Student Retention in Fully Online Programmes at Two South African Universities

Kimera Moodley*, Mari van Wyk, Donald Tive, Izak van Zyl, and Johannes Cronje

***Abstract*—Literature indicates that low retention rates are evident in online modules and programmes. However, a much higher student retention rate than anticipated was observed in two fully online programmes at two South African universities. To explore this retention phenomena, a non-experimental quantitative study was done. The study uses descriptive statistics to identify trends and patterns in student retention and applies non-parametric statistics to test the significance of the observed patterns. Typically, students in a fully online carousel model programme drop out after the first module, specifically in the first two weeks of the module. After the third module, student retention stabilises. Similar patterns are visible in the year model, where students typically drop out within the first three months of their first year. Dropout continues in the second year, resulting in two distinct linear phases of dropout. However, in year 3, approximately 50% of the retained students continued. Findings reveal critical dropout periods. Further studies can be conducted to determine the causes of dropout so that measures can be implemented to improve student retention in higher education.**

***Index Terms*—Dropout, higher education, online learning, South Africa, student retention**

I. Introduction

The enrolment rate in online distance learning programmes, both globally and in South Africa, has grown steadily and significantly in recent years [1–3]. Despite this, student retention rates in online programmes are reportedly low [4], where retention refers to the continued enrolment of a student from one year to the next. Historically, (fully) online modules are known to have a 10–20% lower retention rate than traditional or blended modules [1]. Research reports are inconsistent regarding the dropout rate for online modules and qualifications. For example, in some online modules, the dropout rate is as high as between 40-80% [1], while in another study dropout rates in fully online modules range between 35–40% [5]. Simpson [6] asserted that 78% of students in online qualifications in the United Kingdom drop out and do it early in their studies, or during the first module [6]. These discrepancies are due to the methodologies used to calculate dropout, enrolment policies and definitions of terms such as retention and dropout [7]. The high dropout rate and the inconsistencies in reporting the statistics of online universities are a challenge for the global higher education sector [8], as the long-term success of universities depends on the long-term success of their students [9, 10].

Despite attempts to understand the risk factors that contribute to lower retention in South Africa [11], self-paced distance learning programmes continue to experience high student dropouts [12]. Drawing on the work of Seery and Barreda *et al*. [2], the present study explores the student retention phenomena by investigating the trends and patterns of student retention in fully online programmes. The study reports on the student retention rates, dropout patterns, and the throughput rates observed in two fully online programmes from two South African universities. The present study focuses on the following research question:

How do the trends and patterns of student retention rates differ between a fully online carousel programme and a fully online semester programme?

In order to address this question, the following sub-questions were explored:

1) What are student retention rates within modules and in the broader programmes?
2) When are the critical periods where student dropout is most prevalent?
3) What is the throughput rate in fully online programmes?

The primary objective of this study is to contribute to the emerging literature on trends and patterns of student retention in fully online programmes in higher education. Our findings advance the field in several ways: we provide context-bound insight into the trends and patterns of student retention in fully online programmes across regions, institutions, and programmes.

II. Background and Theoretical Overview

Online learning is often used interchangeably with e-learning, virtual learning, network(ed) learning, web-based learning, mobile learning, and distance learning [4]. This is because online learning encompasses Internet access and various technological applications, devices, and media for educational purposes [4]. Globally, there has been a renewed focus—at all levels of education—on online or distance learning in the context of the COVID-19 pandemic [13]. Subsequently, the interest in (and significance of) these programmes has been revived in the context of emergency remote teaching and learning.

The development of fully online programmes and short courses in higher education institutions in South Africa (e.g., University of Pretoria, University of the Free State, University of the Western Cape, University of Cape Town, and Cape Peninsula University of Technology) predate the onset of COVID-19. This growth in formal online university qualifications is also accompanied by the recent introduction of fully online secondary education (e.g., the UCT Online

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Kimera Moodley, Mari van Wyk, and Donald Tive are with the Directorate of Comprehensive Online Education Services, University of Pretoria, South Africa.

Izak van Zyl and Johannes Cronje are with the Cape Peninsula University of Technology, South Africa.

*Correspondence: kimera.moodley@up.ac.za (K.M.)

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High School and St Stithians Online School). It is within this long-term use of fully online programmes that this study is situated.

The growth in online distance education necessitates the need to reassess student retention and success in the online environment. Current literature on retention rates in online programmes is minimal [2], and there is a lack of consensus on the extent of the poor student retention phenomenon in online learning programmes. This prompted the need for an analysis and understanding of the trends and patterns of online programmes in South African universities.

A. Online Retention, Throughput, and Dropout

Student retention, attrition, and dropout are complex but interrelated notions. Retention reflects the general ability of learning institutions to preserve their student enrolment numbers and mitigate the risk factors that lead to student deregistration, dropout, or failure [14]. Student retention is typically described as the continued enrolment of a student from one year to the next [10]. A retention rate is a numerical marker of the proportion of students who have (actively) remained in or completed a particular module or degree programme. However, retention does not necessarily reflect the level of student activity and engagement in a module [15]. Retention rates may vary across modules, degree programmes, teaching modalities, year of study, departments, faculties, and the like.

