

Investigating the Adoption and the Application of Learning Analytics in South African Higher Education Institutions (Heis)

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Abstract: The universities in South Africa are faced with low student success and throughput rate. These challenges go beyond the strength of the available tools, yet universities continue to use the same tools in addressing their challenges and yet they expect different outcomes. As a result, universities are taking steps towards improving their students' performance. In addressing these challenges, several universities have taken progressive steps; moving towards digitalization of education in order to apply data-driven decisions. So far, this is a positive move towards addressing some of the challenges that are contributing to low students' performance. This study aims to investigate the potential of introducing learning analytics as a tool to analyze student data; to respond to the low student performances faced by South African universities. Learning analytics is an emerging field with the potential to enable higher education institutions to gather information to provide an understanding of students' learning needs and use it to improve student performance and throughput. Learning analytics has been studied and implemented in other countries, such as the United Kingdom, Australia, and other parts of Europe. In these countries, learning analytics as one of the systematic ways of analyzing data, has been reported to have the ability to improve student success and throughput. It also provides an opportunity for early identification of students who are at risk, because, among other things facing the universities of South Africa, are the factors mentioned above. Informed by the background explained above, the main question of the study is; how the introduction of learning analytics will help South African universities to improve student success and throughput rate? To respond to this question, five South African universities of technology were used as case studies and thematic analysis was applied to analyze the collected data.

Keywords: South-Africa-Universities, learning-analytics, performance, throughput, success.

1. Background

Academic strategies and methods to improve student's success and throughput rate have been established and documented within South African higher education ever since it existed (O'Donoghue et al., 2004). Despite the different strategies employed to improve students' performance, universities still do not yet understand their students' needs, how they learn and what challenges they are facing (Laat & Prinsen, 2014). Low students' throughput and success rates in institutions of higher learning are counter-productive to the national economy, and hamper the prospects of students of securing a livelihood (Lewin and Mawoyo, 2014; (Mafenya, 2014). In addition, Mafenya (2014) argues that the low success rate and throughput of students, are arguably the single biggest problems facing South African higher education.

Furthermore, poor student performance brings into question the capacity and viability of academic institutions to produce educated minds and essential skills (Council on Higher Education, 2013); and yet government continues to increase funds for higher education, with expectations of specific targets of numbers of graduates and levels of quality (Council on Higher Education, 2013). While the country is still faced with these challenges, teaching and learning technologies are evolving, with the technological tools of the time. The audited stats indicate that only 27% of registered students finish the course in due time (Ibid).

To connect between the need to improve the students' performance rates and balance this with the changing technologies of the time, most universities are moving towards data-driven decision-making (SAAIR, 2017), as a systematic way of analysing data about academic activities. The application of learning analytics is one of the data-driven interventions to help in the early identification of students who are at risk of failing or dropping out (Gašević et al., 2015). Learning analytics has been defined as "the collection, measurement, analysis and reporting of data about learners and their contexts, for the purposes of understanding and optimizing learning and the environments in which it occurs" (Siemens & Long, 2011). Indeed, the emerging field of learning analytics has the "potential to enable higher education institutions to increase their understanding of their

students' learning needs and to use that understanding to positively influence student learning and progression" (Prinsloo & Slade, 2013).

Atkinson (2015) introduces an argument that the power of learning analytics depends on the learning designs used, for learning analytics to deliver on tailoring individuals on learning, competence and the life context. There is a need to enable learning designs that will work best with complicated or sophisticated learning analytics. According to Siemens and Baker (2012), there are commonalities between the fields of learning designs and learning analytics. "It is suggested here, that no matter how sophisticated the learning analytics platforms, algorithms and user interfaces may become, it is the fundamentals of the learning design, exercised by individual learning designers and faculty, that will ensure that technology solutions will deliver significant and sustainable benefits" (Atkinson, 2015).

Indeed, the emerging field of learning analytics has the "potential to enable higher education institutions to increase their understanding of their students' learning needs and to use that understanding to positively influence student learning and progression" (Prinsloo & Slade, 2013:2). However, learning analytics has as yet seen limited, ineffective, and insufficient use or non-adoption, in the South African higher education environment (Prinsloo & Slade, 2017). While acknowledging criticisms of privacy and legality (*ibid.*), the literature gives little attention to the issue of how exactly learning analytics can contribute to or enhance student performance and retention in South African HEIs (Lemmens & Henn, 2016). This has become an important problem to address, in the context of the increasing digitisation of African universities, coupled with systemic challenges of student drop-out and failure (Lemmens & Henn, 2016; Prinsloo & Slade, 2017).

