The use of academic libraries in turbulent times

Student library behaviour and academic performance at the University of Cape Town

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Abstract

Purpose – The purpose of this paper is to explore how an innovation in the University Management Information System was leveraged to incorporate library data by an initially sceptical strategic management team. The rationale was to extract evidence of correlations between library use and student achievement. This kind of information is of particular interest to the institution, which is at present dealing with crises popularly summarised in the slogan "#FeesMustFall" among students who suffer from the effects of poverty and exclusion in higher education. Comment is offered on some of the relationships between student library behaviour before, during and after the nationwide disruptions that destabilised universities and threatened their survival at the end of 2016, just before the final examination period.

Design/methodology/approach – Data were extracted from the data warehouse from the comparative demographic perspectives of students' degrees of disadvantage in an effort to uncover any hitherto hidden patterns of library use.

Findings – The use of the library as expressed by footfall and loans was mapped against students' pass rates and their collective GPA, indicating that increased library use correlates positively with better academic performance. Some of the initial correlations between student library behaviour before, during and after the nationwide disruptions that destabilised universities and threatened their survival at the end of 2016 just before the final examination period are explored. The effects that library closures (under threat of damage) at a critical time in the academic year might have had on library use and on student performance are interrogated.

Practical implications – Students on financial aid, which was used as an indicator of disadvantage, come from schools and environments where access to information technology and libraries is very limited, so that library habits are either poorly established or not at all. At the University of Cape Town (UCT), considerable support is in place for students to encourage the development of library habits. An analysis of available data indicates that students who have acquired library habits regardless of unfavourable financial circumstances do not exhibit behaviour and academic outcomes markedly different from that of their more privileged peers.

Originality/value – Combining library data with data from the university data warehouse is a new approach in South Africa. It is an approach that is of value both to the library and the institution at large and has brought meaningful insights into the role the academic library might be seen to play in promoting student academic achievement.

Keywords Value, Impact, Analytics, Innovative methods, Library use, Performance indicators

Paper type Case study

Introduction

In this paper, the development of a data warehouse at the University of Cape Town (UCT), which allowed a pioneering study (in South Africa) to document the link between student behaviour and academic performance is charted. The design process of the warehouse is outlined, noting its genesis and implementation at a critical time in Higher Education in South Africa: one of unprecedented nationwide student protests, the consequent grappling

of universities to meet the needs of poor students – both access to and an improved experience of the university environment – and the general student demand for transformed universities and curricula. This context is described with particular attention paid to the impact on the university library, which is having to defend its funding insofar as it contributes to the solution of the problems as directed by government responses, for example its renewed focus on the imperative to increase student throughput while improving teaching and learning outcomes. The focus of accompanying policy shifts and commentary has been on the plight and experience of the majority of students who tend to be poor, first-generation university students and the ones leading the movement against exclusion. In this section, analytical comment is offered on the discourse surrounding the conflict, focusing in particular on the shift from the student-as-problem perspective (the deficit model) to the student-as-agent perspective, one raised by attempts to articulate a new approach to a decolonised curriculum (Godsell and Chikane, 2016).

In the methodology section, an account is given of the decision to focus on students according to a specific attribute, i.e. beneficiaries of the National Students Funding Aid Scheme (NSFAS), a surrogate that yields a sample of students fitting into the category of poor and mainly black (i.e. not white according to racial classification that is maintained for purposes of historical redress). This focus is warranted by the central theme animating the students' cause at all campuses – that of racialised economic disadvantage (Nicolson, 2016), succinctly captured in the slogans "Black pain" and "White privilege".

After the presentation and discussion of the results, the conclusion identifies future lines of inquiry that, it is argued, will yield a more comprehensive account of the value of the library at the UCT.

