	2013 2014 1st Semester courses				
	D Grades	F Grades	Total Failed	Total Student	% Failed
MAC102	14	12	26	34	76
AAE101	17	13	30	42	71
ACP101	9	24	33	59	56
MMS202	74	49	123	238	52
MKT302	19	5	24	47	51
ACP207	9	7	16	37	43

A preliminary extraction of data from the Students Information System Administration (SISA) reveals that there are some courses in which students fail more than in others. Table 1.1 above which was extracted from SISA shows that some courses at Africa University may easily fall into the category of gatekeeper courses

The gatekeeper courses effect has become more of a perennial problem at Africa University. During the year 2013-2014 for the first semester analysis, 76% of total candidates failed the MAC 102 (Fundamentals of Accounting 2) course. This challenge amongst others has negatively affected students' progress to safely proceed to next levels of their academic studies.

C. Objectives of the study

1. Identify the gatekeeper courses in the undergraduate, conventional programmes at Africa University using data mining techniques,
2. Establish the views of faculty, administrative staff and students towards gatekeeper courses at Africa University,
3. Recommend possible strategies to convert gatekeeper courses into gateway courses.

II. REVIEW OF RELATED LITERATURE

A. Introduction

This section focuses on the literature review. Reports, journal articles and books were reviewed.

Conceptual Model Oseguera, 2009) in (Martin, 2017) came up with a conceptual model for college degree completion as shown by Figure 2.1 below.

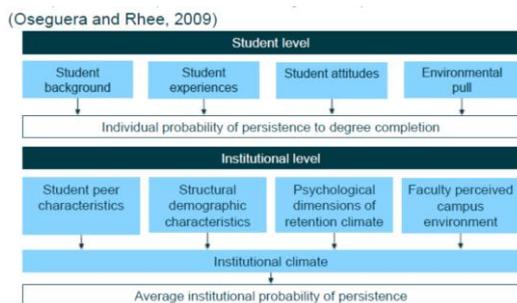


Fig. 1. Conceptual Framework

The framework shows that background both social and academic, attitude towards school work and experience play a role in determining the student progression. The institution plays a bigger role in degree completion. Researchers in the current study examined gate views of lectures, students and administrative staff on gatekeeper courses at Africa University in Mutare, Zimbabwe.

B. Data Mining Techniques

Data mining is a powerful technology that can be best defined as the automated process of extracting useful knowledge and information including, patterns and associations (Abu-Oda and El-Halees, 2015:15). In the words of Algarni, (2016) data mining is a powerful artificial intelligence (AI) tool which can discover useful information by analysing data from many angles or dimensions and summarise the relationships identified in the database. It involves analysing usable information and extracting data from large data warehouses, involving different patterns, intelligent methods, algorithms and tools. Data mining was used in the current study to extract data. "Using data mining techniques to analyse student information can help identify possible reasons for student failures" (Algarni, 2016). Large amounts of data currently in student databases require automated analysis techniques to extract the most useful information for decision making. Flair (2018) identified six data mining techniques that can cater for different business problems. These data mining techniques include classification, association, prediction, clustering, sequential patterns and decision trees. Clustering was used in this study. Clustering techniques can be applied to a variety of educational data sources, including performance data from standardized tests, data from class discussions, student evaluations, and data from interviews with the students (Ampandu, 2023:16).

C. Gatekeeper Courses at University

Gatekeeper courses are high enrolment courses (Eagan & Jaeger, 2008) and the failure rate exceeds 30%. This prohibits students from moving forward in the field of study to subsequent courses in sequence and generally, they fail to graduate. Gatekeeper courses are usually in the first two years with content that is introductory in subject nature (Gasiewski, 2011). "Gatekeepers are normally first level courses in any degree programs, or any course in the curriculum that exhibits a low rate of student success" (Marsh, 2010). Further, Marsh (2010) add that "the common gatekeepers are first college level courses in English and maths". A study by Roksa et al (2009) established that less than 50 percent in the study completed gatekeeper English and just over one quarter completed gatekeeper math. Gatekeeper courses lower rates of student success and stop many students from advancing to degree completion. These gatekeeper courses often have a historical lack of success. A report by Shay et al (2020) established that at UCT there were 'high-risk courses' offered by the university. "These courses are often also service courses, meaning that they are taught by departments outside of the student's faculty of registration" (Shay et al, 2020). Campbell (2022) add that "a service course is a compulsory or

optional course offered by a department in which students will not take their major courses”. Compulsory service courses perform a ‘gatekeeper’ role. Students cannot graduate without passing the service courses. “Although these courses are not the focus of the degree, students who cannot meet the demands of the service course are assumed to be less likely to meet the demands of further courses” (Campbell, 2022).

