COVID-19 AS A DISRUPTIVE DRIVER OF ORGANIZATIONAL CHANGE: A CASE-STUDY ON LEARNING ANALYTICS ADOPTION

Christine Armatas, Ada Tse, and Chun Sang Chan
The Hong Kong Polytechnic University
HONG KONG SAR CHINA

Abstract

A case-study is presented on how COVID-19 both accelerated and expanded learning analytics (LA) implementation at a Hong Kong university. Two change management models, one specific to LA, informed the actions taken to address the urgent need for data about students' learning behaviour and outcomes during the period of fully online learning enforced by the pandemic. This case-study illustrates how it is possible to be adaptable and agile in using disruptive forces to drive organizational change in a way that would otherwise be difficult, while still delivering outcomes consistent with organizational goals.

COVID-19 as a Disruptive Driver of Organizational Change: A Case-study on Learning Analytics Adoption

COVID-19 severely disrupted education globally, and even with a high degree of institutional readiness, many had concerns about the quality of the online learning experience for students and the impact on learning outcomes during the pandemic. The case-study presented here highlights opportunities that disruptive events such as COVID-19 present and how these can shape future plans. At the university in question, the sudden shift to fully online and mainly synchronous learning accelerated and shaped the use of learning analytics (LA) because of the need for visibility and accountability of outcomes from online learning. This case-study examines the challenges and opportunities COVID-19 presented at a large public university in Hong Kong in the context of Kotter's (2014) change leadership model and the model for LA adoption developed for the SHEILA project (Tsai et al., 2018). In doing so it articulates some important lessons learned and describes how the vision, strategy and roadmap for institutional adoption of LA at the university changed as a result.

Learning Analytics

Learning analytics (LA) is "the measurement, collection, analysis, and reporting of data about learners and their contexts, for purposes of understanding and optimising

learning and the environments in which it occurs" (Siemens, 2013, p. 1382). It has been used to predict behaviours and outcomes for students as well as performance metrics for management and strategic development purposes. The usefulness of LA has been enhanced by the proliferation of online learning environments which produce large volumes of data that can be used to study learning behaviour and learning outcomes (Greller & Drachsler, 2012).

As LA has expanded in higher education (HE), most of the work in the field has involved interrogating large datasets for purposes such as predicting attrition and academic performance from pre-entry data (de Frietas et al., 2015; Seidel & Kutieleh, 2017) and analysing learning management system (LMS) datasets as proxies for student engagement (Arnold & Pistilli, 2012; Buckingham et al., 2012; Atherton et al., 2017). LA has also been used at subject and programme levels to investigate discrete aspects of a curriculum or student learning. For example, Casey and Azcona (2017) used student activity patterns to develop a highly accurate (85%) classification system for early detection of poor performers, while Ellis et al. (2017) used a range of analytic techniques to investigate student learning behaviours in an undergraduate engineering programme. Armatas and Spratt (2019) showed how LA can inform curriculum review by analysing data such as students' grades and subject satisfaction scores to identify areas for enhancement and improvement in a programme.

Learning Analytics Adoption

While the body of research related to LA is growing, examples of successful systematic and large-scale implementation of LA in HE are limited. The SHEILA project (Tsai et al., 2018) was launched in response to a lack of a defined strategy or monitoring framework to help HE institutions to implement LA effectively. The SHEILA policy framework consists of a comprehensive list of adoption actions, relevant challenges and policy prompts that are framed in six elements of the Rapid Outcome Mapping Approach (ROMA) model.

Step 1 in the ROMA model (Tsai et al., 2018) is mapping to the political context which helps to establish the purpose for adoption which in turn drives action. Identification of stakeholders (Step 2) acknowledges the environment into which LA is to be implemented and the role others play in this environment. Step 3 involves identifying the desired behaviour change which is needed to be able to establish objectives and measurable outcomes. Developing an approach that can avoid identified or known issues and challenges is part of defining an engagement strategy (Step 4), which also includes planning how and when to communicate with stakeholders. Understanding what resources are needed, which are already available, and how resources will be obtained and utilised is part of the analysis of internal capacity to effect change, which is the fifth step. Lastly, establishing a

framework for monitoring implementation and impact and a plan for how to build on, respond to, and learn from outcomes is key to successful implementation.

