An elephant in the learning analytics room – the obligation to act

Paul Prinsloo
University of South Africa
3-15, Club 1, P O Box 392
Unisa, 0003, South Africa
+27 12 433 4719
prinsp@unisa.ac.za

Sharon Slade
The Open University
Walton Hall
Milton Keynes, UK
+44 1865 486250

sharon.slade@open.ac.uk

ABSTRACT
As higher education increasingly moves to online and digital learning spaces, we have access not only to greater volumes of student data, but also to increasingly fine-grained and nuanced data. A significant body of research and existing practice are used to convince key stakeholders within higher education of the potential of the collection, analysis and use of student data to positively impact on student experiences in these environments. Much of the recent focus in learning analytics is around predictive modeling and uses of artificial intelligence to both identify learners at risk, and to personalize interventions to increase the chance of success.

In this paper we explore the moral and legal basis for the obligation to act on our analyses of student data. The obligation to act entails not only the protection of student privacy and the ethical collection, analysis and use of student data, *but also*, the effective allocation of resources to ensure appropriate and effective interventions to increase effective teaching and learning.

The obligation to act is, however tempered by a number of factors, including inter and intra-departmental operational fragmentation and the constraints imposed by changing funding regimes. Increasingly higher education institutions allocate resources in areas that promise the greatest return. Choosing (not) to respond to the needs of specific student populations then raises questions regarding the scope and nature of the moral and legal obligation to act. There is also evidence that students who are at risk of failing often do not respond to institutional interventions to assist them.

In this paper we build and expand on recent research by, for example, the LACE and EP4LA workshops to conceptually map the obligation to act which flows from both higher education's mandate to ensure effective and appropriate teaching and learning and its fiduciary duty to provide an ethical and enabling environment for students to achieve success. We examine how the collection and analysis of student data links to both the availability of resources and the will to act and *also* to the obligation to act. Further, we examine how that obligation unfolds

in two open distance education providers from the perspective of a key set of stakeholders – those in immediate contact with students and their learning journeys – the tutors or adjunct faculty.

CCS Concepts
• **Social and professional topics**→**Computing profession** • **Applied computing**→**Education**

Keywords
Learning analytics; obligation to act ethics

1. INTRODUCTION
Recent theoretical, conceptual and empirical research in learning analytics provides glimpses of the immense promise offered by the collection, analyses and use of student data in higher education. As the field continues to evolve, current research and practice attempt to address a host of ethical, legal and logistical issues, challenges and concerns [13, 22, 33, 40, 42, 44, 55].

Despite advances in the conceptualisation of the ethical and privacy challenges in learning analytics as mapped in the DELICATE framework [13, 22], the potential of learning analytics remains tempered by the scope and practicalities of student privacy as a possible 'show-stopper' [22, p. 23].

Against a backdrop of growing research on the ethical implications of learning analytics, this paper focuses specifically on the *institutional* obligation to act. We acknowledge that this may be curtailed and frustrated by students' own unresponsiveness. Most recently the main emphasis in exploring the institutional obligation to act has been to focus on the obligation to safeguard student privacy [13, 22]. The recently published LACE review of current issues and solutions with regard to student privacy [22] moots the issue of the "role of knowing and obligation to act" as part of the ethical responsibility of the institution and asks "Does the new knowledge gained bring with it a responsibility to act upon it? What the ramifications of action or inaction?" (p.7).

We attempt here to respond to the question posed by the LACE review [22]. Underpinning the obligation to act is the extent to which higher education institutions have the resources, understanding *and* the political will to effectively respond to the promise of learning analytics. Learning analytics produces information that can be translated into knowledge and action, but various factors may impact on this translation of data into actionable knowledge and understanding [27]. Although we may 'know more' about our students, choosing appropriate and effective strategies to respond is entangled in a mess of epistemic,

philosophical, political, legal, economic, social, technological and environmental assumptions and factors. Responding to what we know and understand is dependent not only on the political and institutional will to respond, but increasingly also on having the necessary resources to respond [39]. The increasing costs in providing an enabling environment to students who are often underprepared means that higher education institutions increasingly need to triage and choose how they allocate resources. As Prinsloo and Slade [39] indicate, this is increasingly leading to a focus on those students who may provide a return on investment as a result of an intervention. The combination of funding constraints with an increasing need to support often underprepared students places institutions in a moral and legal double-bind – even if they want to provide the support students need, they simply cannot.

Examples of higher education's obligation to act include providing disabled students' with equitable access, preventing discrimination, bullying (and increasingly cyber bullying) and responding to students who are at risk of committing suicide. These examples flow from the contractual, moral and fiduciary duties of a higher education institution towards supporting students at risk of physical or emotional harm. Compared to case law which has investigated the institution's duty to act in these cases, there appears to be no equivalent regarding an institution's obligation to act in the event of knowing that students are *at risk of failing*. With the growth in the scope and detail of learning analytics, it is a valid question [22] as to whether students would have recourse to legal or other action if they were identified as more likely to fail, but *not* warned or supported.

Acting on what we know about students, especially where this links to behaviors which might imply higher risk of failure, often falls on faculty and a range of support staff who may have access to such information through visualizations provided by learning analytics' dashboards. In reviewing how learning analytics (LA) has been taken up by various stakeholder groups, Greller & Drachsler [21] refer to data clients (e.g., teachers) as the 'beneficiaries of the LA process who are entitled and *meant to act upon* the outcome' (emphasis added).

In this paper we question the assumption that we *will* respond by firstly mapping the obligation to act from a series of legal and ethical perspectives. We present two short case studies entailing a directed content analysis of the tutor contracts in two different distance learning institutions. The purpose of the case studies is to determine to what extent tutors are obliged to respond to the analyses and information provided in learning analytics. The paper concludes with some tentative pointers as basis for action.

2. PREDICTING AND PREVENTING STUDENT FAILURE AND DROPOUT
The early theoretical and empirical models developed by Spady [48, 49] and Tinto [51] emphasized the social conditions and the role of "a lack of consistent, intimate interaction with others" [48, p. 78] in influencing students' decision to drop-out. (Also see [51]). Learning analytics, more than ever before, provides us with information regarding these social conditions and the various nuances, instances and frequency of interaction of students with their peers, resources (whether online or offline) and teaching and support staff in their learning journey [16, 18]. Given the contractual nexus between university and student, it follows then that access to actionable and empirically verifiable data relating to factors that impact on academic success increases the potential for liability.