Gatekeeper courses not only contribute to high failure rates but also have a high overall impact on programme progression. Extending this line of argument Marsh (2010) identifies gatekeeper course as that course that has high student enrolment and a student success rate below eighty percent. The high enrolment is often due to its critical place in the pathway of a degree or certificate being undertaken by students. In this view, Barefoot (2013) uses the term “killer courses” to describe courses with high rates of unsuccessful outcomes (D, F, and Withdrawals). These courses “kill” a student’s GPA, motivation, academic progress, scholarship eligibility and interest in remaining in college. Thus, the terms gatekeeper or killer course can be used interchangeably. Courses with DFW rates of 30% or higher are often considered killers (Barefoot, 2013). Li (2017) observed that, “students who enter science, technology, engineering, and mathematics (STEM) fields must successfully complete maths courses up to the calculus”. Similarly, students who wish to get degrees in business are required to show proficiency in calculus with business applications. The current study sought to identify gatekeeper courses, outline their effects and recommend strategies to reduce their impacts at Africa University in Zimbabwe. Having students discontinuing from a tertiary programme should be the last option since gatekeeper courses can be transformed into gateway courses for all learners. An average class at Africa University has 25 students. A course with at least 25 students and has a pass rate below 80 % will automatically become a gatekeeper course by Africa University standards.

D. Faculty Views on Gatekeeper Courses

“Faculty members perceive that the main causes of students failing are classified into three main groups’ namely (1) student-related factors (2) life and socioeconomic issues and (3) failures of the educational system” (Cherif, 2014). On student related factors the students might not be ready for college or might be lacking general interest or motivation. On life and socioeconomic issues faculty members cited life issues, such as poverty, homelessness, single parenting, excessive workload, family responsibilities, health, mental illness, addiction and death of a loved one as factors that can affect students in gatekeeper courses. Failures of the educational system according to Cherif, (2014) reflected failure to address students’ diverse learning styles, lack of interest in teaching from the faculty as the major causes of students’ failure in gatekeeper courses.

Views of Students on Gatekeeper Courses

Forsyth et al (2008) report that when students get poor grades in courses they conclude that it was difficult and the teaching was of low quality as the key causes. Further to that Japhet et al (2015) report that “students view large classes as

overwhelming for lecturers which make it difficult to practice and get help in the classroom”. This is a disadvantage to students. In addition, the attitude of students towards learning is a big contributing factor to student failure in courses they undertake.

E. Views of Administrative Staff

Administrative staff acknowledge that gatekeeper courses significantly influence student retention and graduation rates. In their study Wong and Koller, (2023) established that students who take more high-risk courses in their first year have lower fall-to-fall retention rates. Administrators see these courses as both a challenge and an opportunity. “Improving outcomes in high-risk courses is viewed as a lever for increasing overall institutional retention and equity” (Wong and Koller, 2023). Administrators acknowledge that high failure or non-enrolment rates in these courses can contribute to low overall completion rates (Roksa, Jenkins, Jaggars, Zeidenberg and Woo Cho, (2009). Gatekeeper or high-risk courses often act as critical hurdles for student progression and degree completion. These courses are central to discussions about student retention and academic success. Gatekeeper courses are essential for students as they progress through their college education. “These courses are prerequisites for other courses” (Hoffman, 2020:17). All students take certain gatekeeper courses. Cuseo (2017) grouped administrators’ views on student failure onto academic and motivational roots. Under academic roots, administrators view inadequate preparation to meet the academic demands of college coursework and lack of interest with the content of courses or their method of delivery by the lecturers as factors affecting first years. Affirming this, Cuseo (2017) cite lack of commitment to school work and perceived irrelevance of the college experience by students as major causes of student failure. Psychosocial and financial roots are viewed by administrators as causes of student attrition. Administrators are of the view that students with high entry qualifications often perform better than those with low entry qualifications (Adedeji, 2001). In the words of Amasuomo (2014) “admission points and the different entry qualifications, which are the results of prior or previous academic performance, are likely to affect the students’ future academic performance. Institutions all over the world, including Africa University, use prior academic performance in terms of admission points for entry into degree programmes.

F. Impact of Gatekeeper Courses on Institutions Financial Resources

Gatekeeper courses can result in students dropping out of college without a certificate. According to Brox (2016) if students fail the exam in gatekeeper courses at their first attempt, they have to pass the second attempt. Otherwise, they lose the eligibility to continue the same programme. The goal of higher educational institutions is to train qualified workers for the labour market. “Dropout coincides with a waste of resources that could have been spent for other students” (Brox, 2016). Raisman (2013) laments attrition in colleges as it results in large sums of money being lost when students leave.