#FeesMustFall – impact on university libraries
Since 2015, all universities in South Africa have been affected by national student protests whose main rallying cry, "#FeesMustFall", has mobilised students to make a variety of demands on university managements and the national government, some generalised and others more specific to the students' particular institutions. The general demands are for free education for all students, and a "decolonised" curriculum. In addition, localised student formations have formulated specific grievances at individual universities relating to particular policies, for example, to the use of the Afrikaans language as a medium of instruction. Universities that were reserved for whites under apartheid have been charged to change their culture, by, for example, creating a physical and symbolic environment that is inclusive of all students, recognising and reflecting the cultural background of the majority of students in South Africa, that is, students who identify as black. The rhetoric accompanying protests and demonstrations has to a greater or lesser extent proposed a binary polarised spectrum locating students as either feeling "black pain" or expressing and exerting "white privilege", and has called for the "decolonisation" of higher education. The protests have, on occasion, been accompanied by damage to property, including the burning of the Law Library and its valuable collections at the University of KwaZulu-Natal, and the destruction of artworks at the UCT. A few months before the end of the academic year in 2016, with campuses across the country shut down by protesting students, there was a real prospect that the entire academic project would be derailed if the suspension of academic activities persisted until the end of the year without final examinations being allowed to be written. This disaster was averted through a variety of agreements negotiated with the main groups and formations identified as leaders at the universities. The academic year opened relatively calmly in January 2017 when delayed exams were written to complete the 2016 year, and when the new academic year started. In the meantime, to facilitate registration in 2017, ad hoc financial relief was afforded by the government to students whose family income qualified them for these grants.

Godsell and Chikane (2016) observe that the protests and accompanying debates have revealed a number of new insights about teaching and learning at the university. They note:

> Public and university opinion on student pass-rates, or throughput has portrayed students as being in deficit. First-generation students, in particular, have been seen as inadequate students bringing problems (poor basic education, inadequate language skills, lack of books in the home, absence of computer skills) with them onto the campus. [...] The Fallist movement focuses attention on the problems, previously concealed, which are embedded in systems and structures on campus [...] and a narrative begins to take shape which is campus-as-a-problem, even society-as-a-problem, rather than simply student-as-a-problem (2016, p. 55).

Because of the fluidity of the movement, which responds variously to different dynamics at the sites of struggle, there is no agreed definition of the "Fallist Movement" because different formations have different priorities (Ngcawani, 2016). "The commonly understood definition is that fallism, as a paradigm, seeks to achieve the complete decolonisation of power, identity and knowledge systems" (Ngcawani, 2016).

The particularity of the demands – for example, free higher education, a decolonised curriculum in which African scholarship is acknowledged and taught (Gumede, 2017), and an end to the perceived racism experienced on campuses – cannot be extricated from the problems of education experienced by the majority of the (black) population. Nicolson (2016) points out the dismal rate of progress through primary, secondary and tertiary education of black children and youths: barely half the cohort that starts school in Grade 1, will make it as far as the final year of schooling, with very few of those entering into university.

This general overview of unprecedented student mobilisation and protest serves as an introduction to the situation at the UCT and its library, the research site.

Disadvantaged undergraduate students

Godsell and Chikane (2016) advise that, in the process of curriculum transformation to accommodate all students, the tendency to blame students for academic performance that does not meet standard expectations is unwarranted. Many initiatives at South African universities that aim to address educational disadvantage are based on such "deficit" assumptions that tend to alienate students and undermine their confidence in their own ability to participate on an equal footing with their more privileged peers. As was made very clear by the "#FeesMustFall" movement, as discussed above, students often say that they do not feel welcome on more privileged campuses, do not find themselves fully integrated in campus life, and find it difficult to make successful transitions from their schools to university. In order to address a situation such as this, the "capability" approach, first conceptualised by Amartya Sen, suggests that students would benefit if they had the freedom to choose how to participate actively in their own learning (Calitz *et al.*, 2016, p. 59).

In identifying dimensions of equal participation, Calitz *et al.* (2016) note a lack of academic resources "such as textbooks, photocopies and the internet" (p. 62) as one of the prime factors in the marginalisation and exclusion of disadvantaged students. Although they make no specific mention of libraries, it is contended that the services and resources provided by the UCT library indeed go some way towards enabling students to exercise agency over their own learning and to reduce the perceived learning deficits of students receiving financial aid, an indicator of disadvantage. In support of this contention, Mezick (2007, p. 562) proposes that library use is a positive factor in students' integration into the institution and therefore in student retention.

