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Content strategy: a lesson from the industry for university learning analytics

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This paper proposes an industry paradigm, called content strategy, for identifying data that has yet to be explored in learning analytics: student engagement data with individual online learning resources in a particular week of a course. Industry examples (including nine.com.au and Buzzfeed) suggest that adopting a content strategy approach to course design could increase student engagement with learning resources, making them more likely to achieve learning outcomes. Furthermore, this paper argues that there is no time left for blindness to content strategy data. Given the online context of curriculum, universities need content strategy to better align themselves with the student of today's user-centred internet. Finally, this paper draws on a university case study to identify existing challenges with implementing content strategy at university, including the limited capabilities of university learning management systems, limited instructor knowledge and copyright issues.

Keywords: learning analytics, LA, online learning, Blackboard, content strategy, LMS

Introduction

The aim of this paper is to explain content strategy as a valuable—yet missing—component of learning analytics (LA) for improving online university curriculum design. 'Content strategy' involves implementing metrics and analysing data in order to align content with organisational goals and user needs. My intention is to begin discussion about strategies, and strengthen feedback loops to learning management system designers, in order to make this approach more possible and achievable for university curriculum designers—or what are often still called (rather inaccurately), 'unit coordinators.'

This paper is organised as follows. First, I briefly recap the background on LA, Then I argue that because of the 'online' part of online learning, student 'engagement' with content is now a significant consideration, making testing and optimising online content unavoidable. Furthermore, the increased competitiveness of higher education institutions makes engagement even more crucial. Next, I will draw a comparison between what universities need to do and what the digital content industry has been doing for almost ten years: I argue that content strategy is a strategy for university curriculum design that could increase engagement. Following this argument is my discussion of the challenges facing the implementation of content strategies in higher education (HE). Finally, I discuss a recent case study from an attempt to measure engagement with content at Western Sydney University (WSU). This case study illustrates the potential of content strategy as an important part of LA, as well as some of the challenges and opportunities for further research and development.

Learning analytics: background

Learning analytics (LA) involves studying student data for the purpose of optimising learning and its environments (Daniel 2014). It is an area only recently receiving attention (Dawson 2015). In simple terms, LA involves looking at students' data traces, called a 'breadcrumb trail,' in order to understand more about them:

> It relies on 'digital breadcrumbs' students leave as they interact within information systems on and off campus. Such breadcrumbs involve records of student logins and logouts, maps of student clickstreams, time stamps of activities and resource access, and any text inputs (e.g., discussion forum posts) students provide within information systems. (Rubel & Jones 2016, p. 144)

Given that a key strategic focus of many universities is reducing student attrition, it makes sense for LA to focus on bigger-picture data representing student engagement with the university as a whole (Buckingham Shum et. al. 2012) and at the course level, to see if a student is 'on track' (Arnold & Pistill 2012; de Freitas et. al. 2015)—for example, tools that provide users with an overview of class or group learning activities (Martinez-Maldonado et. al. 2015); and dashboards that predict learning outcomes based on multiple data sources, including a student's grades in the course so far, time on tasks, and past performance (Verbert et. al. 2014). But this broader focus does not mean it is not valuable to drill down to a micro level and consider data gathered from students' use of particular resources in an LMS in order to identify 'relevancy of resources' as well as 'time spent' on each resource (Verbert et. al 2014).

LA is still coming to terms with concerns regarding what constitutes relevant data—and this has been identified as an important area of future research (Verbert et. al. 2014). A grey area in current research is what the 'resources' are that are being clicked and the specifics of the data available. In today's online and blended context of HE, students access a range of resources, often created on or curated by third-party websites (i.e. websites outside the university's password-protected LMS); for example, in a first year core communications unit I teach, approximately fifty percent of resources are content on third-party websites (e.g. *The Conversation*, *Mammamia*, *Vice*, *ABC News*). Alongside the value of students' use of resources in an LMS, it would also be valuable to gather data about engagement with third-party resources specifically (for example, web content, such as online features, journalism, blogs, videos, webinars, podcasts etc.). Both data sets would sit beneath a content strategy approach—discussed in the next section.