Each student who walks out of college takes his or her tuition, fees, and other revenue the institution might have been able to receive such as for housing, food and bookstore purchases. Fountain (2009) established that high DFW rates increase student waiting lists for courses and increase student demand for additional support services, such as tutoring and supplemental instruction at an institution. The cost to the student can be so high as to force a student to postpone or abandon any dreams of earning a college degree.

I. Institution's Reputation

II. Gatekeeper courses affect the quality of results and institutional pass rates. Institutional aim and pride to achieve quality is affected by gatekeeper courses. In this view, Marsh (2010) report that "It is difficult to get high enrolment for the preceding years in those courses that are labelled as challenging". Gatekeeper courses decrease the competitiveness and marketing of the programs. A low graduation rate decreases the ranking position of a university. Gatekeeper courses according to Alagehgr (2010) lower the graduation rate of a university and therefore negatively affect the ranking.

G. Strategies to address Gatekeeper Courses

Gatekeeper courses can easily be converted into gateway courses provided the appropriate action is taken before registration and during lesson delivery for the gatekeeper courses. Roksa (2009) recommended the review of policies and procedures both within and outside the system aimed at increasing gatekeeper course completion among students. In this view, Marsh (2010) identified three major strategies to address gatekeepers which are: (1) student support activities, such as tutoring and supplemental instruction, learning communities with linked courses and early warning systems, (2) curriculum review and pedagogy improvement, instructional improvement and multiple pedagogic techniques, clarifying course objectives, and (3) innovative training, this includes use of ICTs in the teaching and learning process. A number of actions to address "killer courses" can be taken by departments. One of them is to inform departments of DFWI rates. The departments may not be aware. Institutional variables such as support services, student environment and program of study play a vital role in students' academic performance (Fischler (2017). The support service includes the library and information and communication technology services. The institution should provide internet connectivity and the necessary hardware and software to enhance academic performance. The library can be equipped with digital and electronic information resources to facilitate access to learning and research resources anytime, anywhere with any gadget. Availability of these information resources enhance the quality of teaching, learning and ultimately reduce the failure rate in gatekeeper courses. Universities can use tutoring method for promoting student success. Peer tutoring has been shown to be effective for addressing retention in many programs (Batz, Olsen, Dumont, Dastoor, & Smith, 2015). The benefits of peer tutoring includes increasing understanding as the explanations are from colleagues. It provides skills, practice and immediate feedback on performance. Errors are corrected on the spot and

a social and supportive environment is nurtured. Introducing study skills enhancement programmes may help in reducing the problem of gatekeeper courses. Universities need to create a student-centered learning environment in which students are active learners. ENLACE Florida (2009) report that "universities can also support departmental efforts to improve student performance in gatekeeper courses by offering supplemental instruction (SI) to students". A study at Florida International University demonstrated that passing rates in gatekeeper courses can be improved by reforming the class structure, offering supplemental instruction, and strengthening student support services (ENLACE Florida, 2025). This study also established that the failure to pass a gatekeeper course does not reside entirely with the student. Professors, departments, and higher academic officials at colleges and universities also have an obligation— including ethical responsibilities—to facilitate the learning and success of every single student who walks into any university classroom (ENLACE Florida, 2025).

III. RESEARCH METHODOLOGY

This study adopted both qualitative and quantitative methodologies. Data mining, questionnaires and observation were used to identify what courses are gatekeepers, where they reside, what views are held by students and lecturers about such courses and what strategies the University can use to transform such courses into gateway courses. This study is descriptive. Clustering analysis was used in the current study. A cluster is a collection of similar data objects. Clustering analysis was done. The data mining component of this study did not use a sample as data was mined from the total population consisting all records for the selected period. However, for the survey part, the researcher used samples drawn from students, staff and faculty. Data mining component of this study consists of student records from 2014 to 2017 to date. The SISA database from where data was mined has records for over 10000 students over the defined period. For the purposes of the survey, the population consisted of full time lecturers teaching at Africa University and academic support staff, undergraduate, conversional students registered for the academic years 2014 to 2017. Academic support staff were treated as key informants and five participants were conveniently selected each from the library, registry and ICT.