Recently, there has been a surge in literature providing evidence of correlations or relationships between student achievement and various aspects of library use such as loans, e-resource use and physical visits to the library. As early as 2003, Kuh and Gonyea found that libraries had a positive influence on student learning, especially for "members of

historically underrepresented groups" (2004, p. 270). At Wollongong, using a new multidimensional institutional warehouse that could combine student and library data, Cox and Jantti (2012) found a strong correlation between students' use of library resources and their average marks (p. 311). Similarly, Stone and Ramsden (2013), from the University of Huddersfield, conducted a study at eight UK universities that was able to confirm a statistically significant relationship between book borrowing or electronic resource access and student success, but not between entry into the library and student success (p. 554). More recent studies, using robust methodology and undertaken at the University of Minnesota by the Office of Institutional Research and the Library of the University of Minnesota, have also successfully demonstrated the positive correlation between library use and undergraduate performance (Soria *et al.*, 2016, 2017).

Similar correlations or relationships that specifically focus on less-privileged students who come to the university without much library experience or established library habits, have, however, not yet been investigated. As discussed above, studies of the South African situation have shown that class and race differences result in experiences of marginalisation and of exclusion among students, detrimentally affecting their academic participation and engagement with the learning process (Calitz *et al.*, 2016, p. 62). With this in mind, it is proposed that an accepting and academically supportive environment, such as can be found in an academic library, may play some role in addressing experiences of exclusion and supporting learning.

Students who are beneficiaries of financial aid frequently come from schools and environments where access to information technology and libraries is very limited, with the result that library habits are either poorly established or not established at all. In order to assist redress, considerable opportunities for self-directed learning are available to UCT students to establish and enhance the development of library habits, for example, support in information commons venues and in the provision of online training tools.

Data warehouse

In 2014, mindful of investigations from institutions such as Wollongong and Huddersfield, where very interesting correlations have been obtained from institutional data storage facilities that contained both student data and records of different aspects of library use by the entire student body, the Library and Information Studies Centre (LISC) at UCT applied for funding from the South African National Research Foundation. The application was for a Library Values Project which, inter alia, would explore issues such as the link between library use and student achievement, an ongoing concern among LISC staff.

At the same time, the University was implementing a Business Intelligence Project that was intended to combine large institutional financial and student-based databases into a single data warehouse. The Strategic Intelligence Committee at UCT evaluates and prioritises applications for projects to have data included in the data warehouse and linked with existing data. Such projects are expensive and time consuming and the Committee was initially sceptical when the library approached them with the request to have library data included in the warehouse. The library's first project application was therefore not approved. A second application, re-emphasising the practical value of the project and the argument that this data would make it possible to extract meaningful correlations that could objectively affirm the value of the library and show the role of library services in student retention, success and throughput, eventually swayed the Committee and was successful.

A number of library colleagues were, rightly, concerned that data should be securely anonymised, so that the library activities, and success or failure of individuals, would not be evident. This seemed a serious stumbling block at first, and the application to the Strategic Intelligence Committee was delayed until such an assurance of anonymised data could be obtained. It was agreed that these correlations would be made available to LISC and library staff on a broad aggregated level only, so that there would be no possibility of identifying

individual students, which could result in ethical difficulties owing to concerns about the confidentiality of data.

The project was a lengthy one – six months for securing library data from various sources, and rendering these data segments compatible, together with the establishment of the data reporting structure. A further six months of close working between library staff and analysts in the university's Information and Communication Technology Services (ICTS) Department was necessary to ensure the integrity and completeness of the reported data and to generate a series of further reports as new possibilities and needs became evident. The sudden awareness of new reporting possibilities, in particular, is a good illustration of how the existence of such a tool as the data warehouse can suggest its further, unexpected and inventive, uses.

The library was accordingly able to input into the data warehouse data of library use, expressed as card swipes upon entering the library, and loans of library material. Additionally, it is hoped that data relating to the use of electronic library resources, such as databases and electronic journals, will be added to the data warehouse in due course.