Moodley and Singh [16] refer to the different categories of students who do not return to university, namely dropout and attrition. Dropout is often associated with failure or inability and therefore presents a negative connotation. Whatever the reasons behind the dropout, the result is students who leave tertiary studies without obtaining a formal qualification. Moodley and Singh go on to list the terms to describe dropout from a student perspective, and these include: "departure, withdrawal, academic failure and non-continuance" [16]. Attrition, in turn, is the gradual weariness brought about through academic, social, economic, and other pressures [17]. While dropout and attrition can be used interchangeably, attrition is regarded as a steady decline in academic interest or performance, which might result in withdrawal, however, not necessarily. Therefore, this study distinguishes between the terms and focus of work by describing instances and trends of dropout.

Dropout or withdrawal from tertiary education may have far-reaching social and economic implications. By doing online modules (as with all other modules), students will receive acknowledgement and ultimately a qualification [18]. Obtaining a new qualification can potentially lead to personal growth, promotion, or new career opportunities, contributing to the economy and society. The economic cost of students dropping out of a module is high, both for the student and the university. Time, effort, and money are wasted on the part of all stakeholders [19]. Therefore, it becomes necessary to study retention in various dimensions starting from the trends and patterns of various modalities of online learning.

From an educational perspective, high retention rates indicate the success of a module or qualification [2]. From a financial perspective, high retention rates are critical. Retention affects the rating and economic well-being of universities, as subsidiary structures and allocations are based on the ability of the university to retain its students [20]. Overall, retention is fundamental in sustaining the educational integrity of a university and provides valuable information to inform policy development [21].

Despite their differences, retention and throughput rate are closely linked. While retention rate refers to the proportion of students who are still enrolled in a qualification, throughput rate refers to how many of the initially enrolled students completed the programme within a certain period [22]. The calculation of the throughput rate is based on the same cohort of students who enrolled in year 1 and finished within the allotted period. Low throughput rates lead to higher education costs and a waste of time and money for students and institutions [22]. Consequently, a high retention rate might result in a higher throughput rate [23].

B. Theoretical Perspectives of Student Retention and Dropout

Challenges of student retention and dropout have impeded higher education institutions for several decades and continue to threaten the viability of universities [24]. Considering this comment, scholars have long theorised the nature, effects, and conditions of retention and dropout in tertiary education. The seminal work of Tinto [25], for example, examines the relationship between the student and the university environment and it is clear from this work that the phenomenon of dropout is complex and interwoven with interpersonal, academic, institutional, and even political dynamics.

Tinto's model relies heavily on the notion of connections [25]. When a student transitions from the familiar hometown, high school, or family life to university, connections made with the social system and the academic system of the university determines whether a student persists or drops out [26, 27]. However, in an online environment, the transition is not as apparent as students stay in their own homes with their families while enrolling in an online qualification. Subsequently, the social system is less visible, however, no less critical [28]. According to Burke [10], when students feel a sense of belonging, they are more likely to be retained from one year to the next. In a face-to-face learning context, students partake in social activities, such as student relations, residential life, and sports events. Conversely, the academic system is magnified in an online environment compared to the social system since it becomes the focal point of the student, where interaction takes place with the lecturers, peers, content, and grades [29]. Although Tinto's [25] work is still helpful in understanding online retention, new arguments and relations need to be made when investigating online retention rates. Even though Tinto's [25] model has been applied in many contexts, other researchers (Undergraduate Dropout Process Model [30]), (Student Attrition Model [31]) argue that none of these models are testable with a direct correlation [10]. Some authors rely on the characteristics of individual relationships [25, 30], whereas another author [32] focused on the workplace.

The work of certain researchers [11, 32] somewhat departs from a theory of institution-driven risk and finds that a 'sense of belonging' has the "most important direct effect on

students' intention to stay or drop out of university" [11, p. 212]. However, an important proviso here is that this research was conducted with first-year students. This furthermore accords with a different analysis by Laato *et al.* [33], who found that students tend to drop out at the beginning of a module when their sense of belonging is yet to be forged. Earlier work illuminates these findings [16]. These authors describe increased dropouts among first-generation students, namely those whose parents or family members had no tertiary education. These students tend to receive less moral support from their families and have different (and potentially mismatching) expectations when entering their first year of tertiary education.

C. Factors that Inhibit Student Retention

Prior research [6] suggests that the graduation rates from online learning institutions are less than 25% of the traditional face-to-face universities and therefore, an online education gap is observed. A different study suggests that universities focus so much on creating teaching material that motivation for students to learn, is left behind [6]. Therefore, universities need to put plans in place to overcome high dropout rates.