A. Population Sample sizes

For populations that are large, Cochran (1963:75) developed the equation below to yield a representative sample for proportions as quoted in (Stanley, 2016).

$$n_0 = \frac{Z^2 pq}{e^2}$$

Which is valid where:-

- n_0 is the sample size,
- Z^2 is the abscissa of the normal curve that cuts off an area α at the tails ($1 - \alpha$ equals the desired confidence level, e.g., 95%)
- e is the desired level of precision

- p is the estimated proportion of an attribute that is present in the population, and q is 1-p.
- Z is found in statistical tables which contain the area under the normal curve

Calculation of sample size

• n_0 is the sample size,

• $Z^2 = 1.96$

• $p = 0.2$ as the proportion of failure for and 0.8 proportion of Success

• $e = 0.05$ from statistical tables which contain the area under the normal curve

$N = 1.96^2 * 0.2 * 0.8$

$= 307$

Anticipating 10% non-response from the distributed questionnaires

Therefore, the maximum sample size $= 307 / 0.9 = 341$

Student sample

Anticipating 10% non-response from the distributed questionnaires Therefore, the maximum sample size

$= 307 / 0.9 = 341$

Student sample

Students are stratified by year of admission as shown by the table below.

TABLE 2. Source CSISA) AU Database 2018

Year	2014	2015	2016	2017	Total
No of Students	421	457	560	406	1844

Stratified by year

2014 sample size = $421 / 1844 * 341 = 77.85$
 $= 78$ Students

2015 sample size = $457 / 1844 * 341 = 84.51$
 $= 85$ Students

2016 sample size = $560 / 1844 * 341 = 103.55$
 $= 104$ students

2017 sample size = $406 / 1844 * 341 = 75.08$
 $= 75$ students

B. Lecturers sample

Lectures are stratified by college as shown by the table below.

TABLE 3. Source AU HR Database 2018

College	CHANS	CSSTHE	CBPLG	Total
Lecturers	13	29	23	65

Twenty Lecturing staff will be selected purposively. This is because we have identified 20 gatekeeper courses in the period of study. Ten Lectures whose courses are identified as gatekeeper courses and ten whose courses achieve high pass rates will be included in the study.

Purposive sampling in going to be used to select the lectures for the concerned courses.

C. Academic Support staff

Support staff stratified by Departments as shown by the

table below:

TABLE 4. Source AU HR Database 2018

Department	Library	Registry	ICT	Total
Members	19	16	8	

Academic Support staff are key informants and five from the library, five from registry and five from ICT are going to be chosen conveniently.

IV. DATA PRESENTATION AND ANALYSIS

Academic records from the student database SISA were extracted and analysed using SQL data mining scripts. Data was transcribed from data collection tools. An analysis of associations between and among the variables was performed. Percentages and averages were used to describe the data. Qualitative data was analysed manually using open coding to establish emerging themes. Cross-case analysis was conducted to establish any overlaps and common trends. The study was submitted to the AUREC for ethics review and permission to conduct the study was sought from AU management. Both quantitative and qualitative approaches were used to address theme 1. An SQL server and Microsoft Excel software were used for the mining and analysis process. Questionnaires were used to gather data from lecturers, students and administrators. Results are discussed under three major sections. The first is identification of gatekeeper courses, the second section is views of students, lecturers and administrators on gatekeeper courses and the third section focusses on strategies to address gatekeeper courses. Data was analysed to identify gatekeeper courses at Africa University and possible solutions recommended.

A. Identified Gatekeeper course from Data Mining

Data mining was done using SQL Server queries (See appendix for the script). Output from a SQL Server Query passed into the Student Database is as below

TABLE 4.1 Source Data mined from SISA

Course	Yr	A	A-	B+	B	B-	C+	C-	C	D	FF
MAC102	2014	10	17	21	15	26	18	8	23	15	39
MEC101	2014	3	18	11	14	32	17	10	22	23	17
MMS103	2014	2	15	19	24	28	14	19	9	27	11
MMS101	2014	20	30	19	13	12	4	10	12	16	24
MMS202	2014	2	1	4	4	11	15	16	34	4	33
MKT102	2014	1	3	5	22	16	27	10	14	23	14
MMS203	2014	4	5	4	12	9	21	8	8	14	11
MAC305	2014	6	10	3	1	10	11	8	20	15	3
MMS204	2014	0	1	1	5	13	8	10	9	37	0

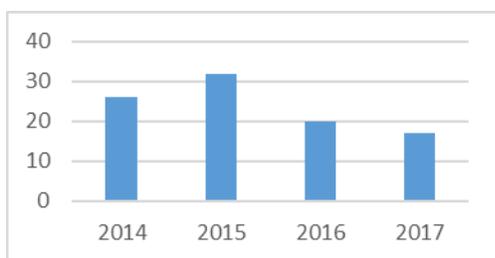
The results clearly showed that there are courses that are gatekeepers at Africa University. Accounting, mathematics, economics and quantitative methods fall into these categories. A gatekeeper course has a high enrolment rate and high failure rate. For the purposes of this study, a course enrolment of 25 students and a failure rate of 20% and above was used. Filtering technique for courses with a failure rate greater than or equal to 20% and a student enrolment greater or equal to 25 was applied to the 78 records from above and a total of 26 courses were identified as gatekeeper courses at Africa University during the period under study.