According to Tsai et al. (2018), these steps should be done iteratively as part of a continuous quality cycle in order to successfully develop and implement an LA framework for the organization. However, this requires planning and preparation, and as the COVID-19 pandemic has shown, there are situations in which action is needed urgently, or plans become unworkable given the circumstances. The question then arises as to how to respond where urgent action is needed and planning and preparation time is limited.

Disruption as a Driver of Change

There have been many pressures that have transformed the HE sector, although paradoxically, the sector is resistant to change and when change does occur, it usually happens slowly (Vlachopoulos, 2021). LA has taken a typical path in its adoption, with research on how best to implement learning analytics emphasizing the need for organizational and culture change in order for it to be successfully implemented and gain mainstream adoption. LA adoption can be viewed as similar to introducing a new product or service and trying to shift users from traditional products or services to a new entrant to the market. This process is called disruptive innovation, which is a market concept that describes a process whereby a new product or service enters the marketplace, undergoes continuous improvement, and then becomes mainstream (Petzold et al., 2019).

Petzold and colleagues (2019) propose a process view of disruptive innovation with three phases – initiation, niche, and mainstream. The factors that influence the dynamics of each phase include the perception and expectations of the opportunity and the entrant's innovation, the strategy and the use of enabling technologies. While acknowledging that the process is dynamic, Petzold et al. argue that there are alternate pathways that an innovation can take, of which many could inhibit the innovation depending on the timing of entry and adaptability of the strategic actions. The interaction between what the entrant does and the environmental factors shape what needs to be done to stay on the disruptive path. As they note, continually sensing the environment, and seizing and adapting the offering, are critical to staying on the desired path. As such, the process of disruptive innovation is conceptualized as being shaped by an interplay of what the entrant does, how incumbents react, and events in the external environment.

Applying the ROMA model (Tsai, et al., 2018) while also conceptualising LA as a disruptive innovation (Petzold et al., 2019) provides additional insight into strategies and actions for adoption. It highlights the importance of the six steps being completed iteratively as part of a quality cycle as the situation will change as

adoption progresses from initiation to niche to mainstream. It also shows the importance of monitoring and responding to environmental changes and ensuring the engagement strategy is aligned with stakeholder needs. Although this is useful, a third element is needed to successfully manage the situation COVID-19 created, which is how to manage change in a new and unpredictable environment.

Leading Change

Disruptive change is not always bad and it can be argued that it can motivate looking for new ways to do things and opportunities to radically change the status quo or to do things that would not normally be done (e.g., Woodward, 2019). But the challenge with disruption in a dynamic and fast-changing environment is that most organizations are not accustomed to responding in this way, preferring to take things at a slower pace based on planning and preparation. As a guide to action, Kotter's (2014) change management model is well suited to situations where time is of the essence, actions need to be taken in a relatively short time frame, and the status quo is not suitable or sustainable (Hall, 2021). The model (Kotter, 2014) has eight actions necessary for managing change in dynamic situations. These actions relate to establishing a sense of urgency; organizing people to guide and support change; developing, communicating and empowering action related to the vision; planning for and achieving short term wins; consolidating improvements and maintaining change; then institutionalizing changes in the organizational culture.

About the Current Study

In 2019 our university, like others globally, found itself in a situation where immediate actions needed to be taken given the sudden shift from predominantly face-to-face learning to fully online classes for all students. While the university was reasonably well prepared for the move to online learning, what was lacking was a well embedded system for monitoring outcomes from online learning. Consequently, the need for systematic, institution-wide LA became critically acute and the previously defined strategy and roadmap that was developed to introduce and mainstream LA over a period of years, was considered not suitable for responding to this new and dynamic situation. Therefore, the strategy and roadmap needed to be revised based on the demands of the pandemic situation.