2. Methodology

This study employs qualitative research methods of enquiry (Yin, 2009). In qualitative research, various knowledge claims, methods of enquiry, data collection methods and data analysis are employed (Creswell, 2003). The research strategy adopted in the study is an **exploratory case study**, which is a strategy that is used to explore those situations where the interventions being investigated have no one-sided outcome (Yin, 2013). The case study included qualitative data collected through conducting interviews and thematic analysis from the Universities of Technology (UoT) of South Africa. The target participants in the interviews were the directors and managers of e-learning centres, senior management and technicians. There interviews were conducted among 5 universities of technology and South African Technology Network. The unit of analysis comprised people participating who ranged from directors of E-learning centres to content managers and learning designers. The interviews were between 33 minutes and 55 minutes long and 1 interview per institution was conducted.

Of the various methods used for sampling, in this study the purposive sampling method was chosen and the South African Technology Network (SATN), with its South African institutions, is used as a base. The SATN was an umbrella body of UoT in South Africa, and the purposive sampling is mostly suitable when a population has the same characteristics (Barreiro & Albandoz, 2001). The selection of all universities of technology allowed the research scope to be broadened, to dig deeper into the phenomena, with easy access and generalization of outcomes.

Thematic analysis is another rigorous method used to organize and analyse qualitative data. Thematic analysis seeks to uncover the themes significant in the data at different levels (Attridge-Stirling, 2001). The aim of the thematic analysis in this study was to uncover the deep meaning from what participants provided, and to give a detailed presentation of the data. The outcomes of the analysis are systematic themes and sub-themes (Vaismoradi & Turunen, 2013). Rule and John's (2011) argued the question of trustworthiness in the qualitative data; they further provided a proposal to present vast descriptions, to present a critical review and to verify the steps of data analysis.

3. Analysis and discussions of findings

The data analysis process has been conducted as an attempt to respond to the main research question of this study: "how would the introduction of learning analytics help South African universities to improve the students' success and throughput rates?" What came out of the study strongly, were the challenges that contributed to the factors of the non-adoption and implementation of learning analytics (LA). Analysed data gave an indication of what participants felt in various degrees, about each challenge raised; and the challenges

were examined and compared, according to the views of participants. There are five challenges drawn from the study, as presented in Figure 1. These challenges have been discussed in detail.

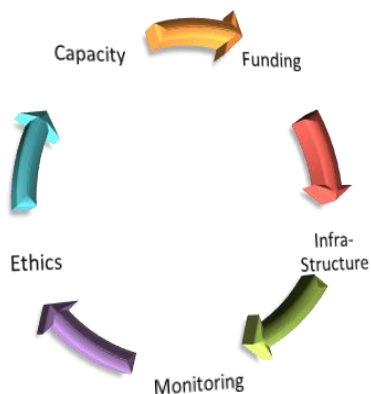


Figure1: Challenges of learning analytics

3.1 Capacity

There is a strong perspective that emanates from the data and that cut across all participants. They all hold the view that capacity of the staff; both academics and administrators is lacking insofar as technologically challenges are concerned. This happens in a world where the technologies of the day seem to have the potential to address several systematic problems that higher education is faced with. Sclater et al., (2016) argues that staff development is part of investing in learning analytics, so as to produce desired outcomes. This point comes out strongly regarding potential challenges that can render the whole learning analytics system ineffective, if not addressed. The participant argues that: “Learning analytics are dependent on the data that is available in datasets and staffs are responsible for inputs.”

The number of participants suggested that staff capacity requires more than volunteer training. Training should be mandatory and be part of the staff contract. Furthermore, the recruitment departments of the universities should start to require such competency skills from the staff. However, these skills will not be acquired overnight. Hence the participants suggested that an option of in-house training to acquire the skill to use the required software fluently is eminent. It is the view of Siemens and Dawson (2014) that; in improving higher education capacity and productivity, some policies and strategies will have to be effected, for learning analytics to be a success. This actually speaks directly to the policies guiding the academic staff. These findings complemented what was said by West et al., (2016), when they conducted a study on the experiences of teachers when they first discovered that using learning analytics for some time, was challenging. However, when training sessions were conducted and policies changed, a glimpse of light came out (Ibid.). It is in their conclusion that staff development is one part that enables learning analytics to reach its capacity, and it’s thus an important stakeholder.