B. Gatekeeper Courses per Year

TABLE 4.2 Number of Gatekeeper Courses Grouped by Year

Year	2014	2015	2016	2017
Gatekeeper courses	26	32	20	17

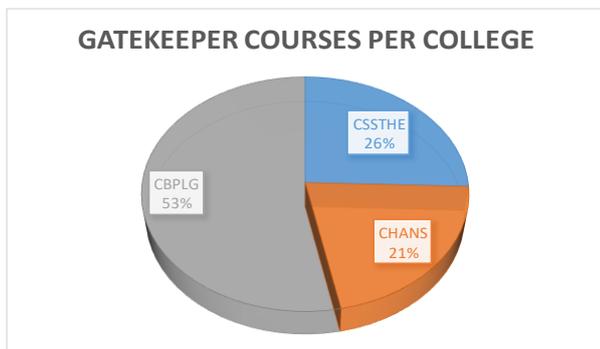
After identifying the gatekeeper courses the researcher went on to group them by year as shown by Table 4.2 above and Graph 4.1 below. The table and graph show a decreasing trend from 2014 to 2017.



Graph 4.1 Number of Gatekeeper Courses by Year

C. Gatekeeper Courses by College

The pie chart below shows the occurrence of gatekeeper courses across the three colleges at Africa University constituted more than a quarter of courses offered and rose to more than 30% in 2015 before gradually falling to less than 20% in 2017.



The highest number of gatekeeper courses occur in the College of Business and Management Sciences with more than half of all such courses in the University. The other two colleges had an almost similar number of gatekeeper courses. Table Occurrence of Gatekeeper Courses for the Period 2015 to 2017

In CHANS, two courses, ACP101 and ACP202 consistently occurred as gatekeeper courses for three consecutive years from 2014 to 2016. Three courses, AAE101, AAS101 and ACP104 which were not gatekeeper courses emerged as such in 2016 while two courses AEC101 and SNS304 that were gatekeeper courses ceased to be such in 2016. In CSSTHE, two courses, HPO111 and HPO112 consistently occurred as gatekeeper courses from 2014 to 2016. Two courses, TBS104 and TRP100 which were not gatekeeper courses emerged as such in 2016 while three courses HES221, HSA201 and TCH211 that were gatekeeper courses ceased to be such in 2016. In CBPLG two courses, MMS101 consistently occurred as gatekeeper courses for the

four years under study from 2014 to 2017. Two courses MAC101 and MMS101 emerged as gatekeeper courses for three years. MKT102, MMS203, MMS204 and MMS206 consistently occurred as gatekeeper courses from 2014 to 2015 thereafter they were no longer gatekeepers. CHANS and CSSTHE did not have gatekeepers in 2017.

Classification of Gatekeeper courses by College for the period 2014 to 2017					CBPLG						
Course	Course Occurrence as Gatekeeper				Total	Course	Course Occurrence as Gatekeeper				Total
	2014	2015	2016	2017			2014	2015	2016	2017	
CIS201	0	1	1	0	2						
CIS202	1	0	0	0	1						
MAC101	0	1	1	1	3						
MAC102	1	0	0	0	1						
MAC202	0	1	1	0	2						
MAC207	1	0	0	0	1						
MAC305	1	0	0	0	1						
MEC101	1	0	0	0	1						
MEC201	1	0	0	0	1						
MKT102	1	1	0	0	2						
MKT302	1	1	0	0	2						
MMS100	1	0	0	0	1						
MMS101	1	1	1	1	4						
MMS103	1	0	0	0	1						
MMS105	0	1	1	0	2						
MMS201	0	0	1	0	1						
MMS202	1	1	1	0	3						
MMS203	1	1	0	0	2						
MMS204	1	1	0	0	2						
MMS206	1	1	0	0	2						
MMS402	1	0	0	0	1						
MPM101	0	1	0	0	1						
MPM106	0	1	1	0	2						
MPM108	0	1	0	0	1						
MPM202	0	1	0	0	1						
MPM203	0	1	0	0	1						
MPM208	0	1	0	0	1						
TOTAL	4	7	7	18	36	7	8	4	19	38	

Demographic Characteristics of Respondents Response Rate

We had a 78% response rate distributed as below. This was considered adequate as the questionnaires were distributed through email and they were self-administered.