Following this logic, it would be beneficial to analyse the effect of the organisation of information in an LMS, in terms of a student's pathway through the course and its materials. Research acknowledges the importance of the big-picture view of a student's progress in a course in general, and LMS dashboards exist that use a traffic light system to identify students at risk (Verbert et. al. 2014), but there is an opportunity for analysis and evaluation of the organisation of resources at a topic level and a weekly level. Relevant is Prieto's (2011) comprehensive review of the concept 'orchestration' in learning environments, defining it in terms of the planning and coordination of learning activities, the management of learning activities, changing and adapting the learning plan, and the use of 'awareness mechanisms' in order to enhance orchestration. Opportunity exists in LA to analyse orchestration in a digital context, drilling down, for example, to a weekly topic of a course in Blackboard, using what commercial software analytics refers to as user 'flow' between 'events' (see Google Analytics for example). This analysis, in order to enhance what Prieto (2011) refers to as 'adaptation/flexibility/intervention' would also benefit from testing the combinations of resources, based on the user data, in the manner of multivariate tests conducted in digital marketing, i.e. 'when a number of elements on a page are tested to determine which combination gives the best results' (Stokes 2013, p. 532).

Naturally, ethics is an important concern as LA raises issues regarding data protection and confidentiality and consent (Kay et. al. 2012). Commercial organisations have been collecting user data and analysing users' digital shadows for many years, but it has been suggested that education is ethically more sensitive than other sectors (Kay et. al. 2012) and also, given a lack of 'legal "maturity"' regarding the application of the law in the digital environment (Kay et. al. 2012), universities may be more cautious and conservative in their decisions about ethics. Clarity is required regarding the information that may be 'justifiably' collected 'in the name of learning analytics' (Rubel & Jones 2016, p. 144) but there is agreement that if student data collected is 'identifiable' then student consent is required.

There is a misconception, however, that LA data is only useful when linked to students (see Rubel & Jones 2016). When this approach is prioritised, the trepidation of HE ethics departments is reasonable and ethics approval for LA projects naturally becomes a hurdle. But placing the importance on data's unique identifiers overlooks the value of de-identified data, including click-rate on resources, time on page data, scroll depth and bounce and exit rate data—all metrics that industry organisations have been using to successfully increase user engagement for many years. Placing greater importance on de-identified data, and increasing awareness about the ethical appropriateness of de-identified data, could clear the path for further LA experiments, making them easier and faster to develop and implement.

Online learning: the state of play and the need for a game-changer

The rise of online learning makes the testing and optimisation of online university curriculum crucial. In this context, testing and optimisation of curriculum needs to be a focus of LA and 'curriculum' becomes 'content' because of the characteristics of the context of its consumption and the patterns of how it is accessed by students. *Going* are the days of academics providing students with curriculum based exclusively on what they think is best. In those days anyway, anecdotal evidence suggests that many students simply 'don't do the readings' and whether or not it is because of the readings themselves is hard to say. In any case, I am arguing in this paper for the value of including in LA *testing content* and *gathering data* as a strategy for deciding on what content to provide students. This process is what content strategy and digital marketing call 'optimisation.'

Evidence suggest that testing and optimising content will likely lead to a decrease in the number of students who 'don't do the readings,' but as I will explain below, it is part of a more fundamental approach for getting students' attention today anyway.

In this paper 'online learning' includes both fully online learning and 'blended' mode. In fully online learning, all content is offered digitally and typically via an LMS such as Blackboard or Moodle—two of the most widely used in Australia. Students interact with course material, fellow students and teaching staff online only, either synchronously in online tutorials (using software such as Zoom), or asynchronously (using email and, often, social networking sites such as Facebook), and often a combination of both—which is the case at WSU. Blended mode is another form of online learning; in fact, for example, it is the only way the Bachelor of Communication at WSU is offered. In blended mode, unit content, which includes lectures, readings, quizzes and tutorial activities, are all provided online via a LMS. Readings are sometimes from a printed textbook, but often they are electronic, from a university's library database, or from third-party publishers. For example, in a first year core unit I teach, 100 percent of readings are electronic and a significant amount are from third-party publishers; and in a second year core unit, textbook readings (print) are supported each week by one or two electronic readings. In blended mode, like fully online mode, students can prepare for class from anywhere they have an internet connection; but, in blended mode students must attend weekly face to face (F2F) classes in order to discuss the material.