In the context of this paper's exploration of the moral and legal implications that arise from learning analytics, we acknowledge that student success be understood as the result of multiple, often inter-dependent and mutually constitutive factors in the nexus between students and institution in a particular micro and macro context [50]. While we specifically focus on the moral and legal obligations of institutions to respond to students at risk, it is important to note that the responsibility to create an enabling environment for student success *does not exonerate students from taking responsibility for their learning*. Godor [20] however warns that there is a danger that learning analytics emphasizes "student-related behaviours and student-related characteristics" and "fails to examine *institution*-related behaviours and *institution*-related characteristics such as the climate of academia" (p. 2; emphasis added). (Also see [50]). Godor [20] also flags that whilst early warning systems alert teaching staff, they "once again externally manoeuvre the foundations for student success from the institution itself back to the student" (p. 5).

In the context of this paper, we propose that the knowledge and actionable information provided by learning analytics raises the need to reflect on the rationale, scope and constraints inherent in higher education's moral and legal obligation to act. Given the relatively recent emergence of learning analytics as one means to support and potentially 'save' students from drop-out or failure and a corresponding lack of policy and relevant case law, we deliberately draw upon parallel arguments relating to student (self) harm and the obligation of the institution to act to illustrate comparable points.

3. MAPPING RESPONSIVENESS
Institutional responsiveness entails much more than the protection of student privacy and the ethical collection, analysis and use of student data. The latter has received increasing attention and support in the work of LACE [22] and published research by individual researchers [13, 40, 44]. This paper specifically focuses on the obligation to act as the effective allocation of resources to ensure appropriate and effective interventions to increase effective teaching and learning.

Given the emphasis in this paper on the institutional obligation to act, there is a danger in that we disregard the many strategic and operational initiatives aimed at improving the learning experience and ultimately the return on investment for both students and the institution. However, there is some evidence that changes in funding regimes and increasing competition raise the need for institutions to (re)consider resource allocation to those students who are deemed high risk [2, 37, 39]. While it is tempting to focus only on the impact of the increasing resource constraints on institutional responsiveness, there are other relevant factors such a lack of understanding,; the role of political will in shaping institutional responsiveness; the lack of integration in institutional sense-making and resource constraints.

3.1 Lack of understanding or the theory/practice divide
With the advent of Massive Open Online Courses (MOOCs) and other advances in educational technologies, a number of authors (e.g., [17, 43]) have pointed to a need for research to take cognisance of educational theory or past educational research. However, there is some evidence that management and policy makers may disregard educational theory and empirical research [36, 37]. This leads to a potential 'gulf' between higher education researchers, policy makers and practitioners where much of the current educational research is deemed irrelevant in the context of

the need for shorter-term investigations and solutions. El-Khawas [14] highlights management and policy makers who favor positivist and reductionist research modes rather than qualitative modes and critical approaches. In responding to problems, there can be a tendency to seek solutions and just-in-time research that "cut out complexity, turbulence and messiness with an emphasis on simple and uncomplicated findings and proposals that sponsors of the research can use and control" [37, p. 344]. (See also [26]).

3.2 The role of political will and institutional responsiveness

While the duty to respond rests on the institution as a whole, it is the legal duty of management to define and oversee the obligation to act. Research by El-Khawas [14] suggests that institutional policy development tends to focus on research findings or theoretical developments when it is politically convenient to do so. Similarly Kogan and Henkel [28] posit that policy development favors research that fits into the political and technological climate of the time. Institutions respond when "a problem is recognised as serious and requiring a new solution; when the policy community develops a financially and technically workable solution; *and when political leaders find it advantageous to approve it*" [14, p.5] (emphasis added). This may explain why some initiatives to improve student success and retention go against the grain of research of even conventional wisdom.

3.3 Lack of integration in institutional sense-making

While much of the research into improving student success and retention is focused on the integration (or lack of) of students into institutional culture (organizational and epistemic) [7, 48, 49, 51], it is also important to point to the impact of a fragmented systemic institutional response on an institution's obligation to act [46, 50]. Not only do various stakeholders in the institution work in silos, responding independently of each other and resulting in overlap and inconsistencies, institutional sense-making of students at risk is also fragmented [37]. Institutional sense-making and research are scattered amongst individual and institutional researchers, academic and support departments and management and policy development. Learning analytics may provide insight at a course level to individual faculty and/or support teams that trigger a response which may run contrary to institutional policy, strategic objectives and/or allocation of resources.

There is then a real danger that the obligation to act and the effectiveness of the institutional response is hampered by non-systematic and non-integrated approaches to respond to students at risk.

3.4 Resource constraints

As higher education institutions respond to financial constraints and attempt to re-align initiatives to improve student success, there is increasing emphasis on allocating resources to move the "murky middle" – those students who are currently at medium risk of non-completion and who with some additional intervention and support can actually pass [4, 39, 40, 53]. The support and cost needed to address those considered at higher risk of failure are increasingly considered to be wasted resource. The phenomenon of the increasing resource constraints faced by higher education raises the interesting question on how a lack of resource impacts on the moral and legal duty to act.

Institutions increasingly find themselves in a double-bind where they may have the political will and expertise to respond, but not the resources. Responding to students deemed at risk, especially those admitted to higher education but who may need specialized and personalized support to give them a reasonable chance of success, is costly. How do we then respond to the moral and legal necessity to act, when responding in appropriate and effective ways becomes (resource-wise) impossible?

3.5 Student responsibility and autonomy

An ethical approach to learning analytics should acknowledge both the *reciprocal* nature of the relationship between the institution and students as well as the impact of the asymmetrical power relationship [44, 50]. The institutional obligation to act does not result in students becoming mere recipients of services and support. Students have a co-responsibility to fulfil their part in the learning contract [13]. While students' unresponsiveness or disregard for their own responsibility does not absolve the institution of its obligation to act, we should acknowledge the reciprocal nature of the responsibility to ensure effective learning.

4. MAPPING SOME MORAL AND LEGAL CONSIDERATIONS INFORMING THE OBLIGATION TO ACT

Having a basic understanding of some of the moral and legal considerations of the obligation to act is crucial to prevent ill-considered and hasty reactions. As stated earlier, while national legislation and institutional policies and procedures provide clear pointers with regard to protecting student privacy, the moral and legal ramifications of action or inaction in learning analytics [22] have not yet been fully mapped.

4.1 Saving the Drowning: Mapping Some of the Moral and Legal Implications on the 'Duty to Act'

A lawsuit filed by parents of a suicidal student in 2002 [47] and other similar suits form the basis for research by Massie [31] to explore the legal responsibilities of college personnel. Central to this is whether a higher education institution has a 'duty to rescue' or a contractual obligation to act once there is awareness of students at risk. Massie [31] states that "As every law student learns in the first year, there is no general 'duty to rescue' a person in even the gravest danger if the actor has no control over that person and did not create the danger, regardless of how easy and risk-free it would be for the actor to do so" (p. 637). It is clear though that, even if there is no legal foundation, there are moral and ethical issues to be considered. It is not the purpose of this paper to provide a detailed analysis of the different legal, moral and ethical implications of the question whether the obligation to act once student risk is known. Rather, we map some of the different moral and legal implications before using these to engage with the consequences for learning analytic research.