Questionnaires	Distributed	Returned
Lecturers	50	45
Students	550	420
Administration Staff	20	20
Total Responses	620	485
Percentage Returned		78%

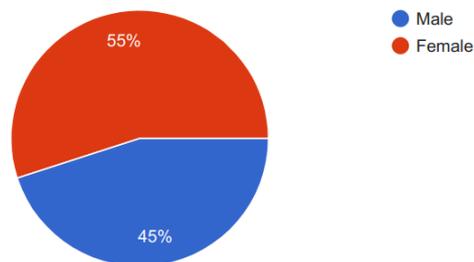


Figure 4.1 Distribution of Student Participants

It was important to include proportionate numbers of male and female participants in the research in order to avoid gender bias. Therefore, as reflected in Figure 4.1 above, the distribution of male to female participants was 45:55 which compares well with the actual student population gender distribution of Africa University of 55% females.

D. Entry Qualifications

Student participants were asked about their highest qualifications before joining Africa University. This was important because inadequate entry qualifications may cause poor performance of students and result in gatekeeper courses.

A study by (Adedeji, 2001) established a strong relationship between entry qualification and course performance in first year of study by students.

.What was your highest qualifications before joining AU?

1 responses

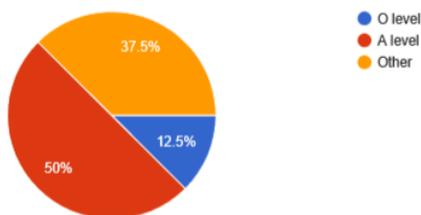


Figure 4.2 Entry Qualifications of student participants

The pie chart in Figure 4.2 above clearly showed that 50% of students entered the degree programme with Advanced Level Qualifications. 12% of the student participants had Ordinary Levels and about 38% other qualifications as their entry qualifications.

Class size

Another factor considered by the researcher was class size in relation to the failed courses. When asked about this, 45% of the participants pointed out that their class size was less than 25 students. However, 55% are in the large class range with 27.5% having up to 50 students and the other 27.5% having more than 50 students per class as shown in Graph 4.1.

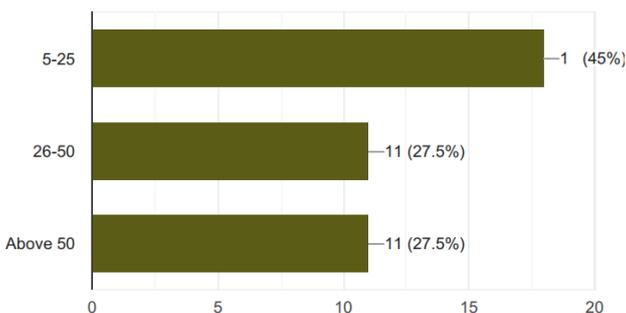


Figure 4.3 Distribution by Class size

D. Identification of Gatekeeper Courses by Participants

Students, faculty and administrators were asked about courses which they viewed as gatekeepers. Accounting, mathematics and economics courses were predominantly cited. These were the same courses extracted by the data mining exercise confirming that the courses defined as gatekeepers in the study were also perceived as such by participants. A student respondent had this to say when asked why the course was difficult for him/her...

“Because the lecturer was too fast in explaining even if he had to repeat himself several times I could not understand because he used the same method of explaining and he was skipping steps “

The issue of teaching method and language barriers may be affecting student performance. Another student respondent had this to say

“There is not so much being done to see whether the problem is not the students or the lecturer. But a course where students fail mostly every year should not be the students' fault.”

Another student respondent had this to say:

“It was not difficult per say but it just felt like a course that will never be of any use to edify my degree because I was learning it just to fill up the credit hours.”

This may imply the need for curriculum review for all the courses the student registers per semester, some may not directly contribute to the degree programme they are doing. Administrators when asked similar questions were quick to mention quantitative methods, mathematics and accounting as gatekeeper courses.

A faculty participant had this to say:

“Lecturers should understand that making things difficult does not make it more important. Without compromising on standards lecturers should facilitate student success by using various pedagogies. Staff development for lecturers without teaching qualifications should be encouraged”.

One administrator participant had this to say:

“Some students are enrolled without the high school prerequisites, e.g. mathematics at A” level which is not offered in other countries”. In view of this Adedeji, (2001) reported that “students with high entry qualifications often perform better than those with low entry qualifications”.