Online learning is on the rise. For example, MOOCS, or 'massively open online courses,' are exploding in popularity. *The Economist* (2014) estimated that MOOCs have provided courses to over 12m students in the United States, Europe and India predominantly. One MOOC aggregator estimated in 2015 that there are 4,200 MOOCs offered by more than 500 universities around the world with 35m enrolments (Carter 2016). Closer to home, a simple search on SEEK Learning returns a list of approximately 285 'online courses' in Australia, and tertiary institutions include Swinburne and Deakin. At WSU, I already mentioned that the Bachelor of Communication is offered in blended mode and year one and two are fully online, and by 2017 year three will also be fully online. Furthermore, the model of the Bachelor of Communication is currently being adopted by other schools at the University.

Online learning is on the rise for good reason. Currently, enrolments of new students at university in Australia have plateaued (Moodie 2016)—and have even declined for some universities, and so online learning is likely an attractive option for institutions looking to boost their numbers. Online learning suits students with work and family commitments, and this is in so far as content, and tutorials, are more conveniently accessed. Online learning is more flexible generally, allowing students more potential opportunity when it comes to paid work, and so it is likely to keep growing in popularity, especially given high numbers of students (in Australia) who combine study with work (Parr 2015). Yet enrolments are set to rise in the future given the population growth of 18–24 year-olds (Parr 2015) and online education could be seen as a cost-effective way for universities to accommodate more enrolments or attract a greater percentage of enrolments through the appeal of the flexible learning opportunities offered by online learning.

Online learning is part of a paradigm shift in information consumption and media use today. 'The latest Digital Australia report from professional services firm Ernst & Young has found Australians spend on average 10 hours and 24 minutes engaging with their internet-connected devices every day' (Carmody 2016). Statistics also show an increase in user-preference for on-demand services, reflected in a shift away from commercial TV viewing, or 'linear' free-to-air television, coinciding with the rise of internet-based entertainment: 'Streaming and downloading provided a whole new outlook on media consumption: content on-demand. Now, Commercial TV faces an even more direct competitor, in the form of Subscription Video on Demand (SVOD) including Netflix, Stan, Presto, Quickflix and Foxtel Play' (Roy Morgan 2016). This also coincides with an increase in smartphone usage (Smith 2015). In one report, twenty-five percent of people surveyed said 'they spent more time on their smartphone than they did talking to their partner or friends' (Carmody 2016). Taken together this data paints the picture of today's media user being surrounded by information, all the time, and who is increasingly used to having it that way. But the data also identifies a big challenge for content producers and publishers in this sea of information: getting users to notice their content in the first place and, ultimately, read it.

Given the growing use of electronic resources in HE, many of which require students to leave their LMS and visit third-party publisher's websites, it is often the case that university curriculum is vying for students' attention in the sea of information that is always flowing, 'always on' for today's media user. Furthermore, this is the user used to controlling their access to information themselves, and so the onus is on the institution to choose learning resources that suit their online context. In other words, university learning resources need to become 'content.'

Of course, ‘content’ refers to everything online, but we can be more specific and define content as all of the following: responsive, engaging and optimised. Since content needs to be accessed any time from any device, it is responsive to different screen sizes and how users read online. Content is also engaging in so far as it achieves a desired user outcome, and these outcomes are measurable, they are ‘metrics’; for example, click rate, session duration and page depth—or the ‘count of pages that a visitor visits on your site beyond the page they landed on’ (Patel 2016). In HE, content is engaging when it is opened and read—in full. Finally, optimised content is better aligned with organisational goals and user needs. It results from the analysis of data collected from metrics. Typically, insights from the data gathered are used to modify content as part of an iterative optimisation and testing process. For a content producer, modification may involve changes to the content itself; for an organisation that provides content, such as a university (a re-publisher, or a curator), modification simply involves choosing different content.

Ensuring content is responsive, engaging and optimised are the broad objectives of ‘content strategy.’ Content strategy involves looking at a combination of engagement metrics (such as click-rate and session duration) and comparing the data gathered to benchmarks, set by the industry, and goals, set by the content strategist on behalf the organisation’s business objectives, in order to decide if and how the content needs to be optimised. In sum, this discipline is concerned with deciding on content based on ‘a deep understanding of the intentions of the content creators [and/or curators] as well as the needs of the content consumers’ (Lovinger 2007; see also Kissane 2011). Related is content marketing, which involves using content strategy to drive a profitable action (Rose 2013).