Our university was faced with the challenge of how to effectively continue to implement LA to meet immediate needs related to the shift to online learning, while adapting the strategy and roadmap to take into account changes arising from the situation created by the pandemic. In doing this, we viewed COVID-19 as a disruptive change driver and LA as a disruptive innovation and drew on Kotter's (2014) model for leading change to guide actions and re-shape the implementation of LA at our university. The next section describes the LA strategy before the

pandemic and the changes and adaptions made in response to online learning during the pandemic. It also details actions taken and how these influenced the strategy for mainstream adoption of LA in support of online learning. This in turn provides the basis for lessons learned that can assist others HE institutions with managing change and driving adoption of LA.

Adoption of Learning Analytics at the University

Before COVID-19, our university had already begun to introduce LA, but in a controlled and limited way. The adoption was initiated by senior managers in the areas of teaching and learning, information technology services, and the University's Educational Development Centre (EDC). The slow and cautious approach was considered necessary to provide time for the required infrastructure, processes, and systems to be put into place, to raise awareness of the use of LA and to provide training on its effective use. However, the aim was for LA to be available for all subjects taught at the university by the end of the 2021-22 academic year.

Use of Learning Analytics Pre-pandemic

With increased interest in LA, our university recognised the potential for LA to inform teaching and learning, especially, in respect to the relationship between learners' activities and their academic performance (Gašević et al., 2015). As a result, the Subject e-Engagement Report (SeER) was initiated in 2017 to provide teachers with a customized learning analytics report on students' usage of the LMS for their courses. The SeER started off as a simple interactive report in Excel providing graphs and tables of weekly usage figures for commonly used LMS tools (e.g., content pages, announcements, grade centre, discussion forums). It also included a list of students with low LMS usage in the class, and identified students who had not logged into the course. The aim of the SeER was to help teachers gain a better understanding of students' behaviour when using the LMS for their subject and help them identify students who may require follow-up action based on usage patterns such as number of log-ins, discussion forum participation, and quiz results. The SeER was generated every four weeks during a semester and teachers could retrieve and read the report themselves via the LMS.

The SeER was piloted with 20 subjects in the 2017-18 academic year, with progressively more subjects being added each semester. Although the pace was slow, this gave the implementation team time to work on the systems and processes underpinning the report as well as on the format and content for the report. It also allowed for activities such as workshops and training to occur to assist subject teachers to use the SeER effectively, particularly if this report was new to them. By the start of the 2019-20 academic year, around 250 LMS courses received the SeER each semester, representing around 13% of all LMS courses. Initial feedback was

positive and there was confidence that as the SeER was rolled out to more subjects, academics' awareness and willingness to use LA to enhance teaching and learning would also increase. The roadmap for full implementation of LA only included the SeER, with all subjects expected to be receiving the SeER four times a semester after the 2021-22 academic year.

Responses to COVID-19 and Suspension of Face-to-face Teaching

The suspension of face-to-face classes in Semester 2, 2019-20 as part of the public health response to the pandemic resulted in moving almost all teaching and learning online, with large volumes of data generated and logged from multiple systems and platforms. The only LA available to teachers at the start of the pandemic were the SeER which reported LMS usage, and analytics built into specific platforms, such as Panopto, which users had to generate themselves. This level of LA was not considered sufficient or efficient – most of the online teaching during the pandemic was conducted via synchronous conferencing platforms for which no reports were available, and for platforms where reports were available, those reports had to be generated by users and the results were not integrated with other LA data.