Recent studies [12, 16, 34, 35] support the view that retention and dropout are influenced by myriad factors extending beyond the student's academic proficiency, irrespective of modality. These include the educational programme (workload; lack of interaction; meaningless activities; cognitive load), personal challenges (family and work responsibilities; lack of affordability), aptitude, technological capability, and, importantly, institutional barriers [12, 16, 34, 35]. Alarmingly, one study [34] argues that institutions play an instrumental role in creating at-risk students "through institutional culture, procedures, policies and assumptions about the nature of teaching and learning" (p. 129). Seery and Barreda *et al.* [2] identified five factors that influence student retention: student affective factors; institutional; faculty and module factors; environmental and demographic factors; and student academic and technology factors. Student attitudes, values, and beliefs are essential in a student continuing their online studies, where motivation plays a pivotal role in online studies [2, 36]. Non-cognitive issues, such as perseverance, goal commitment, and self-efficacy also play a role in student retention [37]. Not only is the role of the student important, lecturers also need to develop an online presence, creating a space to interact with students. Furthermore, environmental factors, such as finances, emotional support, workload, and family responsibilities influence student retention. In some of the articles reviewed by researchers [2], it was found that academic and technological factors might increase student retention. As mentioned earlier, the issue of retention is more complex than expected. Another study [38] reported that cost, time-management, and lifestyle changes contributed to more than 50% of student dropouts. Other demographic factors, such as age, gender, rank, and academic readiness may also impact retention [39–44]. Socioeconomic background in terms of family responsibilities and workload are further reasons for low retention [45]. In contrast with previous studies, which did not refer to academic achievement, one study [9] advocates that a high Grade Point Average (GPA) is a strong predictor coupled with facilitator personality for student retention.

Seery and Barreda *et al.* [2] supported by other studies [4, 46–48], identify various reasons why students continue with an open online module. These reasons can inform retention strategies. Module development, including timely assessment and feedback, is an important strategy to prevent students from dropping out. The module's design and ongoing lecturer involvement contributed to students' intention to continue studying. Providing students with career planners, technology support, and orientation programmes create a sense of security. Furthermore, both social and emotional engagement are necessary strategies to retain students. Social engagement can occur through well designed collaborative activities with other students, while emotional engagement refers to the student's internal relations like commitment to learning [2, 4, 46–48].

If the factors mentioned above resulted in students continuing in an online module, this would need to be included in the strategies to increase retention rates. Muljana and Luo [4] found six possible strategies to prevent student dropouts. High alert levels need to be in place to identify potentially at-risk students early. Not surprisingly, full-time student support is suggested, coupled with support for the lecturer. Weekly interaction between students and lecturers is essential to sustain the online presence and create a safe, collaborative environment [49]. The proper design of online modules, including constructive alignment, will also help prevent students from dropping out [50]. Lastly, all stakeholders (student, tutor, lecturer, student support) need to communicate regularly and clearly.

After an extensive literature review, Seery and Barreda *et al.* [2] found that common strategies to counter high dropout rates are providing lecturer training and support, including dedicated student support. Tinto and Pusser [51] reported various conditions for student success. These include institutional commitment, higher expectations, academic, social, and financial aid, monitoring and feedback from the lecturers, and educational and social involvement [26, 51].

Students also drop out at various stages in their academic life. In a study conducted by Perry and Boman *et al.* [52], 15% of the students that dropped out, did not even start the module work, however, researchers agree that most of the students drop out early in the module, semester, year, or programme [33, 50]. Higher education institutions are often so fixated on recruiting students that they lack the same commitment in retaining the students from registration to graduation [2]. This results in high dropout rates, especially in the online environment [2].

While it is a good idea to learn why students leave/dropout [1], this study focuses on the patterns/trends of student retention/dropout as well as when the student actually leaves. Therefore, the focus of this study is not on the factors or strategies, but the trends and patterns of student retention in two fully online programmes at two universities in South Africa.

III. Context of the Study

In this study, we explored the trends and patterns in student retention of two programmes from two different Higher Education Institutions in South Africa. While both programmes run fully online, the postgraduate diploma follows a carousel modality and the undergraduate diploma a traditional semester intake modality. Although both programmes under discussion are fully online, their curriculum offering structure differs. In the postgraduate diploma programme, students could only register for one module every eight weeks, while students in the undergraduate diploma could simultaneously register for up to five year-long modules.

A. Postgraduate Diploma

University A offers a fully online postgraduate diploma programme consisting of nine modules. The programme follows a rotating carousel approach where a new module is offered every eight weeks. All cohorts start with the same module (Module A) that repeats every eight weeks and thereafter proceed to any other module offered during the rotation period, and end with a research capstone (Module I), as shown in Fig. 1. The rotating carousel format allows students to join the programme at any of the six intakes in a year and complete the programme 18 months later. This fully online offering began in May 2020 and attracted 1080 students by June 2021. This study explores student retention phenomena using enrolment data from the seven cohorts registered between May 2020 and June 2021.

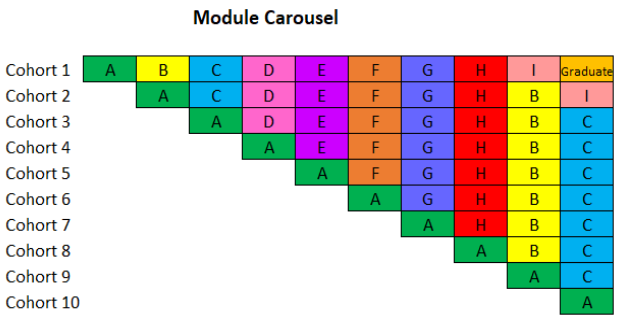


Fig. 1. Extract of the carousel (rotational) enrolment of students.

B. Undergraduate Diploma

University B offers a three-year undergraduate diploma programme through contact and a fully online learning mode. This study focuses only on students that enrolled for the programme in fully online learning mode. The selection criteria for a student's inclusion into the study was as follows: (i) a student enrolled as a first-year student in this programme between 2017 and 2020; (ii) a student that did not transfer from another programme or institution; and (iii) a student that was enrolled for the fully online learning mode only. In the four cohorts that enrolled during the period under investigation, 739 students qualified for inclusion in the study sample. This undergraduate programme consists of 13 modules, divided between the three years of study. Fig. 2 illustrates the arrangements of modules per study year for each cohort. However, students could register for fewer modules than specified for their level of study.