There are many examples of different organisations undertaking content strategy. One of the most extravagant attempts recently was by an Australian news team. Hal Crawford, Andrew Hunter and Domagoj Filipovic (2015) built a tracking tool called The Likeable Engine to analyse in real time the news headlines from media organisations around the world that are most shared on social media. Crawford et. al. then used the data gathered to deduce characteristics of news stories that would most likely result in engagement, which in this case is a user sharing the content to the connections in their network. Despite there being many factors influencing user engagement, as a result of the insights from the data gathered from The Likeable Engine, Hunter and Crawford's news teams at MSN and Nine (as they are now known after the end of ninemsn joint venture in 2014) can prove an increase in their ability to predict a shareable story based on headline (A. Hunter, personal communication, July 11, 2016). This is a case, then, of journalists using data to work out what stories to tell and how to tell them.

Buzzfeed is another publisher well-known for testing and optimising its headlines in an attempt to boost engagement with their content, and based on their success generally (see Alexa.com for example), it is reasonable to say their strategy is effective. It has been reported that Buzzfeed test several headlines for each piece of content they publish, as Walgrove (2015) explains: ‘For the first couple of hours after [the content is] published, visitors to the homepage or the article page will randomly get one of those variations. Then, editors test the performances against each other, taking into account click-through rates and share rates.’ Typically, one or two versions perform better, which are the ones the editorial team use going forward. Given that an optimal headline can be ‘the difference between 1,000 or 1,000,000 people reading your story’ the time taken in the testing and analysis process is well worth it (Walgrove 2015).

As I have suggested, content strategy is not only relevant for content producers (i.e. organisations who write and publish original content) but content curators also. Content curation, according to the Content Marketing Institute (CMI), ‘assembles, selects, categorises, comments on, and presents the most relevant, highest quality information to meet your audience’s needs on a specific subject’ (Cohen 2014). Curation, then, involves gathering and republishing someone else’s content, but crucial is that content curation adds commentary. This commentary is often in the form of a headline and an introductory blurb based on the curator’s own ‘input or insight’ (Souza 2012). *The Huffington Post*, an acknowledged ‘master’ of content curation (Ristic, quoted in Cohen 2014) is also known for testing different headlines in real time: ‘*The Huffington Post* applies A/B testing to some of its headlines. Readers are randomly shown one of two headlines for the same story. After five minutes, which is enough time for such a high-traffic site, the version with the most clicks becomes the wood [sic] that everyone sees’ (Seward 2009). It is fair to assume that *The Huffington Post* are testing headlines of curated content as well as original content—and in any case insights about how to optimise a headline for original content apply equally to the kind of content to curate.

In these examples, data from testing—or other forms of analysis (e.g. 'scraping,' performed by The Likeable Engine)—is used as part of a user-centred strategy for aligning content with organisational goals and user needs, and although the examples noted are 'success stories' it is nevertheless reasonable to say at the most basic and general level, that testing and optimisation is better than relying on intuition. Crawford et. al. emphasise this point, even in the context of journalism— once the stronghold of intuition-based insight: 'The addiction to the "tummy compass" is one of the bindweeds of old media. The cult of the alpha male editor with its attendant blindness to data now represents a dark side that will work against any organisation still subscribing to it' (14). On the one hand, content strategy is a paradigm necessary for organisations to increase their competitiveness online, but also—as Crawford et. al. make clear, *not* taking advantage of the fact that 'almost every action on the web can be tracked, captured, measured and analysed' (Stokes 2013, p. 9) is dangerously ignorant.

In higher education it appears that the tummy compass still rules when deciding what learning resources to include in courses. Of course, I am not suggesting that readings and other texts are not chosen based on criteria of credibility and expertise, but I am saying that the planning aspects of managing content are not as user-centred as they could be. Optimisation, occurring dynamically and responsively, needs become an approach to online curriculum design in HE and needs to be a part of LA. This is in order to increase the number of students reading content and better prepare them for class and, ultimately, enable them to achieve course learning outcomes. In today's mobile media environment, the onus is on university teaching staff to get to know their students better and align content with their needs, or else they will click somewhere else. The expectation that students are already engaged users, in so far as they have agreed to take the course and are theoretically motivated (i.e. they are not what the marketing industry refers to as 'cold leads'), is not reasonable today. It is necessary to use analytics gathered from data to make the content as engaging as possible.