The aim was to see whether the data warehouse could yield evidence showing that there was a positive relationship between student achievement, as reflected by pass rates or GPA, and library use. The student data could be selected according to parameters such as by faculty, or globally for the university as a whole, and by level of study, e.g., undergraduates or postgraduates. For the purposes of this investigation, data from undergraduates only were extracted. The queries posed could also distinguish between students who were recipients of financial aid through the National Students Funding Agency, and those who were not. It needs to be emphasised that positive correlations do not imply causation and that the claim is not being made that increasing library use alone would result in improved grades. It is also to be emphasised that the investigation never attempted to disaggregate students by race *per se*, but rather by disadvantage. The category of "Students on financial aid" was used as a proxy for disadvantage, in the knowledge that NSFAS loans are only granted to impoverished students, who frequently come from library-deprived environments.

Reflections on the calculations made using the data show that the complexities of securing and combining library data with other data sets were underestimated by project proposers, and how much is owed to the dedication of the ICTS staff members, who went far beyond their strict remit in order to make it all work.

Library support at UCT
When students first come to UCT, they are encouraged to sign up for one of the many sessions introducing the library that are held in the first few weeks. Although not a great deal of library knowledge can be imparted in such introductory sessions, students learn about the basic services and facilities available to them in the library and are introduced to the information commons venues and the 24/7 facilities that are heavily used by undergraduate students throughout the academic year. They are also shown the large number of online library instruction packages available from the library website and which come in formats ranging from online LibGuides and PowerPoint slides (see www.lib.uct.ac.za/lib/guides-tutorials) to online video tutorials and games.

These resources and services have been developed in the UCT libraries to support students' agency and their own control of their library use. One of the most popular library facilities, the undergraduate information commons, known as the "Knowledge Commons", has been functioning since 2002. It was the first of its kind in South Africa and was based on the commons concept first introduced by Beagle (1999). It aims to foster information and learning skills among undergraduate students. (A different facility, known as the Research Commons, is specifically aimed at the needs of postgraduates.) "Commons" resources may be superficially similar to computer laboratories, but they are designed to offer learning and study spaces providing a seamless service that does not distinguish between assistance

with library and learning issues on the one hand, and computer problems on the other. They give integrated access to electronic information resources and software and computer equipment to enable the completion of writing assignments and research projects from the conceptualisation stage to final production in a single, fully supportive environment; this is often referred to as the "one-stop shop" approach (McKinstry and McCracken, 2002).

Such dedicated learning spaces have become common and very popular in academic libraries, and an extensive study in 2015 showed that the UCT knowledge commons was heavily used and highly valued by undergraduates, who said that they wanted to work there rather than anywhere else on campus. They believed that working in that particular venue made a positive difference to their academic achievements, assisted them in their learning and improved their grades (De Jager, 2015). The present investigation aims to build upon these findings to continue with the exploration of evidence for the tangible value of library services to undergraduate students and, so far as they are able to be identified, to students who come to university with economic, and by implication also academic, disadvantages.

In order to foster its aim of enabling students to take ownership of their learning, the UCT libraries have furthermore developed a range of online learning tools designed or created by subject librarians for self-directed learning. These are available from the library website (www. lib.uct.ac.za/lib/research-help). The main tools for undergraduate students are the following.

LibGuides are developed by subject librarians on a department-by-department basis. A case study by Chiware at UCT in 2013, for example, shows that when a librarian develops course-appropriate LibGuides and teaches students how to use them, the use of the LibGuides increases substantially and students find them very helpful (Chiware, 2014, pp. 30-34).

Vula, UCT's electronic course management system, is used by many subject librarians to embed links to library resources, and it functions as a gateway to specific subjects and how-to resources. Individual librarians tailor the guides for which they have responsibility, at times most imaginatively. Students in political studies, for example, may use the in-house game "Mistress Serendipity's Library" to encourage and enable them to read beyond the reading lists in their particular courses (http://libguides.lib.uct.ac.za/Political_Studies/MistressSerendipity).

How-to videos (www.lib.uct.ac.za/lib/how-to-videos) have become very popular since their inception in 2014. They cover a wide range of topics that explain the use of specific library resources and services. The graph shows the most accessed topics in 2014-2016 (Figure 1).

Ask a Librarian is a feature that consists of either pre-formulated questions, which may be accessed with a click, or a text box in which free-text questions may be entered. This feature was first introduced with some publicity at the beginning of 2015, hence the spike in usage when it was first introduced (Figure 2).