Strategies to address Gatekeeper Courses

Lecturers involved in this study were asked about how student performance can be improved. They all indicated that they needed systematic training on the use of technology lesson delivery. Although innovative teaching and learning equipment are available at the Africa University, participants emphasised that they needed to be staff-developed on how to utilise the resources in their lecture rooms. The responses also revealed that they need to use teaching methods that are student-centred besides the lecture method. Besides staff development programmes, lecturers preferred small classes and workloads which they view as manageable. Administrator participants emphasised tutorials from qualified tutors, curriculum review and increase in attendance by students. There was mention of having proper entry qualifications for the programme of study.

E. Discussion of Findings

Discussion of findings is based on the objectives of the study. The following sections discuss the findings.

Research Objective 1: to identify gatekeeper courses in the undergraduate, conventional programmes using data mining techniques.

A total of 26 courses were identified as gatekeeper courses at Africa University during the period under study. Accounting, mathematics, economics and quantitative methods fall into these categories. Views from some administrators show that some students are enrolled without the high school prerequisites such as Advanced Level mathematics which is not offered in other countries. A study by Shay et al (2020) at the University of Capetown (UCT) established that “the MAM suite of courses is failing

approximately 35 percent of its students”. Further, Shay et al (2020) report that “successful completion of MAM1005H is a prerequisite for MAM1006H”. These authors emphasise that “more than 33 percent of all students enrolled in this course over the period in question achieved less than 50 percent”. The highest number of gatekeeper courses occur in the College of Business and Management Sciences with more than half of all such courses in the University. In their study, Shay et al (2020) at the University of Capetown established that some faculties have greater challenges in retaining and progressing students. This is despite the fact that “UCT attracts some of the top academic talent in the country” (Shay et al (2020)). In CHANS, two courses, ACP101 and ACP202 consistently occurred as gatekeeper courses for three consecutive years from 2014 to 2016. Two courses MAC101 and MMS101 emerged as gatekeeper courses for three years.

Objective 2: to establish the views of faculty, administrative staff and students towards gatekeeper courses at Africa University. Views of each category of participants are discussed in the following sections.

Administrator Views

From the perspective of administrators some students are enrolled without the high school prerequisites, e.g. mathematics at A” level which is not offered in other countries. Administrators at Africa University view quantitative methods, mathematics and accounting as gatekeeper courses. In view of this Adedeji, (2001) report that “students with high entry qualifications often perform better than those with low entry qualifications”. Affirming this, Lancia et al., (2013) add that historically student success has been defined in terms of grades, grade point average (GPA), course completion, retention rates, degree of attainment, or transfer. A study by Hoffman (2022) established that high school GPA was a good predictor of success”. In their study Lancia et al., (2013) examined over 4500 academic records and found out that “more successful students tend to be older, have higher income and a higher high school grade point average”. Administrators often see gatekeeper courses as essential for maintaining academic standards and ensuring students possess necessary foundational skills before specialising in the chosen discipline. Administrators compare gatekeeper courses to screening mechanisms to ensure students are prepared for the rigor of their chosen discipline (Reddit, 2025). Success in these courses is viewed as a strong predictor of student retention and progression. Administrators at Africa University view strengthening support services as key to student success. In concurrence with these results, Eagan and Jaeger (2008) report that “administrators recognize that improving faculty support and accessibility is important for student success in gatekeeper courses”.

F. Lecturer Views

Lecturers suggested curriculum review without compromising on standards, use of various pedagogies and adhering to strict enrolment standards to ensure students recruited can complete the programme. Lecturers reported that some students are enrolled without the high school prerequisites for example Advanced Level Mathematics which

is not offered in other countries. Africa University enrolls students from various African countries and beyond. From the perspective of lecturers, staff development should be introduced for lecturers without teaching qualifications to improve their teaching skills. Furthermore, lecturers viewed service courses as gatekeeper courses. In the context of Africa University, service courses are university-wide courses and they are most often taught by part-time lecturers. According to Shay et al., (2020) these courses are taught by departments outside of the student’s faculty of registration. They may also be requirements for entrance or continued progression in a number of different academic programmes, and thus not only contribute to high failure rates but also have a high overall impact on programme progression (Shay et al., 2020).

G. Student Views

Fifty-five percent of the students reported large classes were affecting their studies since it was difficult to interact with lecturers. Affirming this, Japhet, et al (2015) established that large classes were overwhelming lecturers and affecting the students’ performance negatively. “Gatekeeper courses have received significant criticisms from students and scholars for a number of reasons, including: (1) the lecture format encourages passive learning (2) professors often grade students on a curve (3) a high premium is often placed on memorising information rather than thinking critically about concepts (4) they are often taught by part-time adjunct faculty (5) they are deliberately designed by some faculty to weed-out students” Eagan and Jaeger, (2008). “Some students feel that these classes are designed to “weed out” those deemed less prepared or less committed, which can discourage exploration and learning outside one’s primary field of interest” (Nguyen, Fagioli, and Kaminsky, 2020). This leads to burnout or discouraging interest in a subject (Reddit, 2019). During the period under study, most university wide courses were often taught by part-time adjunct faculty who did not have adequate time to engage/interact with students. This might have resulted in increased gatekeeper courses. “First-year college students are more likely to drop out of college if their gatekeeper courses are taught by part-time adjuncts” (Glenn, 2008).