4.2 Moral and Ethical Bases for an Obligation to Act

The duty to rescue has been embedded in philosophical discourses in various forms such as the 'trolley problem' and the 'drowning person' (e.g. [1, 32, 45]). Approaches to 'solving' these philosophical and ethical problems are often complex and, like the field of law, require specific knowledge and background. Very broadly speaking, one can distinguish between deontological and teleological approaches [30]. A deontological approach to ethics is based on rules and forms the basis for legal and regulatory

frameworks, as well as Terms and Conditions (T&Cs) that clarify the nature and scope of the rights and responsibilities of parties to the agreement in a particular context. Deontological approaches are effective in relatively stable environments. Having consensus on following a deontological approach necessitates agreeing on the type and choice of rules (e.g. consent-based or contract-based). A deontological approach is also based on the notion that decisions to adhere to the rules arise from an "autonomous, objective and impartial agent" (Edwards as cited in [6, p. 1072])

An alternative approach is a teleological approach where ethical norms around the potential for harm, the scope of consent and recourses in cases of unintended harm are negotiated and agreed upon. A teleological approach focuses on fulfilling "the needs of others and to maintain harmonious relations" [6, p. 1072] and considers potential vulnerabilities of those affected by the intervention or opportunity.

Velasquez, Andre, Shanks and Meyer [54] distinguish between a number of approaches, such as (1) a utilitarian approach (deciding on an action that "provides the greatest balance of good over evil"); (2) a rights approach (referring to basic, universal rights such as the right to privacy, not to be injured); (3) a fairness or justice approach; (4) the common-good approach (where the welfare of the individual is linked to the welfare of the community); and (5) the virtue approach (based on the aspiration towards certain shared ideals). In an attempt to ensure ethical problem solving, Velasquez et al [54] suggest asking five questions, namely (1) what are the benefits and harms, to whom and what are the alternatives? (2) what are the rights of those affected by a course of action and which course of action respects those rights? (3) which course of action treats everyone the same "except where there is a morally justifiable reason not to"? (4) how will the common good be served by the action taken? and (5) which possible action develops moral virtues?

It is clear that exploring moral and ethical implications may involve choosing the lesser of two evils (e.g., [1]) and, as illustrated by [32], deal with messy problems such as deciding to terminate, allowing to fail or die and withdrawing aid. Contrasted with the range of ethical approaches, legal frameworks attempt to make such complexities more palatable by reducing them to a series of principles or rules. Botes [6] suggests that an ethics of justice and an ethics of care are often positioned as opposites, but Gilligan [19] contends that both care and justice have a place in ethical decision making and that 'the two aspects are inextricably linked and in constant interaction' [6, p. 1073] (emphasis added).

4.3 An Overview of the some of the Legal Issues in the Obligation to Act

When does an obligation to act arise and what recourse does an individual have when an obligation is not fulfilled – whether intentionally or when the fulfillment of the obligation has become impossible? The duty to act is an established principle in different legal frameworks. For the sake of this article we consider an obligation as a legal bond (*vinculum iuris*) whereby a person, a group of persons or organization is bound to act or refrain from acting based on an agreement between said persons. This legal bond imposes a duty on the obligor to perform or act depending on the agreement, but also creates a corresponding right by which the recipient or oblige can demand a performance or action to be rendered, in fulfillment of the agreement.

Interestingly, in most Anglophone countries there is no general duty to rescue a person. A duty to rescue arises in two situations namely: (1) where a person has created a dangerous situation that causes another person to fall into peril. Under such circumstances the person who created the context has the duty to rescue the endangered person; (2) where a special relationship exists between two persons, e.g., parents and children, and between employers and employees. The principle of 'reasonable care' could be questioned in these special relationships where "...what constitutes reasonable care is contextual - the extent and type of supervision required of young elementary school pupils is substantially different from reasonable care for college students" [31, p. 639]. However, do universities not specifically take on this obligation at the point of formal registration?

A tort or delict, depending on the legal system in a particular context may consist of the following elements: (1) *Conduct/action or non-action* – where harm may have been caused by the specific action (commission) or omission or failure to act). It is important to note that omission only arises when there was a duty to act; (2) *Wrongdoing or wrongfulness* – where the act or non-action was in contravention to the specific legal mores in a particular context; (3) *Intentionality or fault* – where the scope of resource to action or sanction will depend on whether the person acted intentionally or negligently; (4) *Loss/damage* - the conduct or inaction must have resulted in some form of loss or harm to the claimant in order for them to have a claim such as material loss (e.g. financial loss) or patrimonial loss (a reduction in a person's financial position, such as is the case where a claimant incurred medical expenses) or immaterial loss (e.g. pain and suffering); (5) *Causation* – an important element for the complainant to prove is that the loss or damages (directly or indirectly) arose because of the action or non-action of the accused - in other words the damage was a *sine qua non* of the plaintiff's conduct.

It is important to note that torts (or delict in the US and South Africa) may result from negligence or criminal actions. Negligence refers to fault which may be negligent or intentional; whereas criminal law requires that the act be intentional. Tort laws have a different burden of proof, such as a balance of probabilities rather than beyond reasonable doubt as in the case of criminal action.

A specific concept in tort law is the '*duty to rescue*' relating to circumstances where a party can be held liable for failing to come to the rescue of another party in peril. Under common law, the duty to rescue is rarely penalized through statutes of law, but this does not erase the implicit moral duty to rescue under a set of separate ethical arguments.

In general, accountability resulting from the special relationship between an institution of higher learning and a student is determined based on a combination of the following factors existing: "foreseeability of harm to the plaintiff (generally conceded to be the most important consideration); degree of certainty of harm to the plaintiff; burden upon the defendant to take reasonable steps to prevent the injury; some kind of mutual dependence of plaintiff and defendant upon each other, frequently (as in these cases) involving financial benefit to the defendant arising from the relationship; moral blameworthiness of defendant's conduct in failing to act; and social policy considerations involved in placing the economic burden of the loss on the defendant" [31, p. 639]. Even though most colleges no longer act in loco parentis we "still have a reasonable expectation, fostered in part by colleges themselves, that reasonable care will be exercised to protect resident students from foreseeable harm" [31, p. 640]. Massie [31] therefore concludes that while common law is silent on the positive duty to rescue, "both judicial and

legislative policies have developed that help to encourage the moral impetus to help one in imminent peril" (p. 668).