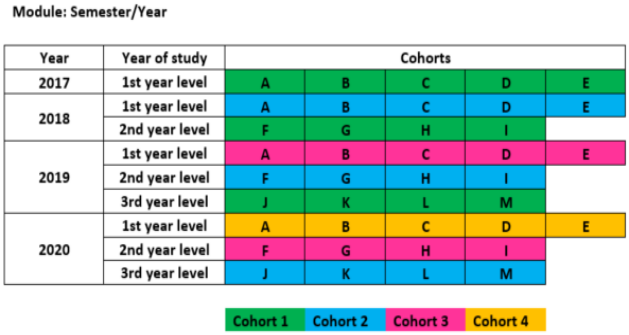


Fig. 2. Extract of semester enrolment of students.

C. Nine Dimensions of Online Learning

To place the two fully online qualifications in context and to highlight the similarities and differences between University A and University B's online programmes, nine dimensions of online learning were used as a structuring principle (Table I) [53]. The list of nine dimensions was derived from a review of the research on effective online learning [54]. The nine dimensions also highlight the complexities of online learning. However, not all dimensions are equally important and can be influenced by earlier choices regarding pedagogy and class sizes [54].

TABLE I: The Characteristics of Online Programmes

Dimension	PG Diploma	UG Diploma
Modality	Fully online	Fully online
Pacing	Self-paced within weekly deadlines	Class-paced, with self-paced between deliverables.
Student-instructor ratio	50 to 1 irrespective of student number	200 to 1 (1st year) 125 to 1 (3rd year)
Pedagogy	Exploratory, expository, practice, and collaboration	Predominantly expository at 1st year with more collaboration and exploration toward 3rd year
Role of online assessments	Provide students with information about learning state Input to grade	Provide students with information about learning state Input to grade
Instructor role online	Support and feedback, asynchronous instruction, occasional synchronous instruction	Active online instruction, discussion and group facilitation, feedback, and support.
Student role online	Explore e-resources, complete assignments and quizzes, read material, complete interactive learning activities, assessment, collaborate with peers and facilitator synchronously and/or asynchronously	Group and peer collaboration, attend online live lectures and workshops, listen to audio instruction, read material, watch both synchronous and asynchronous videos and interactive learning material, assessment and revision, communication with lecturer and peers.
Online communication synchrony	Asynchronous, with a few voluntary synchronous sessions	A blend of synchronous and asynchronous
Source of feedback	Automated, peer, and facilitator	Automated, peer, and facilitator

In this study, the two programmes have more similarities than differences, with the most significant differences being

the number of synchronous sessions at University B and the facilitator's involvement. Hodges and Moore *et al.* [54] point out that facilitators usually feel more comfortable presenting a module a second or third time because of the repetition.

IV. Methodology

The study examined institutional enrolment records from two universities and describe the trends and patterns of student retention in two fully online qualifications offered by the institutions. This non-experimental study [55] uses descriptive statistics to analyse, visualise, and describe the trends and patterns in the data. A time-series trend analysis method was used to plot the proportion of students who are retained at the end of institutionally defined module end periods, relative to the initial cohort size. Hypotheses surrounding the differences in retention rates and module pass rates were tested using the Mann-Whitney u-test.

The study used a convenient sample of two fully online qualifications from the respective institutions. Sample 1 was drawn from University A and sample 2 from University B.

Sample 1 was an 18-month postgraduate diploma programme. This sample consisted of 1080 students grouped into seven cohorts enrolled for the qualification between May 2020 and June 2021. The enrolment data was obtained from the university's Student Information System (SIS). In sample 1, the student retention rate in a module, was defined as the proportion of students who remain administratively enrolled in a module for the entire module offering period. In contrast to sample 2, this definition considered administratively enrolled students, however, academically inactive as retained. Specifically, such students are deemed to be retained in the current module, yet, were academically unsuccessful. At a programme level, the student retention rate was defined as a proportion of students that enrol into the next enrolment period relative to the initial cohort size.

Sample 2 was a three-year undergraduate diploma. This sample comprised 835 students grouped into four distinct cohorts that enrolled for the qualification between 2017 and 2021. This study used only the data of new, first-year students (739) during the period under investigation and thus, excluded historical and transferring students. The students' enrolment data was drawn from the Higher Education Management Information System (HEMIS). For this sample, student retention rate in a module was defined as the proportion of students who remained actively enrolled and sat for the summative assessments. The definition asserted that a student needs to be administratively enrolled and academically active in a module to be considered as retained. At a programme level, the student retention rate was defined similarly to sample 1 and was plotted as an annual proportion of re-enrolments relative to the initial cohort size.

The focus of this study was to find the trends in overall retention rates, identify the patterns and periods where dropout is prevalent, and determine the throughput rate in the two programmes. Therefore, the study summarised and visualised the enrolment and dropout patterns to plot a trend over time.

V. Results

The results will be discussed in terms of retention rate per module, retention rate in the programme, student throughput, and critical dropout points in terms of university A and B.