Although there is no corroborating evidence for this interpretation, it is suggested that the increase in the use of Ask a Librarian in October 2016 might be due to the closure of the library to students during the #FeesMustFall protests, possibly providing further evidence for students engaging with library resources even when in-person library services were not available.

Another library resource that is frequently used, but for which download data are not available at present, is the referencing guide produced by librarians for the Humanities Faculty, which has recently been published as an electronic book. The UCT Author-Date Reference guide is available at: http://webcms.uct.ac.za/sites/default/files/image_tool/images/25/resources/UCT_Author_Date_referencing_2016.pdf

Findings from the data warehouse
The findings indeed substantiated the expectation that undergraduate achievement improved as library use, expressed as visits, increased.

Figure 3 illustrates how GPAs of all undergraduate students rose as they visited the library more frequently. This finding contradicts that of Stone and Ramsden (2013, p. 554),

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Views of How-to videos 2014-2016

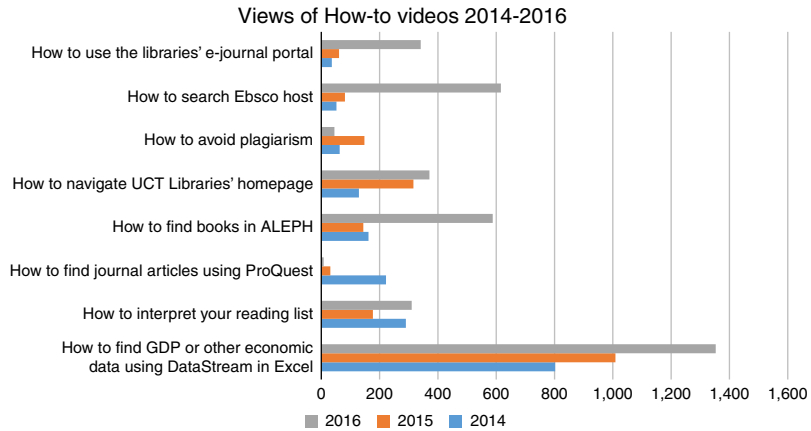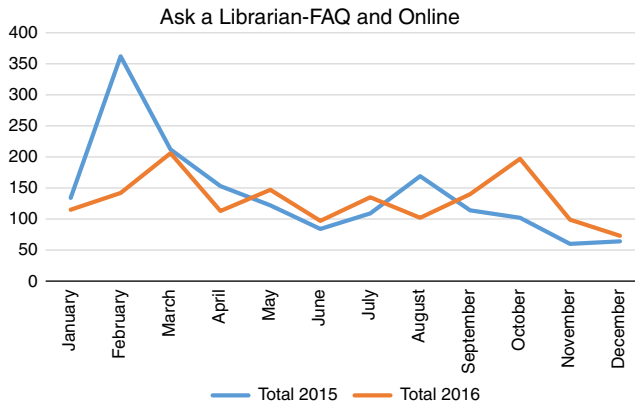Ask a Librarian-FAQ and Online

who did not discover a positive relationship between entry into the library and student results, but, as was explained above, library spaces – especially the Knowledge Commons – are an important aspect of library support, so it came as no surprise that a relationship between library access and GPA could be discerned.

In order to test whether this relationship was statistically significant, a Spearman's rank correlation coefficient was selected since the relationship clearly was not linear (Spearman's Rank-order correlation, 2013). Cox and Jantti (2012) also found a "nonlinear correlation" in their data (p. 311). The Spearman's rank correlation coefficient is appropriate for nonlinear variations and the values are shown in Table I. Coefficients were calculated for six groups of days visited ($n = 6$).

Although not quite as distinct, this relationship also appears with students on financial aid (Figure 4 and Table II).

It is therefore clear that although relationships are evident, they are only statistically significant for 2014. Contextual factors suggest that the #FeesMustFall disturbances during 2015 and 2016, which saw the libraries shut for some weeks close to the examination periods when they are normally heavily used, might have played a role in this lack of correlation.