5. (RE)DEFINING RESPONSIVENESS

Institutional responsiveness is most often considered in the context of resource constraints, and specifically human resource constraints. We would argue though that this is a somewhat restricted view. Institutional responsiveness includes not only policies, systems and human resources but also increasingly affordances offered by advances in technology such as machine learning and Artificial Intelligence (AI). AI "tools are producing compelling advances in complex tasks, with dramatic improvements" [9, par. 1]. Without disregarding its potential, we are also faced with situations where "AI systems are already making problematic judgements that are producing significant social, cultural, and economic impacts in people's everyday lives" [9, par. 1]. In the context of learning analytics we have to ask "How can we use algorithmic decision-making in higher education to ensure, on the one hand, caring, appropriate, affordable and effective learning experiences, and on the other, ensure that we do so in a transparent, accountable and ethical way?" [38].

Danaher [11] proposes an interesting matrix that maps potential combinations of human-algorithmic decision-making employing the basic actions of seeing; processing; acting; and learning. He proposes that, in each of these four actions, humans can either act on their own; humans can use algorithmic decision-making in any single action or combination of actions; algorithmic decision-making can be used in any single action or combination of actions *with human oversight*; or algorithms can act independent of human oversight in any single action or combination of actions. (See [38] for a discussion on the potential for bias, discrimination and a range of ethical challenges in algorithmic decision-making).

6. METHODOLOGY

This paper is based on a qualitative interpretative or hermeneutic study [5, 10] using a dialogical case study methodology as described by, amongst others, Thomas [52]. In using a dialogical case study we attempted to apply specific theoretical understandings of the notion of the obligation to act to two institutions' job descriptions of tutors. As an *instrumental* case study [52] we seek to gain insight into the ways that tutor contracts understand the nature and scope of the obligation to act in response to learning analytics.

The units of analyses were the tutor contracts of two different distance learning institutions in respect of online courses. We used a *deductive,* directed content analysis approach that entailed identifying key concepts flowing from the literature review [15, 24]. Case studies do not (and should not) aim to produce generalizable theories but rather phronesis or practical wisdom which is "about understanding and behaviour in particular situations" [52, p. 214]. The credibility of this research was ensured by peer debriefing and member checking, and its dependability and confirmability by being transparent regarding choices and the limitations of this study as well as keeping a paper trail of the analysis [15, 29].

The limitations to this study include (1) that neither of the two researchers is a legal expert and that case law from differing national contexts may have provided different or more nuanced insights; (2) the study is only based on two institutions' contracts and job descriptions for tutors; and (3) the field of and responsibilities resulting from learning analytics have yet to be incorporated in our understanding of various levels of responsibility and action. The aim of the research was not to generalize but rather use the two case studies as a basis to illustrate the need for further consideration and research.

7. CASE STUDIES

7.1 The Open University (OU)

The Open University (OU) in the UK is a large, open entry, distance learning institution supporting around 200,000 students per year. Teaching at the OU is delivered primarily through the embedded teaching and learning design in module materials, learning activities and assessment; and in the direct distance teaching delivered by contracted tutors to their tutor groups (normally around 20 students) mainly through online forums, supported by occasional synchronous tutorial events. The distance learning nature of the university means that learning analytics is playing an increasing role in delivering proactive student support. Approaches include the use of simple tracking systems which identify students matching pre-defined combinations of demographic and study behavior conditions and then trigger interventions from support staff, as well as reviews of student engagement with, for example, assessments, module content and other online materials in order to better understand teaching and learning design.

7.1.1 OU tutors and engagement with learning analytics

The OU has also been developing systems to help identify at-risk students through the development of two predictive analytics models. One approach uses logistic regression to calculate the probabilities of individual students being registered at key milestones during a module presentation and is being used by curriculum focused student support teams to guide targeted intervention at key points [8]. A second approach, known as OU Analyse [56] also aims to predict at-risk students and is being piloted in a format which puts information directly into the hands of students' own tutors.

A recent study [23, draft] looked at how OU tutors experienced this predictive tool. A group of 55 self-selecting tutors from a range of subject modules were given access to OU Analyse over a single presentation (around 100 other tutors were told that they must use the information – no records were kept of their engagement). At the end of the pilot, a small sample of tutors were surveyed to establish the extent to which they had engaged with information from the model and whether it led to actionable insight. Some also participated in semi-structured interviews. Weekly tutor engagement with the dashboard varied across the modules and across time with higher usage generally associated with key events (such as assignment deadlines) but was typically 25% or less of tutors.

The levels of engagement by tutors with student data are impacted by a wide range of factors (see for example [40] who refer to the Technology Acceptance Model developed by Davis et al [12] as useful in explaining why teachers use educational technology). However, at the OU at least there seems a possible disconnect between developers who see the value of learning analytics as a key tool to provide insight and greater student support and have greater expectations around both adoption rates and acceptance of the value of these approaches, and tutors who can opt to employ such an approach (or not).

Expectations for student support from tutors are set out in several documents and policies. The OU's Tutor Support Statement [34] for students states that tutors will "Seek to make contact with you if you appear not to be engaging with the module activities, in order to discuss ways of supporting you with your studies and/or options open to you." The formal Terms and Conditions [35] for OU tutors make no reference to an expectation that a tutor uses learning analytics to provide student support, save for a broad statement outlining their duties which includes that tutors should "monitor the progress of students on their course, including making contact with students who do not submit assignments". A new contract has been in negotiation for some time, but it is not apparent that this aspect of the Terms and Conditions will fundamentally change. However, revised role *guidance* is likely to include more reference to the increasing uses of technology. Specifically the draft guidance includes tasks such as carrying out an initial identification of student learning support needs using available student profile data; making proactive contact with students at critical points; monitoring, recording and supporting students' engagement with learning and their progress on a module and *taking appropriate action as necessary* to support student progress (emphasis added) and acquiring, developing and updating the necessary skills to work in the OU e-teaching and learning environment. Although it is encouraging that revisions attempt to highlight the potential and need for greater tutor engagement with student data to inform effective support, it seems a shame that such work is labelled as role guidance rather than a necessary part of the normal tutor contract. This also potentially contradicts the University's own policy regarding the ethical use of student data for learning analytics [33] which has, as one of its main principles, that the University "has a responsibility to all stakeholders *to use* and extract meaning from student data *for the benefit of students*". Although it is fair to say that policy often lags practice, the reluctance to enforce an obligation to act as part of the revised tutor contract perhaps appears a missed opportunity and inconsistent with broader policy.