A. University A

For this sample, the study explored the trends and patterns of student retention by examining the student retention rates within modules as well as in the broader programmes; identifying the critical period where student dropout is most prevalent and determining the throughput rate in fully online programmes.

1) Retention rate per module

As indicated earlier, in this sample we considered the student retention rate in a module as the proportion of students who remain administratively enrolled in a module for the entire module offering period. Fig. 3 graphically shows the observed student retention rates in the postgraduate diploma modules. The 15 modules (seven cohorts of Module A + Module B to I), offered in the postgraduate diploma programme during the period under review, experienced high student retention rates with low variability between the modules. The average student retention rate for these 15 modules was 94% with a standard deviation of 3.9. However, the cumulative effect of dropout in each of the sequentially aligned modules resulted in a downward trend pattern in student retention rate at the programme level.

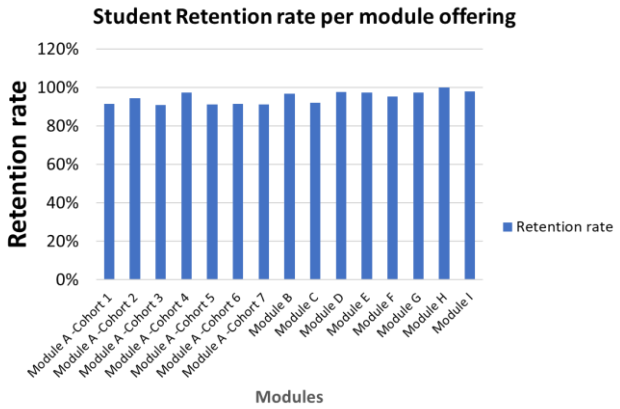


Fig. 3. Student retention rate per module for postgraduate diploma.

2) Retention in the programme

Student retention rate at a programme level refers to the proportion of students that continue into the next enrolment period relative to the initial cohort size. Fig. 4 depicts the average retention rate for the seven student cohorts enrolled in the programme.

Fig. 4 shows that student dropout in this programme followed a logarithmic pattern distinguished by two distinct phases. Phase one is a linear phase formed by high student dropout at the beginning of the programme. On average, a quarter of each cohort intake discontinued their studies during this phase. Phase two is characterised by a slower rate of student dropout, gradually forming a plateau. The study sought to understand the significance of this observation. The Mann-Whitney u-test was used to investigate the question and hypothesis below:

Question: Is there a significant difference in the retention rates of the introduction Module (A) compared to subsequent Modules (B–I)?

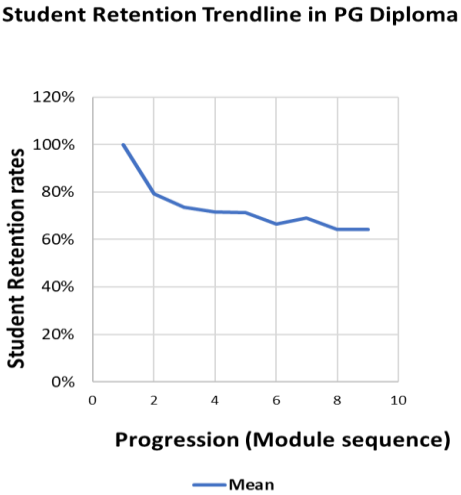


Fig. 4. Student retention trend line in postgraduate diploma.

Null Hypothesis: there is no significant difference in the retention rate of module A compared to other modules.
Alternative Hypothesis: there is a significant difference in the retention rate of module A compared to other modules.

As depicted in Fig. 3, the student retention rate is presented in Table II. Group 1 represents the retention rate of the fixed start Module A, whilst Group 2 represents the retention rate in the subsequent Modules B–I.

TABLE II: STUDENT RETENTION RATE FOR MODULES IN THE POSTGRADUATE DIPLOMA

Group 1: Module A (%)	Group 2: Module B–I (%)
93	97
94	92
91	98
97	97
91	95
91	97
91	100
	98
Total: 7	Total: 8

Based on the data above, the calculated Mann-Whitney u-value was 5.5. The critical value of U at $p<0.5$ is 10. Therefore, the result was significant at $p<0.5$, and the null hypothesis was rejected. Student dropout is significantly higher at the start of the programme when compared to other modules beyond the entry point module, as observed in Fig. 4.

3) Critical period of dropout

The critical dropout period is when the number of retained students stabilises [33]. Fig. 5 depicts the distribution of student dropout during the eight-week module cycle.

Fig. 5 shows that student dropout is prevalent at the beginning of a module cycle and subsides substantially after the second week. Approximately 79% of dropouts occurred either before the module started or during the first two weeks of the eight-week module cycle [52]. This critical period coincides with the time when deregistration can be done without any financial implications for the student. The institution also deregisters any student who has not paid fees by this time.

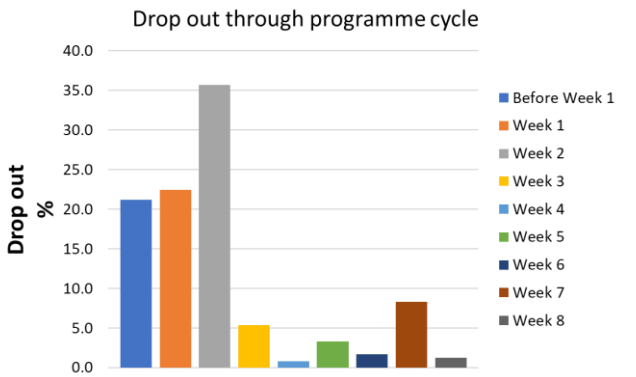


Fig. 5. Distribution of dropout period through a module cycle in the postgraduate diploma.