Furthermore, students expressed their discontent about how lecturers were using inappropriate teaching methodologies that do not provide adequate time for interaction. Students said lecturers pace their lectures very fast leaving no time for interaction. In their study at the University of Capetown Shay et al., (2020) established factors that exposed students to risk in MAM1000W. These were the lecturing styles of some lecturers, learning strategies that needed improvement and difficult content material especially in the second semester. According to Shay et al (2020) students expressed their discontent about how lecturers pace their lectures very fast such that they could not follow. In addition, students reported that where students fail mostly every year should not be the student fault. Results show that some courses were not relevant to edify the chosen degree program. This implies the need for curriculum review. Universities, departments, professors, and graduate assistants must do everything they can to facilitate the success of

students who enrol in their classes, particularly those large, introductory courses that must be passed in order for students to fulfil university requirements (ENLACE Florida, 2008). Africa University enrolls students from various African countries and some from French and Portuguese speaking countries. English is the language used for teaching at Africa University. Therefore, teaching methods and language barriers may be affecting student performance.

Objective 3: Recommend possible strategies to convert gatekeeper courses into gateway courses at Africa University

Results of the current study show that strengthening support services such as library services, student advisory services, career guidance and information and communication technologies is important in improving student success. Availability of these services enhance the quality of teaching, learning and ultimately reduce the failure rate in gatekeeper courses. University libraries play a pivotal role in supporting student success and reducing the negative impact of gatekeeper courses. ExLibris (2025) report that in their day-to-day interaction with students and faculty across disciplines, they are also positioned to directly impact student success. Libraries ensure that required and recommended readings are available to all students at no cost, reducing financial barriers that might otherwise prevent students from fully participating in gatekeeper courses.

V. CONCLUSION

Gatekeeper courses constitute a significant barrier to success in higher education. This study concludes that lecturers can adopt high impact teaching practices in order to convert gatekeeper courses to gateway courses. Universities should carefully review their policies and programmes affecting student performance in gatekeeper courses in order to improve student success rates. This study also concludes that providing professional development support for faculty improves the quality of teaching and student completion rates. Equipping the university language laboratory significantly improves student success by providing an interactive and supportive environment for language learning. Africa University should introduce academic literacy and information literacy skills training courses in order to improve student success rates. Academic and information literacy improves academic writing, study skills, research skills, communication and ethical use of academic information resources which in turn result in student success. Universities should use multiple measures assessments when assessing students for enrolment in degree programmes. Use of standardised placement testing and high school transcripts only may not be adequate. The study recommends equipping the language laboratory at the university since this directly contribute to student success, especially in language acquisition and communication skills.

VI. RECOMMENDATIONS

A. Strengthening Student Advisory Services

Provision of active student advisory services is important. This includes teaching students study skills and provision of career guidance services. Learning resources like course outlines and timetables should be within student reach. Focus

on student-centred learning improves student graduation rates. In this view, universities should strengthen research support services and student advisory services.

B. Academic Literacy and Information Literacy Skills

Academic literacy and information literacy skills courses equip students with digital and research skills to enable them to effective use and ethically communicate academic information. Library services should be available to students 24/7 in all formats so that students have access to library resources to support their research and studies.

C. Adoption of Innovative Teaching Methodologies

Lecturers need to adopt innovative teaching methodologies that are interactive in order to engage students and ultimately reduce DFWI rates. Using technologies in teaching will improve interaction in class thereby improving student engagement and success. Lecturers need to adequately prepare for lectures in order to deliver lectures in a lively way. In addition, lecturers should vary the activities (presentations, group work and seminar) in the class which makes the presentation lively. Lecturers should be trained on the use of e-learning platforms to ensure teaching and learning materials are readily available. Use of online information resources is important in providing access to academic information resources.

D. Curriculum Review

There is need for curriculum review of all the programmes on offer to ensure that they are relevant to the needs of students and industry so that students see the value of these courses.

E. Establish a Language Laboratory

Establish and equip a Language Laboratory in the University Library. Capacity-building the Multimedia Centre in the university library is important in breaking the language barrier for international students.

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