7.2 University of South Africa (Unisa)

Unisa, with more than 300,000 students, is the largest distance education provider on the African continent [26] and due to the cost and sustainability of access to the Internet [25, 57], offers the majority of their courses in a technology-enabled paradigm. All courses have an online presence with a range of resources and possibilities for interaction, and data shows that the majority of students access these online resources. Seven of the 8 colleges or schools at Unisa have a fully online Signature Course (SC) that is a compulsory requirement towards the completion of a certificate, diploma or degree. These SCs have a "two-pronged objective: to leverage the interactive potential of the digital technology and to help students to reflect on the role of their discipline in the societal transformation of South Africa" [26, p. 226].

7.2.1. Unisa tutors and engagement with learning analytics

In the context of this paper, we focus on the scope and responsibilities of Unisa e-tutors and on the Teaching Assistants (TAs) providing digital academic support in these SCs.

In order to reduce the impact of semi-variable costs and to protect "a certain level of economies of scale", each TA must "support a large class (200 students, in four classes of 50)" [26, p. 227]. Given that TAs have to mark 10 assignment items per student per semester, they spend most of their time marking assignments and dealing with administrative issues, and less time on facilitating

discussions and learning. Hülsmann & Shabalala [26] indicate that "This suggests a self-defeating trait in the design template of the SCs: In order to increase participation in online discussion the number of assignments had been increased; as a consequence of the high marking load, TAs find little time for the facilitation of online discussions" (p. 228). Appointed TAs are subject to a contract which tasks set out in a formal Task Agreement. Amongst the tasks specified is an expectation that TAs will: "Monitor student online learning.

Similarly, Unisa's e-tutors are bound to 4 Key Performance Areas (KPAs). KPA 2 which focuses on management of the student learning experiences online assumes that e-tutors will track student engagement and requires e-tutors to: "Monitor student participation in online activities; follow up with students who are not participating in online discussion to assess the reasons for this; and Monitor and report on the students' progress". Although KPA 4 focuses on academic and technical support online, the tasks included are very much reactive, that is, there is no explicit reference to the use of a learning analytics approach to make sense of student behaviors, nor to predict or act upon any insight gained.

Despite the widespread use of technology as a means to deliver teaching and learning, little or no use has been made of an active learning analytics approach. The move toward tracking and alert systems for staff and students has been flagged as a future initiative however [3], and it is hoped that such systems may usefully inform the work of both e-tutors and TAs in the future.

8. SOME POINTERS FOR REALIZING THE OBLIGATION TO ACT

Earlier in the paper we acknowledge that realizing the potential of learning analytics to influence strategic decision making in creating more effective and enabling learning environments, and increasing students' chances of success, depends on a variety of factors. We alluded to the *political will* of institutions to respond in appropriate and effective ways. The appropriateness and effectiveness of these responses, however, depend on institutions' *understanding* of the complexities of student retention and success as well as having the necessary *resources* and structures in place to respond accordingly. It is relatively easy to bemoan the negative impact of issues such as funding constraints and increased competition, and forget that resources are but a part of an appropriate and effective response. The scope of an institution's political will as set out in its policies, appointment contracts and performance criteria depends on its understanding and definition of student success and the potential, limitations and ethical challenges around the collection, analyses and use of student data.

An often neglected area then is the moral and legal obligation that arise from having access to more data. More than ever before institutions have rich, albeit incomplete or holistic pictures of students' learning journeys. Having access to data does not, per se, translate into complete or necessarily accurate information or knowledge. But where it does flag a likely outcome which might result in student harm, it does raise the obligation to act, whether on moral and/or legal grounds.

In this concluding section we map some tentative pointers for considering the moral and legal implications of the obligation to act.

8.1 Co-responsibility in an asymmetrical power and contractual relationship

It is important to acknowledge that institutions do not bear sole responsibility for ensuring learning and student success. Effective learning is found in the nexus between students' locus of control and situated agency and the institution's fiduciary and contractual duty [44, 50]. While learning analytics has the potential to provide students with timely feedback and analysis on how to change their behaviors, we should be careful not to assume this exonerates the institution from its fiduciary and contractual duty [20]. The obligation to act is then a *co-responsibility* of students and institution, albeit tempered by the asymmetrical power and contractual relationship in which the institution has very specific moral and legal duties to respond.

8.2 Data, information and knowledge

As learning analytics matures, the potential for real-time feedback and personalization of learning becomes an increasing reality. Our expectations and assumptions regarding data collection processes (sample size, context, limitations), as well as our understanding of the collected data itself, should be scrutinized for bias, statistical error and unintended consequences. Accepting that data does not necessarily translate into information and knowledge [27] raises a number of ethical concerns that should be acknowledged and addressed [44, 55]. As proposed in this paper, the collection and analysis of data increases the necessity and scope of the obligation to act. In responding to the analyses there is a fiduciary and contractual duty to ensure that processes and analyses are rigorous and open for peer review and adaptation.

8.3 The scope and implications of the moral basis for the obligation to act

In approaching the necessity and scope of higher education institutions' obligation to act from a deontological or rule-based moral position, it is clear that higher education institutions have an obligation to act (see next point). In the current fluid and uncertain higher education context we propose that, despite the stability of a deontological approach, a simple reliance on rules and legal frameworks is not enough, and perhaps not even fair [39]. A teleological approach allows for higher education institutions to create spaces to realize and investigate the potential of accepting the co-responsibility of students and institution towards making sense of the responsibilities arising from both data and analyses and determination of the range and limitations of available resources to enable more effective and responsive learning. A teleological approach allows the possibility to explore the benefits and harms, the responsible actors, and the alternatives available in a particular context [54]. We suggest then the need to engage with the potential of both a deontological *and* teleological approach in exploring the scope, limitations and reasonableness of the obligation to act in a particular institutional, disciplinary and geopolitical context.

8.4 The scope and implications of the legal basis for the obligation to act

Acknowledging that legal frameworks and case law may differ depending on the geopolitical context of a higher education institution, it seems clear that the collection and analyses of data by higher education is not only part of the mandate of higher education [39], but also implies a *vinculum iuris* or legal basis to act. There is a contractual obligation that arises between student and institution that stipulates the duties and responsibilities of both parties to the agreement. We accept that learning analytics has a case to answer when this leads to information and knowledge that students are potentially at-risk or that students' behavior at a particular point in time in a course increases the probability of dropout. While acknowledging that students and institution are co-responsible, there is ample research that administrative and operational inefficiencies have a negative impact on student learning, and as such, increases the legal basis for students to demand a performance or action in fulfilment of the agreement.