4) Student throughput rate

The student throughput rate measures the proportion of students who completed the programme within a particular time frame. Although the study noted a higher retention rate in this programme, the throughput rate was slightly lower as this was affected by student progression. This study found that 53% of the students in the first cohort had completed the programme within the minimum study period. A further 12% of students in the first cohort are at least 80% into the programme and could complete within two module offering periods. However, this period may be delayed by 2–15 months due to the rotating carousel curriculum offering design. In the second cohort, approximately 52% of the cohort was on track to complete the programme in the minimum duration, and a further 20% could complete after two additional offering periods.

B. University B

The undergraduate diploma offered flexible module selection. This enabled the fragmentation of cohorts and convoluted the mean student retention rate per module for each cohort. Therefore, this calculation was omitted. The study focused on establishing the student retention rate per cohort at a programme level.

1) Retention in the programme

Student retention at a programme level refers to the annual proportion of re-enrolment relative to the initial cohort size. Fig. 6 depicts the trend and pattern of student retention rates in the undergraduate diploma programme for the 2017–2020 cohorts. The 2019 intake experienced an uncharacteristically low re-enrolment in year 2, thus presenting an outlier. Therefore, the median was a more representative measure of central tendency for the trends of retention in the programme.

The programme experienced two distinct linear phases of student dropout, as shown in Fig. 6. Phase one occurred during the first year of each student intake. It is distinguished by a rapid and significantly higher dropout rate. Approximately 41% of each new intake dropped out during this phase. The second phase began in year 2 of the programme and is distinguished by a less acute linear pattern of dropout. This phase occurs at a slower dropout rate compared to phase one. An additional 30% of the initial

cohort size is lost during this phase. Fig. 6 further shows that approximately half of each intake remained actively enrolled in the programme by year 3, which is the expected programme completion period. The approximation of student retention rate in years 4 and 5 included the proportion of retained and graduated students from the programme. Fig. 7 shows the gradual degradation of student re-enrolment in the programme.

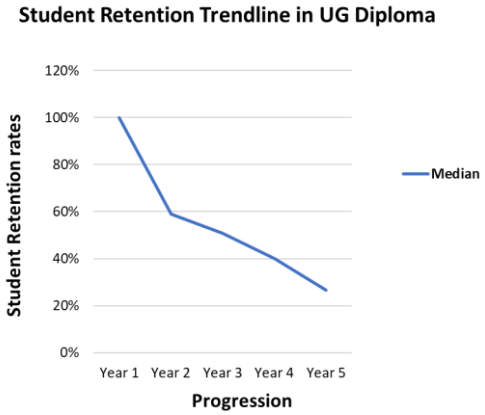


Fig. 6. Student retention trend line in the undergraduate diploma.

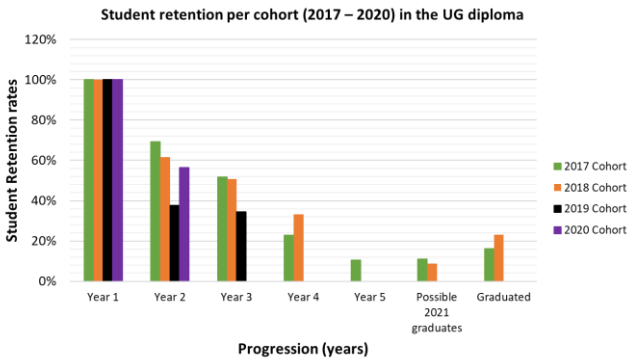


Fig. 7. Re-enrolment into subsequent years by each cohort in the undergraduate diploma.

Fig. 7 shows that only 16% of the 2017 cohort had graduated by year 5, while 23% of the 2018 cohort had graduated after four years in the programme. A further 10% of each of the two cohorts may possibly graduate within a year.

2) Critical period of dropout

The study assessed the critical period when student dropout occurred and the categorical reasons for dropping out. The definition of student retention in university B included only students who remained administratively registered and academically active. Thus, the definition created two categorical dropout groups: administrative deregistration and academic inactivity. Administrative deregistration meant that a student formally withdrew by informing the institution and deregistering accordingly. A dropout due to academic inactivity meant that a student informally withdrew by failing to submit the required assessments.

The study found that 94.7% of all dropouts from modules occurred in the first-year level, 5.1% in the second-year level modules, and less than 1% in the final-year modules. Fig. 8 indicates the categorical distribution of reasons for dropping out of a module.

The most prevalent form of dropout from the programme is due to academic inactivity or absence from exams. Approximately 56% of all withdrawals from modules were informal and done through abstaining from the summative assessment. Only 44% of the withdrawals were done formally through administrative processes. Fig. 9 shows the distribution of periods (months) when administrative deregistration occurred. The study found that approximately 70% of all formal de-registrations happened in the first three months of the academic year.