3.2 Funding

The funding issue has been a strong debate for some time. According to the Department of Education (2003), in their white paper, funding models were inherited from the apartheid system which disadvantaged black institutions over white institutions. As a result, the department has not been able to level the ground between institutions. Furthermore, the Council of Education (2010), in their report, concluded that former disadvantaged institutions still struggle, even in the existing democratic dispensation. The findings strongly suggest that part of the government funding should subsidise the adoption of technologies for teaching and learning. Currently, universities depend on their internal funds to secure these software programs. The funding in no uncertain terms tops the list of challenges. Participants felt that it should no longer be a barrier to the adoption of learning analytics. Many participants suggested that universities who have limited funding cannot sustain the purchase of these software programs without assistance. Part of the arguments by participants, was a strong suggestion on the role that the government could play in securing these software programs as a consortium. They could then provide them to its institutions at a central point. In addition, Lewin and Mawoyo (2014) concluded that access and success needed the government to play a critical role, not only in providing

funding. They should also be suggesting guidelines. For learning analytics to be adopted in South Africa, the government must avail funds for this, and play an active role in ensuring that this strategy is adopted and implemented.

3.3 Infrastructure

There is a realization from all participants, which while learning analytics are a virtual system that is externally provided, institutions had to meet some computer competencies so as to use them effectively. Central to infrastructural development, participants felt strongly that the datasets that institutions use are disconnected, making it impossible to monitor them. The participants strongly suggested that if learning analytics were to be used as one way to increase students' performance other datasets such as life national financial systems, residences, demographics of students, and the library system, should be embedded with each other. Most institutions already have most of these systems; however, they operate in isolation from one another; thus, there is a strong argument for condensing these systems so that they can talk to each other. It is noted that institutions can rent virtual spaces to host the learning analytics system. However, the internal infrastructure should still deliver credible data, which can be systematically analysed to gain insights.

3.4 Monitoring

The monitoring systems in any project are pivotal. Atif et al., (2013) when evaluating tools and approaches on learning analytics, suggest that if we cannot monitor what we do, we are unable to see progress or immediate problems. At this point it is not necessary to categorise monitoring as a strong barrier against adoption and implementation. However, as a cautionary measure, that part of planning should be included. According to Xavier et al., (2014) monitoring systems in learning analytics provide an opportunity to access and respond, while learning is taking place; which is why learning analytics is mostly advantageous. Fewer participants concerned themselves about monitoring; however, they strongly showed a depth of understanding the need for learning analytics.

3.5 Ethics

Lastly, the question of ethical implications was discussed. Many authors in literature, writing about learning analytics have outlined the ethical issues such as with the collection of data. Their use is faced with a number of ethical challenges, including location and the interpretation of data (Slade & Prinsloo, 2013). Ethical oversight of student data in learning analytics is a typology derived from a cross-continental, cross-institutional perspective; (Willis et al., 2016) and in exploring the relationship of ethics and privacy in learning analytics and design implications for the field of educational technology (Ifenthaler & Tracey, 2016). In all the papers mentioned above, what is common is their conclusion that ethical implications are a threat to learning analytics, while they note and agree on potentials.

The author's conclusions are contrary to those of South Africa universities, who strongly felt that they were not conflicted, and that they do not face similar ethical issues in teams of learning analytics. Further, they argued that students' data, whether manual or systematic, has always been in the hands of the institutions and their employees. The institutions are governed by a policy that protects students from victimization. Therefore, it can be concluded from this analysis that a lack of ethics can be a threat to a country, probably based on the high levels of cybercrime. However, in South Africa that is the least of the challenges or barriers to the non-adoption of learning analytics. Participants felt strongly that students' data is a sensitive issue and as such, it must be handled with care, be it manually or systematically.

In summary, the investigation of the adoption and application of learning analytics identified factors that are hampering the adoption and the implementation of learning analytics in South African higher education institutions. Table 1 presents how the participants have rated these barriers, based on their comments and the level of agreement.

Table 1: Summary of the challenges of learning analytics

Challenges/Barriers	Comment	Level of Agreement
Capacity	Staff development, internal learning designers	Strongly agreed
Funding	Government subsidies, Consortiums	Strongly agreed
Infrastructure	Data sources, learning systems, proper centres	Strongly agreed
Monitoring	Reports, evaluations	Not a major concern yet
Ethics	Disclaimers, institutional policies	Not a major concern yet

4. Conclusion

The study investigated the process of adoption and the implementation of learning analytics in South Africa, and challenges have been identified that hamper the adoption and the implementation of learning analytics. These challenges have been viewed as major barriers and were ranked from capacity, funding, infrastructure and monitoring to ethics. From the study, participants were in unison that the process of adopting learning analytics has the potential to enable higher education institutions in South Africa to gather information to improve student success and throughput. However, these challenges need to be given immediate attention and needs to be addressed, to enable the adoption and implementation of learning analytics in higher educational institutions.

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