It falls outside the scope of this paper to explore the various aspects and implications of intentionality or fault, the proof of damage or loss, and causality. The obligation to act arising from the data, information and knowledge harnessed through learning analytics is also tempered by the notion and definition of reasonable care. However, we suggest that there should be account for the responsibilities that arise in knowing more about our students' dispositions, contexts and learning journeys.

8.5 The implications of the obligation to act for policies and performance agreements

This paper has mapped a number of issues resulting from the moral and legal bases for the obligation to act. The two cases provide some insight into the need for review of the contractual arrangements of tutors as a result of that obligation (whilst recognizing the differences in maturity in using learning analytics to make informed pedagogical decisions in these two institutions).

In both cases there is no formal or explicit expectation nor any contractual requirement that *tutors* will engage with the information and knowledge provided by learning analytics. While the OU case study suggests that tutors are not the only institutional staff responding to data flagging at-risk students, the case makes clear that staff at the forefront of the potential of learning analytics are not (yet) contractually bound to respond.

The two case studies highlight the importance of an institutional, integrated response to the information and knowledge garnered from learning analytics. Although some applications do address issues across the whole student journey, learning analytics is often focused on effective learning and support at a *course* level. This suggests not only a certain granularity of information, but also a response typically at *course* level. The ability of staff (whether tutors or teaching assistants, faculty or support and administrative staff) to respond is muddied and embedded in broader institutional policies and funding arrangements, which impact on departmental and course structures, tutor: student ratios, the growing outsourcing of academic support to contract, and increasingly, zero-hour contract staff, etc. And, in addition, the willingness and availability of resources enabling institutions to respond and fulfil their obligatory and fiduciary duty to care are further impacted by external legal, policy, quality assurance and funding regulatory arrangements and bodies.

Despite this, the recognition of the impact and constraints of the regulatory and funding contexts does not provide a basis for institutions to ignore the moral and legal implications of their obligation to act. We suggest that an integrated and considered response to the obligation to act arising from learning analytics will involve responding on the following levels:

8.5.1 Institutional policies and frameworks

Institutions must have the political will to act in response to the information and knowledge resulting from learning analytics. The cases presented here illustrate the need for an institutional

response to the provision of appropriate policy and operational frameworks. One such example is the OU's own policy on the ethical use of student data for learning analytics [33]. However, as the OU case illustrates, simply having a policy does not necessarily result in the will or the resources to respond. Realizing and optimizing the potential of learning analytics to enrich institutional and student understanding of the factors that shape students' learning journeys necessitates (re)considering the different responsibilities flowing from knowing more about our students. The complexities of responding to this knowledge will entail appropriately qualified knowledgeable and resourced staff who not only understand the scope and implications of the obligation to act, but who are held contractually liable for responding.

8.5.2 Teaching contracts
Responding appropriately, ethically and effectively to the information and knowledge resulting from learning analytics implies that the obligation to act should be embedded in the contracts and performance criteria of those at the forefront of teaching, whether as course leaders, faculty or tutors/teaching assistants. Both cases provide some evidence that contracts and performance agreements should be more specific than simply asking teaching staff to 'monitor' students' learning. Although interpretation of 'monitor' *may* include taking cognizance of the information and knowledge provided by learning analytics, contracts and performance agreements should be much more precise in defining expectations.

8.5.3 Oversight and accountability
In the light of the moral and legal obligations to act on the information and knowledge resulting from learning analytics, there is a need to also consider the scope and nature of oversight and accountability. The need to respond to information highlighting individual or groups of students risk of failure or lack of engagement also raises questions around who and how we ensure that those responses are appropriate, ethical and an 'optimum' use of available resources. The very nature of learning analytics as an increasingly fine-grained (yet partial) picture of students' learning assumes and possibly necessitates timely and detailed responses. While there is increasing consideration for the ethical dimensions of learning analytics, the exact scope and nature of accountability and oversight are still uncertain [55].

Also crucial is student agency and their recourse to action. We propose that students are not only co-responsible for their learning, but are also impacted by institutional decisions that may either enable their learning or impact negatively on their learning. In the event of institutions knowing that students' behaviors put them at risk, we propose that institutions have a moral and legal obligation to act – to involve, inform and enable *students* to take the necessary steps to alleviate risk. Should institutions fail to act, whether by fault or intentionally, students should have a contractual right to demand redress.

Case law in different contexts relating to higher education institutions' moral and legal duty to respond to cases of bullying, discrimination and student suicide provides the rationale for this paper's exploration of the moral and legal obligation to act arising from learning analytics.

8.6 The potential and perils of new developments in technology
Advances in educational technology provide interesting and promising possibilities in considering the obligation of higher education institutions to act. While we cannot ignore the ethical challenges posed by the use of algorithms, machine learning and Artificial Intelligence, we also cannot ignore the potential to make greater sense of student learning, or to respond to students with specific needs. (See [38]).

9. LIMITATIONS TO THIS STUDY
This paper arose from the authors' involvement in the discourses emanating from the maturation of learning analytics as discipline and field of research in two very different contexts. We acknowledge that though there are differences in pedagogy and educational delivery between distance education and more traditional and/or distributed forms of delivery, the issues raised in this paper, though not conclusive, raise important points for consideration irrespective of educational delivery mode. We further acknowledge that not only does the mode of delivery impact on the maturation and role of learning analytics in our two institutions, but also that the case studies in this paper cannot be used to generalize to all distance or distributed learning contexts. As the evidence from the two case studies presented suggests, knowing more about our students and having the potential to surveil students' activities and recognize behavior that indicate the probability of the risk of failure, raises important moral and legal issues.

While we firmly believe that this paper addresses a real issue in the maturation and institutionalization of learning analytics, we acknowledge that the moral and legal issues pertaining to the obligation to act are complex and require expert opinion. As educators and researchers we acknowledge that this paper has but touched the surface of the moral and legal issues in respect of the obligation to act. Despite this limitation, this paper proposes tentative pointers to guide engagement with the duties and responsibilities resulting from knowing more about our students' dispositions, engagement or lack of, and their relative probabilities of being at risk of failure.

10. (IN)CONCLUSIONS
In the light of the increasing volume, variety, velocity and veracity of student data available to be collected, analyzed and used in learning analytics, this paper raised the responsibilities resulting from knowing more about our students and the resulting moral and legal foundations in the scope and nature of the obligation to act. There is ample and increasing evidence that the insights provided by learning analytics *can* inform students to adjust their behaviors, and institutions to provide additional or more effective and appropriate support. As the two case studies in this paper suggests, knowing more about our students and making this information and knowledge available to a range of stakeholders, does not *necessarily* result in action.