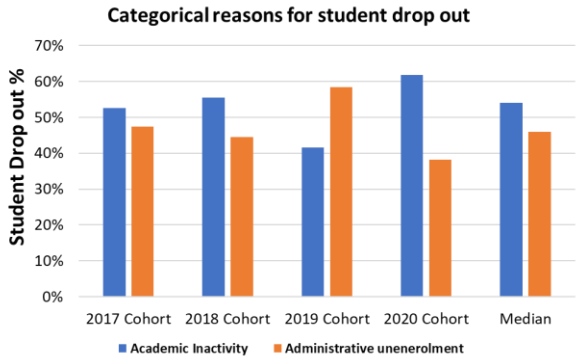


Fig. 8. Categorical reasons for student dropout in the undergraduate diploma.

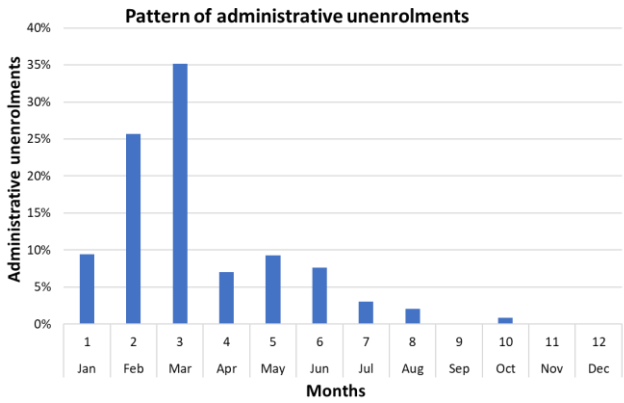


Fig. 9. Distribution of dropout period through a module cycle in the undergraduate diploma.

3) Student throughput rate

The student throughput rate in sample B was measured as programme completion after the minimum study period, plus an additional two years. Approximately 20% of students in cohorts 1 and 2 of this sample had completed the programme in the five years. A further 10% of the undergraduate diploma group could graduate after an additional year.

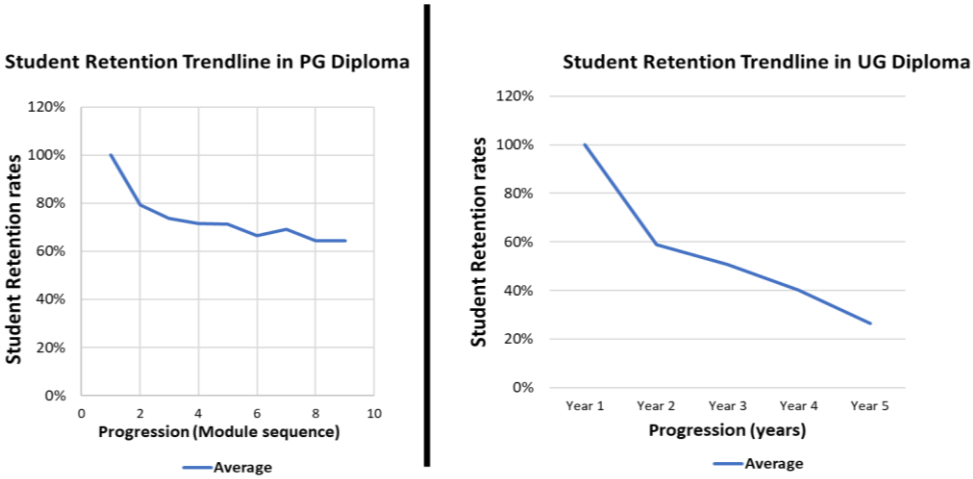
VI. Discussion

Researchers [1, 48] indicated that the retention rates of online students are 10–20% less than the students enrolled in traditional qualifications, while another study [5] reported fully online retention rates of 60–65%. Although low retention rates are flagged as a high risk in online learning, in this study we found mixed results.

The present study sought to explore the trends and patterns of student retention in fully online programmes. The study investigated the phenomena in the case of a postgraduate diploma and an undergraduate diploma programme offered by two different institutions in fully online mode. The

findings of this study revealed similarities and differences in the trends and patterns of student retention in the two programmes.

Like the work of Friðriksdóttir [50], the present study found that student dropout occurred in two phases. It was more prevalent and acute at the beginning phases of both programmes despite the differences in the programme offering structure. This observation is like that of Laato *et al.* [33], who found that most students drop out at the beginning of the module. Student dropout in the initial phases of the two programmes followed a linear pattern. However, the dropout patterns in the second phase were peculiar to each programme. Fig. 10 shows that the postgraduate programme lost an average of 24% of the students in the initial linear stage of dropout. However, the dropout rate receded as students progressed and the student retention rate stabilised in a logarithmic pattern. The average student retention rate trendline in this postgraduate programme remained above 64% (similar to James *et al.* [5]) during the period under review. In contrast, the student dropout rate in the undergraduate programme occurred in two distinct linear phases. The initial linear phase depicts the abrupt student dropout in the first year of study, where the programme lost approximately 41% of each cohort. The observation is similar to what Maluenda-Albornoz *et al.* [26] found, that 38.7% of the students are lost in the first year. However, the second phase depicts a continuation of student dropout at a slower rate. Fig. 10 shows that the undergraduate programme cumulatively lost approximately 50% of the students by the expected graduation period of three years, and the loss grew to 70% after five years (minimum study period + two years).