A practical content strategy for online learning at university needs to include the following processes and data. When analysing content embedded in an LMS page, unit coordinators (who, in this context, are really curriculum *designers*) need easy access to click rate data as well as 'reading' data, including when people scroll and when they reach the end of an article (this is what Google Analytics calls event tracking data—see Cutroni 2012). This data needs to be readily available, as a dashboard, in real-time; and, there needs to be scope built into the course design process, and workload allocation, for implementing the findings. Useful too would be heat map data displaying the areas of an LMS page with the most (and least) activity. At a more sophisticated level, curriculum designers would benefit from the ability to test two or more variations of heading—in exactly the same way *The Huffington Post* and *Buzzfeed* A/B test their content headlines. And worthwhile too would be an aggregation of the most clicked content assets for a given period. Finally, 'time on page' data of content on third-party websites outside an LMS, is essential, and it comes on good advice from senior developers that Facebook already has this capability with the browser software used in its mobile application (P. Steele, personal communication, July 19, 2016; D. Teahan, personal communication, July 16, 2016). All the data gathered would help curriculum designers make informed decisions about the kind of content to include in future weeks, and it would also provide insights useful for optimising content headlines and blurbs.

Content strategy at university: challenges

There is no doubt that optimising content to align with students is a valuable addition to university curriculum design. Optimised content can increase the number of students reading content and better prepare them for class and, ultimately, enable them to achieve course learning outcomes. Optimised content can potentially decrease the fail rate, decrease attrition and make a course (and university) more competitive. Analysing data and using the findings to optimise content is a practice that comes under the umbrella of content strategy. Industry examples prove that 'better' content can increase user engagement, and industry examples also demonstrate the usefulness of testing and analysis to this end. As was mentioned above, for example, a good headline can (sometimes) be all it takes to increase readers tenfold. But, while content strategy is an untapped area of LA and potential in curriculum design, there are several challenges surrounding its implementation. These include research-based, technological, and equity-based challenges.

The first challenge facing the implementation of content strategy at university is research-based. The first rule of writing, and by extension: the first rule of content, is know your audience. But how much does academic teaching staff really know about their audience? Not as much as the industry knows about theirs; for example, Crawford et. al. have spent more than four years gathering and studying data from 'The Likeable Engine' and can only now say, with confidence, that social media users are more likely to share content that is newsworthy, inspirational and 'teaming' (for the specific details see Hunter 2016a). In an academic context, what is needed is data and insights about the kinds of content students are most likely to click, and this goes far beyond content format (e.g. video vs. text—see Pagram & Cooper 2011). For example, useful data includes information about whether students are more likely to read recent content, or journal content, or third-party publisher content, or third-party content aimed at their demographic. Data, over time, could also identify particular themes that students respond to better than others, or switch-off to completely. These insights could be equally applied to content examples used in a weekly topic; for example, perhaps students feel saturated with discussions about

WikiLeaks. Moreover, useful data could tell about the balance of content in an LMS—in other words, are students likely to read an academic essay from a peer-reviewed journal if, that same week, it is 'balanced' with a more light-weight piece—but how light-weight is too light-weight (*The Conversation*; *Vice*?). LA would do well to revisit 'orchestration' (Prieto et. al. 2011), but from the perspective of data insights produced through multivariate tests. And, similar to the tests conducted by *Buzzfeed* and *Huffington*, are students more likely to read content if it is introduced by a blurb, a carefully crafted headline, even a call to action (CTA)? Curriculum designers need this data to begin optimising content, and to get this data they need to begin optimising content.