Building on experience with the SeER, in the first few weeks of the shift to fully online learning, the LA team in the University's EDC designed a bespoke LA reporting system for the university which reported analysis of data from the University's LMS (Blackboard), online conferencing tools (Blackboard Collaborate Ultra, Microsoft Teams, Zoom) and video platform (Panopto). Activity logs for both teachers and students were captured, extracted, and analysed. Weekly reports were provided to senior management at the university and Deans and Heads of Departments which summarized online teaching and student learning activities by subject, department, faculty, and the university as a whole. These weekly reports were critical for providing information about online teaching and whether students were engaged in the online learning activities. Teachers also received a weekly LA report on their subjects which combined results from all of the teaching and learning systems and platforms into one report.

In terms of managing this disruptive change, the initial responses to the rapid shift to online learning mapped to Kotter's (2014) change management model in several ways. First, a sense of urgency was created by senior management through communications with staff and this was reinforced by the frequency of the reports and how they were used. The vision became clear and simple – it was imperative that the University could show stakeholders, both internal and external, that the quality of teaching and students' learning outcomes were not negatively impacted by the shift to fully online teaching. This vision was communicated at all levels, starting from senior management down to subject leaders. It was also supported by the formation of a guiding coalition (Kotter, 2014) in the form of a cross-functional

team whose responsibility was to collect, collate, analyse, report, and disseminate relevant LA. The level of co-ordination, co-operation, and collaboration in such a short time period to achieve the weekly LA reports for stakeholders was unprecedented – what was previously impossible became a reality, solutions to long standing problems were found and implemented, and accountability and responsibility were high given the stakes. This empowering of those given the responsibility for delivering LA reports for all subjects taught at the university was a critical factor in the successful implementation.

The sixth action in Kotter's (2014) model is to plan and achieve short-term wins – for the LA team, this was being able to analyse and report on data from all of the major learning-related systems and platforms used at the university. Previously only LMS data were available for analysis and reporting as there were various impediments (technical, political, and resources related) which prevented access to any data other than LMS data which was used to produce the SeER. In addition, it was a significant win to be able to obtain data much more frequently than was possible previously, which in turn meant that the reporting frequency increased to weekly (the SeER was generated every four weeks during the semester). The scope and quality of the available data allowed us to produce a report that provided high level results which were useful indicators of what was working well and where improvements were needed. A second short-term win was the development of a novel tool for teachers to analyse chatroom messages captured by online conferencing platforms, to provide insight in student online learning engagement. This tool was initially developed in response to feedback from teachers and was well received because analysis of this data was not possible previously, but was considered to be important for teachers in understanding students' behaviour and learning in the online environment.

Feedback and Evaluation of the LA Implementation during COVID-19

In Semester 2, 2019-20 when online learning was implemented, of the 2511 subjects for which a weekly LA report was provided, at least one report was viewed for 508 (20%) of these courses. The highest number of views was in the first week of the semester, with views declining across the semester. Of the 73 teachers who responded to a survey on the LA reports provided to them about their subject, 75% indicated that they read statistics or analytics reports about online teaching or students' online learning. Over half of the participants reported that they made use of these statistics and analytics reports to do things such as review participation and progress in the subject and take action where necessary.

At university level, bringing diverse data sources together helped to demonstrate student engagement in online learning and to show the impact of the sudden change to learning and teaching. For teachers, the statistics and analytics could be used to

understand students' learning progress and their engagement with online learning activities and to evaluate students' performance. However, feedback from teachers via surveys, workshops and training sessions indicated a need for more data and analysis results, together with a more convenient way of retrieving the information. Data security remained an issue, together with concerns whether the level of analysis provided could fully explain the quality of learning effectiveness. Teachers also wanted to better understand how to use data to enhance their teaching and make them really useful for maintaining student engagement and motivation.

Changes to the Vision, Strategy, and Road-map for LA

After initial intense activity to put in place the necessary LA reporting mechanism to respond to the pandemic, once the system was in place and functioning there was space to review what had been achieved and plan for what to do next. The last two actions recommended by Kotter (2014) are to consolidate improvements and maintain change, and to institutionalize changes in the organizational culture. To best understand how to do this, we returned to our initial vision, strategy, and roadmap to which we applied the ROMA model to revise the vision, strategy, and roadmap for LA at the university based on the changes already implemented and the current situation.