Possible relationships between achievement and borrowing library materials, or circulation, a well-established indicator of library use, were also considered. Cox and Jantti (2012) and Stone and Ramsden (2013) found significant correlations between library use and student achievement.
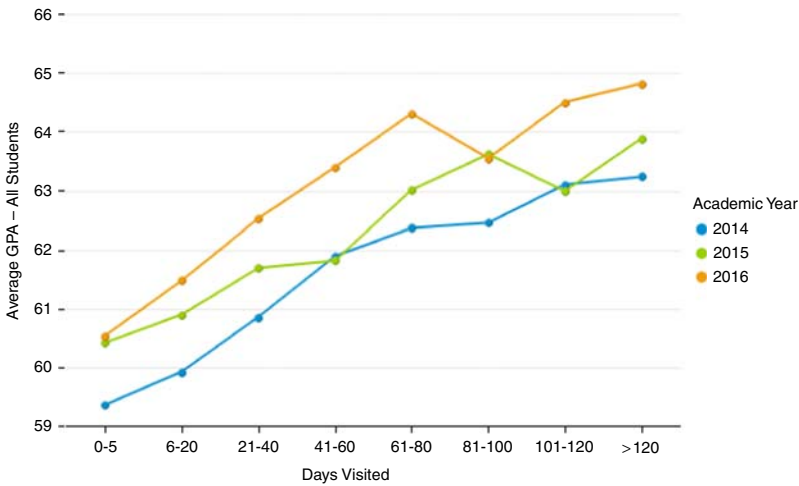
Figure 3.
All students average
GPA vs days visited

	Coefficient	Statistical significance
2014	0.94	5%
2015	0.83	Not statistically significant
2016	0.71	Not statistically significant

Notes: Coefficients were calculated for six groups of days visited ($n = 6$). GPA vs days visited: all students
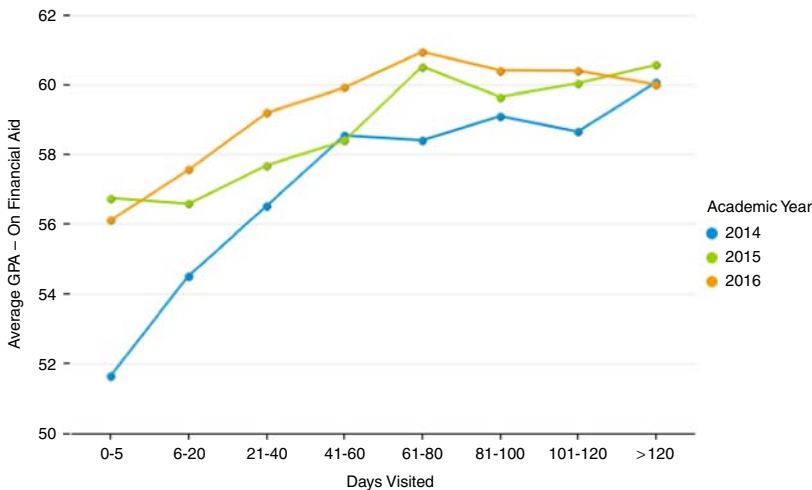
Table I.
Spearman rank
correlation coefficients

Figure 4.
Students on financial
aid average GPA vs
days visited

It is acknowledged that in recent years, as the provision of electronic resources has increased, physical borrowing has decreased substantially, as demonstrated by Figure 5, which represents all circulation activity from 2012 to 2016.

An examination of the circulation data for undergraduate students (Figure 6), however, shows that total borrowing decreased only very slightly between 2014 and 2015, and it is

obvious that circulation remains an important library activity among undergraduate students. There is a much more marked decrease in loans in 2016, which could have been a result of library closures during the student protests – although this, too, remains speculation.

In spite of decreases in lending illustrated above, relationships between students' borrowing and GPA are evident from the graphs (Figure 7), where a positive relationship is nevertheless discernible for all undergraduate students.