Another challenge, related to the first, is technological. A majority of participants in a recent LA survey of HE institutions stated that they felt that their university was not providing easy access to LA data and the data provided was not easy to interpret (Buckingham Shum 2015). Clearly there is an issue here with technology and access. A more straightforward technological issue is the limited capabilities of learning management systems. A focus on Blackboard reveals that Blackboard does not have the capacity to track unique clicks on a third-party content link embedded in a content item. Moodle provides more potential for tracking clicks on individual URLs, but the content needs to be content uploaded to Moodle—in other words, clicks on links to content *outside* the LMS cannot be tracked. But, that is not entirely true either, as Google Analytics can be integrated with Moodle, which means that there is the potential to plug-in what Google calls 'event tracking,' which would allow Moodle users to track clicks on third-party links. But the fact that absolute clarity on this application of Moodle for a potential Moodle user, a university course designer (me)—not an IT expert or learning designer—is not readily available is telling enough of the murky complexity surrounding this issue and the technological limitations of learning management systems more generally. (Of course, YouTube analytics include data about numbers of views and average view duration—but this is only available for staff who are account holders of university YouTube channels). Related are two final technological issues challenging content optimisation in HE. First is the limited technological expertise of most academic teaching staff using LMS; second is the huge cost (financial as well as time needed) required for an institution to change an LMS in order to benefit from other features.

Ideally, content optimisation should happen in real-time, or at least content could be optimised on a daily schedule. This, however, poses challenges unique to an education environment. In order to optimise effectively, a course designer needs to have, on hand, a range of content that deals with the same concepts and themes each week, and add/remove appropriately depending on the engagement data gathered. But this could pose an equity issue as students ideally need to access the same content in order to prepare for assessment tasks.

Regularly optimising content would also mean an overall change in the way a curriculum designer plans and implements a course. It is safe to say that in most HE institutions, courses are planned well in advance, and this is for marketing, enrolment and other logistical and administrative purposes. Typically, a course's learning outcomes and assessments are unable to be changed at short notice. While this is the case, some flexibility likely exists for curriculum designers to update reading lists—but common practice is to allow students at least five days to access and read content for a weekly topic. In order to optimise content on a daily basis (or even hourly) curriculum designers would need to quite radically rethink their process for designing courses, and this is in terms of the content they include, and following on from this, the activities and discussion they plan about the content in class (online or F2F). Course design, and teaching, would need to become much more dynamic and agile. The 'front-loading' approach of designing a whole unit before the unit begins, which includes mapping out content and activities with assessment and learning activities, would no longer work. And students would also need to be re-educated about expectations to do with the regularity of their access to content. Really, students would need to be in touch, asynchronously, around the clock. But doesn't technology today lend itself to asynchronous learning, and aren't students 'always on' anyhow?

Finally, related to the last point about the changing nature of course design, is the changing role of HE teachers—which I have been calling 'curriculum designers.' I am identifying an imminent shift in skills and expertise not unlike the shift in skills and expertise Cindy Royal (2014) identifies in journalism, and teaching journalism. 'If you are a journalism educator or media professional,' she writes, 'I have news for you: We work in tech.' In order to keep up with today's data-driven tech environment, a university teacher needs to be a course designer with some of the following skills and expertise: basic coding, in order to avoid problems with LMS editing interfaces and have greater flexibility re. layout and design ('orchestration'); digital copywriting skills—or what is sometimes referred to as 'web writing' skills (Halvorson 2010, p. 128), in order to craft engaging and useful headlines, blurbs for copy (and keep crafting them) and CTAs; usability (UX) skills, in order to implement optimised user pathways in an LMS, or 'event funnels'—as well as some information architecture knowledge; A/B testing skills, in order to implement and evaluate content experiments; analytics skills, in order to know what data to collect and how to interpret it; and market-research/audience analysis skills, in order to get to know their audience. Of course, it is not reasonable to expect an HE teacher to possess all these skills, but realistically, a skill-set that touches on many of these areas is becoming more and more unavoidable with the trend towards blended and online learning.

Case study

A content strategy experiment was undertaken at Western Sydney University in 2015, designed to provide insights into student engagement with weekly content using the LMS Blackboard. This brief case study illustrates the technological requirements of such an experiment, opportunities for technological development in Blackboard, and complications regarding copyright that arise for content strategy in an HE context.

The aim of the experiment was to gather data on student engagement with reading resources ('content') in a weekly topic. More specifically, the aim was to track the number of unique clicks on content.[1] This data would provide insight into student preferences for content; and potentially, this data could provide insight into student preference for content in relation to the progression of the unit (i.e. content in a weekly topic at the beginning, middle or end of the course) and orchestration of resources in the LMS. It is already the case at some institutions that certain engagement data can be obtained from university reading lists—and there is specific software available to track engagement metrics with resources on reading lists—but it is important the curriculum designers have the flexibility to orchestrate where and how content is embedded. For that reason, reading list data was not considered an option.