Responding to the analyses and insights provided by learning analytics is often constrained by a range of factors, such as lack of political will, gaps in performance contracts and/or a lack of resources. While these factors are mitigating and sobering factors in considering the moral and legal obligation to act, they do not indemnify or exonerate higher education from considering the moral and legal implications of knowing more about our students.

This paper proposed that a deontological or rule-based response to the obligation to act may not be sufficient in the light of the instability in the field of higher education. Despite the limitations in a deontological approach, the obligation to act is embedded in a rich and detailed legal framework of thought that raises important issues for learning analytics. Complimenting a deontological

approach to considering the scope and nature of the obligation to act, is a teleological approach that determining the scope, timeliness and resources needed to enact the obligation to act should be negotiated between everyone affected.

We have outlined suggestions for realizing the obligation to act based on an understanding of student and institution co-responsibility despite and amidst the asymmetrical power and contractual relationship; reconsidering our assumptions regarding data, information and knowledge; the moral and legal implications pertaining to an obligation to act and lastly, the implications of the obligation to act for policies and performance agreements.

Despite their limitations, the two short case studies presented provide a basis for our assertion that the time has come to explore the moral and legal obligation to respond to knowing more about our students' dispositions, learning behaviors and risk profiles.

11. ACKNOWLEDGEMENTS

12. REFERENCES
[1] Alexander, L. (2005). Lesser evils: A closer look at the paradigmatic justification. Law and Philosophy, 24(6), 611-643.

[2] Altbach, P.G., Reisberg, L., & Rumbley, L.E. (2009). Trends in global higher education: Tracking an academic revolution. Retrieved from http://unesdoc.unesco.org/images/0018/001831/183168e.pdf

[3] Baijnath, N. (2015) Going digital, presented at the Learning Africa Conference, Ethiopia, 21 May 2015. Retrieved from: http://www.unisa.ac.za/news/wp-content/uploads/2015/05/eLearning-Africa-2015-Speaking-Notes-N-Baijnath-200515.pdf

[4] Blythe, S., Darabi, R., Kirkwood, B. S., & Baden, W. (2009). Exploring options for students at the boundaries of the" at-risk" designation. *WPA: Writing Program Administration-Journal of the Council of Writing Program Administrators*, *33*, 9-28.

[5] Bos, W. & Tarnai, C. (1999). Content analysis in empirical social research, International Journal of Educational Research, 31, pp. 659-671.

[6] Botes, A. (2000). A comparison between the ethics of justice and the ethics of care. Journal of Advanced Nursing, 32, 1071–1075. DOI: 10.1046/j.1365-2648.2000.01576.x

[7] Braxton, J.M. (Ed.). (2000). Reworking the student departure puzzle. Nashville: Vanderbilt University Press.

[8] Calvert, C. E. (2014). Developing a model and applications for probabilities of student success: a case study of predictive analytics. Open Learning: The Journal of Open, Distance and e-Learning, 29(2), 160-173. doi: 10.1080/02680513.2014.931805

[9] Crawford, K., & Whittaker, M. (2016, September 12). Artificial intelligence is hard to see. Why we urgently need to measure AI's societal impacts. [Web log post]. Medium. Retrieved from https://medium.com/@katecrawford/artificial-intelligence-is-hard-to-see-a71e74f386db#.wi7sq5l3a

[10] Creswell, J.W. (2007). Qualitative inquiry & research design. Choosing among five approaches, 2nd edition, London, UK: SAGE Publications.

[11] Danaher, J. (2015, June 15). How might algorithms rule our lives? Mapping the logical space of algocracy. [Web log post]. Retrieved from http://philosophicaldisquisitions.blogspot.co.za/2015/06/how-might-algorithms-rule-our-lives.html

[12] Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. Management Science, 35(8), 982–1002.

[13] Drachsler, H., & Greller, W. (2016). Privacy and learning analytics – it's a DELICATE issue. 6th Learning Analytics and Knowledge Conference 2016, April 25-29, 2016, pp. 89-98. Edinburgh, UK. DOI: http://dx.doi.org/10.1145/2883851.2883893.

[14] El-Khawas, E. (2000). Patterns of communication and miscommunication between research and policy. In S. Schwarz & U. Teichler (Eds.), The institutional basis of higher education research. Experiences and perspectives (pp. 45-55). London, UK: Kluwer Academic Publishers.

[15] Elo, S., & Kyngäs, H. (2007). The qualitative content analysis process, Journal of Advanced Nursing, 62, pp. 107-115. DOI: 10.1111/j.1365-2648.2007.04569.x.

[16] Ferguson, R. (2012). Learning analytics: drivers, developments and challenges. International Journal of Technology Enhanced Learning, 4(5-6), 304-317.

[17] Gasevic, D., Kovanovic, V., Joksimovic, S., & Siemens, G. (2014). Where is research on massive open online courses headed? A data analysis of the MOOC Research Initiative. *The International Review of Research in Open and Distributed Learning*, *15*(5), 134-176

[18] Gašević, D., Dawson, S., & Siemens, G. (2015). Let's not forget: Learning analytics are about learning. TechTrends, 59(1), 64-71.

[19] Gilligan, C. (1982). In a different voice: Psychological theory and women's development. Cambridge, Mass: Harvard University Press.

[20] Godor, B. P. (2016). Academic fatalism: applying Durkheim's fatalistic suicide typology to student drop-out and the climate of higher education. Interchange, 1-13. DOI: 10.1007/s10780-016-9292-8

[21] Greller, W. & Drachsler, H. (2012). Translating Learning into Numbers: Toward a Generic Framework for Learning Analytics. Educational Technology and Society. 15 (3): 42–57

[22] Griffiths, D., Drachsler, H., Kickmeier-Rust, M., Hoel, T., & Greller, W. (2016). Is privacy a show-stopper for learning analytics? A review of current issues and solutions. Learning Analytics Review 6. LACE. Retrieved from http://www.laceproject.eu/learning-analytics-review/is-privacy-a-show-stopper/

[23] Herodotou, C., Rienties, B, Boroowa, A., Zdrahal, Z., Hlosta, M., Naydenova, G. (2016) Using Predictive Learning Analytics to Support Just-in-time Interventions: The Teachers' Perspective. To be submitted to Teaching and Teacher Education.

[24] Hsieh, H-F., & Shannon, S.E. (2005). Three approaches to qualitative content analysis, Qualitative Health Research, 15(9), 1277-1288. DOI: 10.1177/1049732305276687.

[25] Hülsmann, T. (2016). The impact of ICT on the costs and economics of distance education: A review of the literature. Retrieved from http://oasis.col.org/handle/11599/2047

[26] Hülsmann, T., & Shabalala, L. (2016). Workload and interaction: Unisa's signature courses – a design template for transitioning to online DE?. Distance Education, 37(2), 224-236.