(a) (b)

Fig. 10. Student retention trendlines in the postgraduate and undergraduate diplomas. (a) Univerisity A - Postgraduate Diploma; (b) Univerisity B – Undergraduate Diploma.

This study also determined the critical period of student dropout. Student dropout was prevalent in the beginning phases of a programme and modules. The study found that the highest student dropout in the postgraduate programme occurred in Module A, where approximately a quarter of each intake was lost. Similarly, the highest student dropout in the undergraduate programme was at the first-year level. Approximately 41% of the first-year students who enrolled for this programme during the period under review did not return in the subsequent registration period. These periods were in the linear phase of dropout.

A further assessment of the dates when students dropped out (Figs. 5 and 9) reveal that 70–80% of the students who formally dropped out did so during or immediately after the official registration period. The contextual scenarios in each programme's academic structure and administrative policies may, to an extent, account for the observed patterns. In the postgraduate programme, the critical dropout period (week 2) coincided with the student's financial obligation to pay the registration fees to the institution. Almost 80% of students dropped out during this period.

The formal dropout in the undergraduate programme coincided with the registration period between January to March, where students could still change their module choices or deregister without paying the tuition fees. However, most students who dropped out of this undergraduate programme did so by absconding from the summative assessments rather than formally deregistering. A further assessment of academic activity as a form of dropout is warranted. The severity of formal student dropout at a first-year level of the undergraduate programme is highlighted by finding that 95% of all students drop out from modules that occurred in the first-year modules.

Lastly, this study sought to determine the student throughput rate in fully online programmes where throughput is dependent on the retention of students in the programme [23] and student progression within the programme. Student progression is affected by the efficiency of the programme structure or module selection and their success (pass) in the modules they registered for. The confluence of a high re-enrolment rate, high pass rate, and a simple linear module offering produced a relatively high throughput rate in the postgraduate programme. Approximately 65–70% of the first two cohorts in the postgraduate programme would graduate within the minimum programme duration plus an additional two registration periods. However, the carousel programme design would prolong the completion time for any student who lurks behind their cohort as they would have to wait for 2–15 months to do a module they had missed or failed.

The student throughput rate in the undergraduate

programme was substantially lower. A higher student dropout rate and more downward student progression constrain this programme's throughput rate. The study found that only about 20% of students had graduated after the minimum programme duration plus two additional registration periods. Approximately 10% of students from these two cohorts could graduate after an additional registration period (minimum + three). Unless a student took all modules on offer, the complex permutations and free module selection in the semester potentially prolonged the student's duration in the programme.

The delimitations to this study are a quantitative study that presents a comparative snapshot of two fully online programmes. It does not consider reasons for the trends that are spotted. The possible implications for trends and patterns could be as a result of the nine dimensions as indicated by Means and Bakia *et al.* [53].

VII. Conclusion

The observed differences in the retention rates between the postgraduate diploma and the undergraduate diploma should be read in context. The postgraduate diploma recruited employed, qualified professionals, while the students registered in the undergraduate diploma are first-year undergraduate students. Therefore, postgraduate students' motivation, self-efficacy, and goal commitment for enrolling in the postgraduate diploma could differ from undergraduates.

Secondly, as working professionals, many postgraduate students have financial resources to fund their studies independently and thus, they would academically commit where they invested their hard-earned money. Undergraduate students are more likely to change their programme of study (i) as they learn what the programme entails and its alignment to their interests, (ii) due to academic incompatibility, or (ii) drop out entirely from their studies due to financial hardships.

Most students that drop out of the first module of the postgraduate diploma do not return for a second attempt at completing this programme. This forms the abrupt linear phase of the dropout pattern. Those that reached phase two were likely to keep re-enrolling and do well academically, thus improving student retention in the programme. In contrast, the undergraduate diploma students persisted despite their academic progress. These students tend to do the first-year level modules over a few registration periods and eventually leave. The fact that 95% of module un-enrolments were observed at the first-year level support the conclusion and recommendations that students should be advised on module selection and a rigid programme structuring be enforced. This might improve student retention and enhance throughput. Only 5% of module un-enrolments were at two- or three-year modules. Students continue once they get to their second year

This study sought to observe the status quo regarding student retention, throughput, and critical dropout periods in fully online programmes. However, understanding the empirical findings requires a careful examination of the contextual qualitative issues pertinent to curriculum design, the target student population and learning design for online education. This study was limited to two fully online programmes at two South African universities and focused on the trends and patterns in student retention. While the study did not consider the reasons for these differences or the possible implications each individual programme has on student retention, further studies are recommended in this regard.

As with the study by Laato and Lipponen *et al.*, this study found that the highest dropouts are observed at the beginning of the study programmes, specifically within the first two weeks of the eight-week modules of the postgraduate programme and the first three months of the year-long modules of the undergraduate programme. Therefore, we recommend further research studies into the reasons that cause students to drop out during the early stages of online learning programmes.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

K Moodley done works on conceptualization, writing-original draft, investigation, writing-reviewing and editing, funding acquisition, project administration; M Van Wyk done works on conceptualization, writing-original draft, investigation, writing-reviewing and editing; D Tive done works on data curation, visualisation, methodology, formal analysis, software; I Van Zyl done works on conceptualization, methodology, writing-original draft, writing-reviewing and editing; J Cronje done works on supervision, writing-reviewing and editing, data curation. All authors had approved the final version.

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