I was advised at the planning stage of the experiment that Blackboard did not possess the analytics capacity to track user clicks on links embedded in the page of a weekly topic, called in Blackboard a 'content item.' These links are referred to as 'in-item' links. Blackboard could only provide data on views of the weekly content item itself, and/or clicks on 'web links'—which, although valuable, are not useful for determining student preference for individual content resources contained in the content item. I was advised, however, that data on file downloads could be obtained from the University server and also that analytics could be added to pages on the University server outside the Blackboard LMS.

As a result, the following workaround solution was implemented. Outside the Blackboard LMS an HTML page was created with a link to the PDF and the following anchor text: 'Download the PDF (xMB).' For a student, after logging in to Blackboard, they would 1. Open that week's content item; 2. Click on a link to access content; 3. Get redirected to the HTML page; and, 4. Click on the PDF link. Tracking this process would provide data from two metrics: page views of the HTML page and downloads of the PDF. Comparing data would provide an idea of student engagement with content and show the drop-off between arriving on the HTML page and downloading the document. The test was to be conducted for two separate weeks and using two PDFs. The results are below in Table 1:

Table 1: Western Sydney University content strategy experiment—results

Week	Total Students	Page Views (Goal 1)	Conver-sion[1]	PDF Download (Goal 2)	Conver-sion[2]	Drop-Off	Engage-ment
7	342	201	59%	187	93%	7%	54%
10		83	24%	78	94%	6%	23%

A conversion refers to any goal a marketer/researcher may have (Burstein 2012). In this experiment, 'Conversion[1]' is the percentage of the total number of students enroled in the unit who completed the first goal, which was clicking on the link in Blackboard and arriving on the HTML page. 'PDF Download' is the number of students who downloaded the PDF (Goal 2), and 'Conversion[2]' is the percentage of students who completed 'Conversion[1]' that downloaded the PDF. 'Drop-Off' is the percentage of students who completed Goal 1 but did not complete Goal 2. And 'Engagement' is the percentage of total students enroled in the unit who downloaded the PDF—that is, the percentage of total students who completed both goals. The results show that Engagement, when considered in the context of the number of students enroled in the course and expected to read compulsory university reading material, appears low. Engagement also drops as the course progresses, and this is understandable. The conversion rate for Goal 2 is also higher than Goal 1, which is to be expected as a student who completes Goal 1 is what marketing would call a 'hot lead.' The drop-off rate for both weeks was comparable, which suggests that a certain amount of 'hot leads' not downloading the content despite getting as far as the 'Download the reading now' link is to be expected.

[1] Since the data collected was de-identified, ethics approval was not necessary (see Kay et. al. 2012)

Several issues come to light as a result of this experiment and the data gathered. Primary is the difficulty experienced collecting this kind of data from Blackboard and undertaking LA focused on content optimisation. Granted, a solution was developed, but considerable technical assistance was required in order to implement the solution. In addition, the solution required that a two-step process be implemented (step 1: student clicks on link; step 2: student clicks on link to download PDF), and it is a fact in the context of digital marketing that there is a drop-off rate with every additional step in a conversion funnel. Also, it is typical for there to be a drop-off rate at Goal 2, or what is more accurately termed 'abandonment'—since this is the final conversion, and the reason is a general user concern with downloading PDFs, and this could be to do with file size and/or concern about potential viruses. Both of these issues, the two-step process and the final conversion being a PDF download, would likely have negatively affected engagement overall.

Another issue is the absence of comparative benchmarks for conversion goals. It is a fact that students are required to read certain learning resources, and that was the case for the two PDFs in this experiment. But what percentage of students typically read the course material in a given week? Benchmarks exist for industry conversions; for example, a 'typical' conversion rate for 'media and publishing' is ten percent and for 'education or healthcare' is eight percent (Burstein 2012). In terms of these conversions, the rates achieved by this experiment are healthy—even good. But until there are benchmarks for these specific conversion goals in HE, an accurate evaluation will not be possible and informed optimisation of course content can only be guesswork.