[27] Kitchen, R. (2014). The data revolution. Big data, open data, data infrastructures and their consequences. London, UK: Sage.

[28] Kogan, M., & Henkel, M. (2000). Future directions for higher education policy research. In S. Schwarz & U. Teichler (Eds.), The institutional basis of higher education research. Experiences and perspectives (pp. 25-43). London, UK: Kluwer Academic Publishers.

[29] Lincoln, Y. S., & Guba, E. G. (1990). Judging the quality of case study reports. International Journal of Qualitative Studies in Education, 3(1), 53-59. DOI: 10.1080/0951839900030105

[30] Marshall, S., 2014. Exploring the ethical implications of MOOCs. Distance Education, 35(2), pp.250-262.

[31] Massie, A. M. (2007). Suicide on campus: The appropriate legal responsibility of college personnel. Marq. L. Rev., 91, 625.

[32] McMahan, J. (1993). Killing, letting die, and withdrawing aid. Ethics, 103(2), 250-279.

[33] Open University. (2014). Policy on ethical use of student data for learning analytics. Retrieved from http://www.open.ac.uk/students/charter/sites/www.open.ac.uk.students.charter/files/files/ecms/web-content/ethical-use-of-student-data-policy.pdf

[34] Open University Tutor (Associate Lecturer) Support Statement (2012). Retrieved from http://www.open.ac.uk/students/charter/sites/www.open.ac.uk.students.charter/files/files/ecms/web-content/tutor-support-statement.pdf

[35] Open University Terms and Conditions of Service for Associate Lecturers (2016). Retrieved from http://intranet6.open.ac.uk/student-services/main/sites/intranet6.open.ac.uk.student-services.main/files/files/ecms/web-content/associate-lecturers/al-services/AL-Terms-and-conditions-April-2016.pdf

[36] Patton, MC. 2008. Utilization-focused evaluation. [4th edition]. London, UK: Sage.

[37] Prinsloo (2016a). Evidence-based decision making as séance: implications for learning and student support. In Jan Botha & Nicole Muller (Eds.), Institutional Research in support of evidence-based decision-making in Higher Education in Southern Africa (pp. 331-353). Stellenbosch, South Africa: SUN Media.

[38] Prinsloo, P. (2016b, October 5). The increasing (im)possibilities of justice and care in open, distance learning. Presentation at EDEN Research Workshop, Oldenburg, Germany. Retrieved from http://www.slideshare.net/prinsp/the-increasing-impossibilities-of-justice-and-care-in-open-distance-learning

[39] Prinsloo, P., & Slade, S. (2014). Educational triage in higher online education: walking a moral tightrope. International Review of Research in Open Distributed Learning (IRRODL), 14(4), pp. 306-331. http://www.irrodl.org/index.php/irrodl/article/view/1881

[40] Prinsloo, P., & Slade, S. (2016). Here be dragons: Mapping student responsibility in learning analytics, in Mark Anderson and Collette Gavan (eds.), Developing Effective Educational Experiences through Learning Analytics (pp. 174-192). Hershey, Pennsylvania: ICI-Global.

[41] Rienties, B., Giesbers, B., Lygo-Baker, S., Ma, H.W.S & Rees, R. (2016). Why some teachers easily learn to use a new virtual learning environment: a technology acceptance perspective. Interactive Learning Environments, 24(3) pp. 539–552. Rule, P., & John, V. (2011). Case study research, Pretoria: Van Schaik Publishers.

[42] Sclater, N. (2015, March 3). Effective learning analytics. A taxonomy of ethical, legal and logistical issues in learning analytics v1.0. JISC. Retrieved from https://analytics.jiscinvolve.org/wp/2015/03/03/a-taxonomy-of-ethical-legal-and-logistical-issues-of-learning-analytics-v1-0/

[43] Siemens, G., Irvine, V., & Code, J. (2013). Guest editors' preface to the special issue on MOOCs: an academic perspective on an emerging technological and social trend. Journal of Online Learning and Teaching, 9(2), iii-vi.

[44] Slade, S. & Prinsloo, P. (2013). Learning analytics: ethical issues and dilemmas. American Behavioral Scientist 57(1), 1509–1528.

[45] Schmidtz, D. (2000). Islands in a sea of obligation: limits of the duty to rescue. Law and Philosophy, 19(6), 683-705.

[46] Simpson, O. (2013). Supporting students in online open and distance learning. London, UK: Routledge.

[47] Sontag, D. (2002, April 28). Who was responsible for Elizabeth Shin? The New York Times. Retrieved from http://www.nytimes.com/2002/04/28/magazine/who-was-responsible-for-elizabeth-shin.html

[48] Spady, W. G. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. Interchange, 1(1), 64-85. DOI: 10.1007/BF02214313

[49] Spady, W. G. (1971). Dropouts from higher education: Toward an empirical model. Interchange, 2(3), 38-62. DOI: 10.1007/BF02282469

[50] Subotzky, G., & Prinsloo, P. (2011). Turning the tide: a socio-critical model and framework for improving student success in open distance learning at the University of South Africa. Distance Education, 32(2): 177-19.

[51] Tinto, V. (1975). Dropout from higher education: a theoretical synthesis of recent research. Review of Educational Research, 45(1), 89-125.

[52] Thomas, G. (2011). How to do your case study. A guide for students and researchers, London, UK: Sage.

[53] Tyson, C. (2014, September 10). The 'murky' middle. Inside HigherEd. Retrieved from https://www.insidehighered.com/news/2014/09/10/maximize-graduation-rates-colleges-should-focus-middle-range-students-research-shows

[54] Velasquez, M., Andre, C., Shanks, T.S.J., & Meyer, M.J. (2015, August 1). Thinking ethically. Retrieved from https://www.scu.edu/ethics/ethics-resources/ethical-decision-making/thinking-ethically/

[55] Willis, J. E., Slade, S., & Prinsloo, P. (2016). Ethical oversight of student data in learning analytics: a typology derived from a cross-continental, cross-institutional perspective. Educational Technology Research and Development, 1-21.

[56] Wolff, A., Zdrahal, Z., Herrmannova, D., Kuzilek, J., & Hlosta, M. (2014). Developing predictive models for early detection of at-risk students on distance learning modules, Workshop: Machine Learning and Learning. Presented at the Learning Analytics and Knowledge (2014), Indianapolis, Indiana, USA. Retrieved from https://pdfs.semanticscholar.org/3d16/f4008858795b126a351354101b9e378c9337.pdf

[57] World Bank. (2016). Digital dividends. Washington: International Bank for Reconstruction and Development / The World Bank. Retrieved from http://www.worldbank.org/en/publication/wdr2016.