Again, the Spearman's rank correlation coefficient was considered appropriate to test for significance. Tables III and IV show the coefficients calculated for instances up to 40 loans

	Coefficient	Statistical significance
2014	0.94	5%
2015	0.77	Not statistically significant
2016	0.43	Not statistically significant

Notes: Coefficients were calculated for six groups of days visited ($n=6$). GPA vs days visited: students on financial aid

Table II.
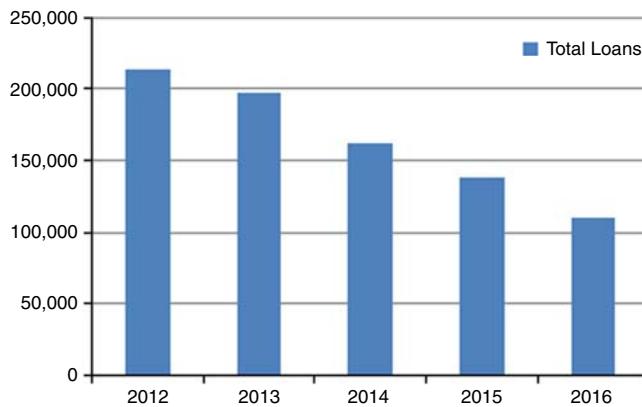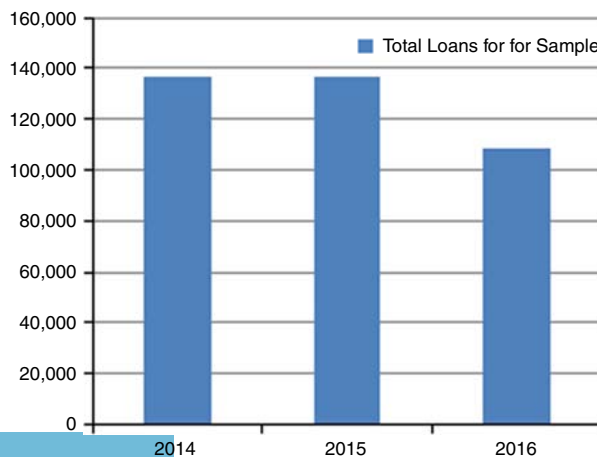Spearman rank correlation coefficients

Figure 5.
Total library loans

Figure 6.
Total loans for undergraduates

www.
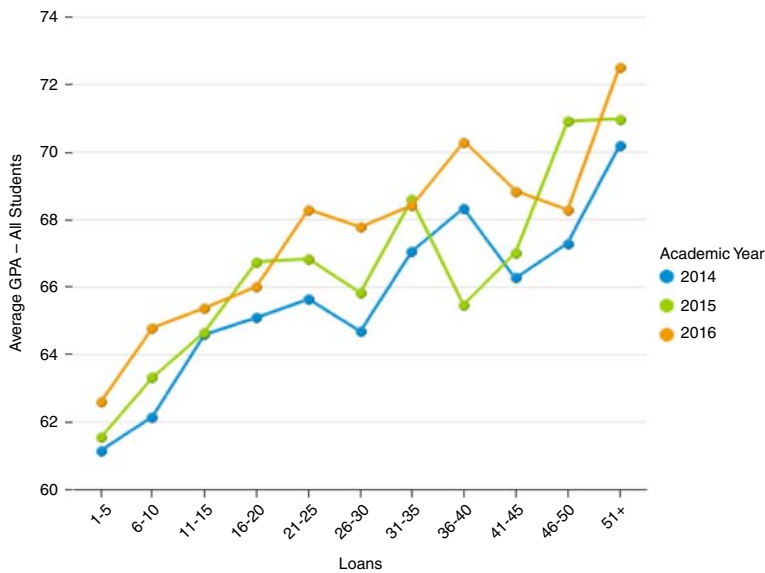
Figure 7.
GPA vs loans: all
students

	Coefficient	Statistical significance
2014	0.83	5%
2015	0.83	5%
2016	0.71	Not statistically significant
Notes: Coefficients were calculated for eight groups of loans ($n = 8$). GPA vs loans: all students		

Table III.
Spearman rank
correlation coefficients

	Coefficient	Statistical significance
2014	0.98	1%
2015	0.55	Not statistically significant
2016	0.79	5%
Notes: Coefficients were calculated for eight groups of loans ($n = 8$). GPA vs loans: students on financial aid		

Table IV.
Spearman rank
correlation coefficients

per academic year, as occurrences of one student borrowing more than 40 items per academic year were so low that they became statistically insignificant. These instances were therefore not used in calculating the correlation coefficient. Coefficients were calculated for eight groups of loans ($n = 8$).