Copyright was also a significant area of concern during this experiment—and this is from a university administration perspective. Since it was decided that the most accurate data would be the comparative result of page views and download data, the content needed to be a PDF. A PDF is less user-friendly than a responsive web page (which is especially relevant if students are reading content on their smart-phones), and usability of the content is certainly an important issue, and it is reasonable to assume this could have affected the Conversion[2] rate since the anchor text was: 'Download the PDF (1.4MB)'—assuming a student would have chosen *not* to download the content upon finding out it was a PDF. But, the data does not support this theory since the drop-off rate was minimal. The issue with the PDF, and all PDFs, is to do with copyright. University library staff advised that it was preferable for PDFs reproduced under the University's copyright agreement *not* to be stored outside the University's password protected LMS. The PDF to be used in the experiment had to be freely available PDFs—that is, PDFs the authors are licenced to distribute without copyright restrictions. This is of course understandable, but it nevertheless places limitations on the resources that could be potentially used for experiments such as this.

This case study reveals that opportunities exist for further research on content engagement and conversion data benchmarks. In thinking about this case study we become aware of possible problems with the data collected, and that has to do with the accuracy of the insights developed; for example, a high number of clicks on a link or extended time on page do not necessarily equate with engagement as readers may, in the first case, be clicking links without reading, and in the second, visiting pages or opening browser tabs/windows and leaving their computers unattended. It is crucial that learning designers are aware of the limitations of metrics; for example, selecting course content based on the 'click worthiness' of headlines is a misguided motivation as it may signal temporary interest but not sustained engagement (Chang 2013).

Curriculum designers do not know what to expect regarding student engagement and what to aim for, and until the answers to these questions are known curriculum designers will not be able to optimise content. Further research would benefit from sustained testing over the duration of a course, and this could involve A/B testing headings and blurbs introducing content. Further research also needs to track engagement with content published on third-party websites. This means tracking clicks on in-item links in the LMS to the third-party content (this would allay the effect of a two-step process involved in accessing a PDF; and also, tracking clicks on links embedded in-item would prevent the need for students to access a reading list elsewhere in the LMS). In terms of concerns about the accuracy of metrics and the danger of misguided motivations, further research needs to follow the industry content strategy advice of Chang (2013) and, through testing, decide on the metrics most accurately reflective of engagement with content in HE, which will most likely involve a combination of metrics. For example, in order to accurately track engagement with third-party content, time on page data *and* scroll data would be useful—in the manner, for example, Facebook likely collects data on user engagement with third-party content accessed while using the Facebook mobile application. Content strategy at university would also benefit from the analysis of a user's movement between learning resources in a single topic. This is different to analysing user pathways throughout an entire course, as the focus in this case is what Google Analytics refers to as user 'flow' between 'events' on a page. Finally, discussion about the suitability of existing university copyright agreements for today's online learning environment is also necessary.

Conclusion

There is no doubt that efforts to test and optimise university course content could improve student engagement with content. Industry examples show, in simple terms, that optimised content could likely increase the number of students reading learning resources, which will better prepare them for class, better enable them to achieve learning outcomes, make them happier and (potentially) decrease issues such as attrition. But, as the case study demonstrates, the technology isn't readily available and accessible to curriculum designers; and curriculum designers aren't quite curriculum designers (yet). University teachers need new skills and a different perspective on course content and unit coordination more broadly. Realistically, however, these technological requirements and teaching skills are unavoidable, or at least becoming unavoidable, as they are characteristics of the online space into which HE is charting a new course. This is a space where content, whether it is university content or advertising content, is competitive and students access it whenever they want—because they can. Moreover, in an environment where the student determines the 'content flow,' it is to be expected that a 'take it or leave it' attitude is the norm. The result is that content needs to be optimised.

HE content strategy has a way to go. The importance of small-scale experimentation in LA is crucial. As recent research from the Australian Office for Learning and Teaching notes, 'Benefit can be gleaned from implementing small-scale LA initiatives, and growing the scope and scale of these programs, rather than aspiring to the generation and development of an 'at-scale' initiative in the first instance' (2015, p. 38). A critical follow on from experimentation, and the results of experimentation, would be strengthening feedback loops between institutions and LMS designers, as this would provide opportunities to develop the analytics capabilities of an LMS.

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