By the end of the 2019-20 academic year, it was clear that face-to-face teaching would not resume as normal for quite some time. As such, the use of LA as part of monitoring teaching and learning was well established and broadly accepted. At this point, the roadmap for LA had changed significantly, as had the vision. The original roadmap was to have all subjects receiving the SeER four times during the semester by the end of the 2021-22 academic year. However, by the end of the 2019-20 academic year, all subjects – over 2500 in total – were receiving a weekly LA report which included data from the LMS and other teaching and learning platforms and systems used at the University. The increased scope and frequency of the reporting created a significant workload for the LA team, while at the same time users wanted more customized analyses and easier access. As a result, the vision for LA shifted from a single report, with limited customization only available at specific times and for prescribed periods, to a self-service model giving users flexibility in the reports they could generate, both in terms of data sources and the period the data covered.

As a result of the successful implementation of LA in response to the pandemic, the University funded the LA self-service portal project which is designed to meet the demand for just-in-time and customizable LA for stakeholders. The activities for this project are aligned with the last two actions in Kotter's (2014) model – the self-service portal will consolidate improvements and maintain change, while also institutionalizing the changes. The project is also an opportunity to revisit the vision

and update the strategy and roadmap for LA given our progress. One exciting area we are looking at is providing students with LA that can help them be academically and personally successful. Providing students with access to LA relevant to them was not part of the original vision, but is now acknowledged as being an important means of empowering students who are key stakeholders not previously represented in the plan for LA at the University.

Lessons Learned, Implications and Conclusions

When the University first began to adopt LA, staff were unfamiliar with LA and adoption was slow. However, when teaching shifted to fully online, there were technical and educational support staff with experience and expertise related to LA which could be leveraged to address the pressing need to have data on how students were learning online and what impact this had on their learning outcomes and learning experience. Initially it was stressful and time consuming to put in place everything needed to generate and refine the LA report and expand its scope as opportunities, such as access to new data sources, presented themselves. What was achieved in a very short period of time was well beyond expectations and forced a re-think of the vision for LA and the strategy and roadmap to achieve it.

While disruptive forces such as a pandemic thankfully don't occur often, this case-study shows that disruption can be a driver of positive change if approached properly. Having a model specifically designed for LA adoption in conjunction with Kotter's (2014) change management model helped to guide and inform our actions. While there is still more work to be done to implement the vision for LA at our University, the pandemic condensed the timeframe for completing the work originally planned, while at the same time expanding the scope of the vision. It also helped to mainstream the use of LA rapidly and to reinforce its importance to stakeholders at all levels for providing evidence related to teaching and learning quality and outcomes. As such, it showed how quickly things can change and the importance of being adaptable and agile to take advantage of a dynamic situation.

Our experience shows the importance of strong leadership and empowering those given the responsibility to take on a challenge so that they can complete the required task. This was a critical factor in the success of the LA team and the response to the pandemic. Given the seriousness of the situation, the levels of co-operation and collaboration made it possible to achieve great results, under difficult circumstances and in a very short period of time. Unfortunately, the levels of stress and effort required to do what was done in response to the pandemic are not sustainable, which makes it all the more important to make the most of opportunities when they arise. Fortunately, stakeholder interest in LA has not diminished and there is demand from the University and teachers for more sophisticated LA which is currently being addressed. As this case-study shows,

while disruptions such as COVID-19 are not welcome, when they happen there can be unexpected consequences which ultimately are beneficial if the disruptive change can be harnessed to bring about positive change in an organization.

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Author Details

Christine Armatas
The Hong Kong Polytechnic University
Hong Kong SAR China
christine.armatas@acu.edu.au

Ada Tse
The Hong Kong Polytechnic University
Hong Kong SAR China
ada.sk.tse@polyu.edu.hk

Chun Sang Chan
The Hong Kong Polytechnic University
Hong Kong SAR China
chun.sang.chan@polyu.edu.hk