These results show that loans correlated significantly with GPA in both 2014 and 2015. The graph for 2016, when the student protests were at their most intense, does not show a statistically significant relationship.

GPA also improved with library loans for students on financial aid, where significant correlations were found for both 2014 and 2016 (Figure 8).

Discussion

In spite of showing positive relationships between library use and student achievement, a statistical analysis was unable to demonstrate statistical significance in all instances, and
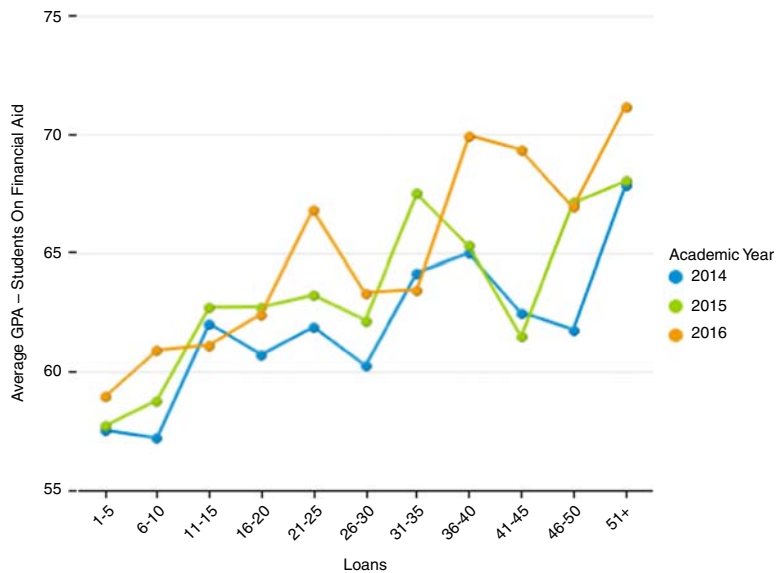
Figure 8.
GPA vs loans:
students on
financial aid

the authors acknowledge that there might be several reasons for this. As indicated above, 2015 and 2016 saw serious disturbances on the UCT campuses that resulted in periods of library closure, which obviously impacted on library use. In addition, the authors would like to note that working with large sets of library data is a complex issue and that the researchers had a difficult task in first convincing the data warehouse managers to include library data, and then considerable effort was required to render the data suitable for ingestion into the warehouse. This was such a serious issue that to date it has still not been possible to seek correlations between library database use and student achievement.

This investigation has nevertheless been able to demonstrate to the Strategic Intelligence Committee that the time and effort invested in including library data in the data warehouse has been a worthwhile expenditure. The evident relationships between library use and student achievement have also provided objective evidence to the university at large that the library is an essential and a valuable partner in the academic enterprise.

The determined lobbying for library data to be incorporated in the data warehouse has been vindicated through this preliminary interrogation of library behaviour both by students on financial aid and by the general population of the undergraduate cohort. The data warehouse has permitted the drawing of meaningful conclusions that show a positive relationship between library use and student performance. The data strongly suggest that students on financial aid, who frequently come from impoverished schools and surroundings without libraries, but who have acquired library habits, benefit from them. This is important for the drive towards redress and increased efforts to ensure that previously disadvantaged students can participate fully in the academic space without feeling alienated. The results show that the library behaviour of students on financial aid, once established, does not differ in marked ways from those of the general cohort, and that their patterns of achievement are comparable.

All university libraries face the challenge of justifying their cost in comparison to value received for the investment, and to account for their contribution to undergraduate success. The investigation should encourage university libraries to undertake similar studies, where comparable basic student data are available, in order to map library use to student achievement.

This sort of performance exercise should be incorporated into the library's business plan as universities experience ever-more-pressing demands on their budgets in a climate where government is focused on the quality of undergraduate education.

Reports drawn from the data warehouse do not allow for the disaggregation of the effect of the library on student learning or the assessment of what value the individual student attaches to his/her use of the library. For this, a series of focus-group discussions with undergraduate students using the facilities of the Knowledge Commons, and postgraduate students using the Research Commons, is planned. This will constitute the next phase of the research project, providing the narrative reports that are so important in interpreting the figures.

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