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Learning Analytics: What's the Use? A Study of Staff and Student Perspectives in Higher Education

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Abstract

Learning analytics (LA) has been defined as the measurement, collection, analysis and reporting of data about learners, for the purpose of understanding and optimising learning and the environments in which it occurs. Due to the volume of student data that has emerged since the rise of virtual learning environments (VLEs), the field of learning analytics has subsequently gained momentum. However, knowledge gaps remain in relation to the ways in which learning analytics is implemented in Higher Education Institutions (HEI) to support students' learning. The purpose of this contextual study was to examine staff and students' attitudes towards and understanding of LA across four colleges within a HEI. Methods: Surveys and focus groups were conducted with both staff and students across four colleges within the HEI. Findings: Both staff and students rated 'improving teaching quality' and 'improving individual students' educational experience' as some of the most important reasons for collecting and analysing student data. However, both staff and students also reported a lack of awareness regarding what data is collected within the HEI, and for what purpose. Conclusions: The main reasons highlighted by both staff and student responses in relation to the collection and analysis of students' data reflect the primary goal of learning analytics which is to enhance the students' learning process. A collaborative approach to is needed to ensure both staff and student voices are represented in the development and implementation of LA in HEIs.

1. Introduction

Emergence of Learning Analytics

We now have more information than ever related to students' learning. Learning analytics (LA) has been defined as the process through which teachers can collect, analyse and interpret students' information to support their learning in an educational setting (Siemens & Long, 2011). The volume of data available from learners is growing at an exponential rate due to increased reliance on, and engagement with Virtual Learning Environments (VLEs)

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such as Blackboard, Moodle and Canvas. The term virtual learning environment is used to refer to web-based tools which provide the grounds for educational interaction between educators and learners (Keller, 2007).

The Cycle of Learning Analytics, proposed by Clow (2012), begins with data obtained from learners, the data obtained is then used to generate metrics, and the metrics are then analysed and interpreted by teachers to provide them with insights to support student learning. Based on this information, teachers then have the opportunity to intervene by adapting course content to increase engagement or contact students who have been identified as requiring additional support. With these interventions in mind, we recognise how LA has evolved from earlier, related fields such as Educational Data Mining (EDM) and academic analytics, moving from a technological to a more educational focus (Ferguson, 2012). The last decade has also witnessed a shift in the role of VLEs, from making information more accessible, to improving students' learning (Viberg et al., 2018).

Learning analytics and VLEs in the context of Covid-19 and beyond

It is estimated that over 1.2 billion students moved to fully remote learning as a result of the Covid-19 pandemic (World Economic Forum, 2020). Prior to the pandemic, VLEs played a secondary role in learning by providing supplementary material to support in-person lectures. However, in the last two years, VLEs became the primary means of educating and interacting with students (Torres Martín et al., 2021). This means that not only did students have to learn in novel ways, but their teachers also had to learn how to educate in a new way, and in the context of a very different environment. For some teachers, this shift may have come as a welcome opportunity to reconfigure their course content and increase levels of engagement, whereas others were faced with the stark realisation of their technical skills deficit (Tsai & Gasevic, 2017). In a short space of time however, both teachers and students alike adapted to their new way of learning (Manca & Delfino, 2021) and discovered the breadth of resources that VLEs could offer. The goal of VLEs is to enhance the students' learning experience and therefore embedded in their design are a range of functions to promote motivation and engagement with course content. Dashboards are one of the most commonly used learning analytics tools and allow for student progress and learning outcomes to be visually presented to both students and teachers (Safsouf et al., 2021). Several benefits of using dashboard functions in VLEs have been reported, including monitoring, establishing learning goals, early detection of student levels of engagement, as well as setting up timelines and a reminder system (Celik et al., 2023). Hedges et al., (2020) however, distinguish between the use of VLEs during an 'educational emergency' such as the covid-19 pandemic, and their long-term use in HEIs. This distinction highlights the fact that relying on online education in an emergency is very different to pre-planned and intentional use of online platforms as a long-term resource to support students' learning.

Based on the enhancement of digital skills that took place during the pandemic, it is hoped that going forward, educators will continue to utilise these skills and take a more considered approach regarding the long-term incorporation of digital technologies in their teaching practices (Manca & Delfino, 2021). According to Farrelly et al. (2018), increasing academics' digital knowledge and capacity was identified as a goal of Higher Education Institutions (HEIs) at both the National (National Forum, 2016) and European level (European Commission, 2014). The reliance on VLEs during the pandemic meant that teachers had to accelerate the rate at which they learned about VLEs and the subsequent metrics available to them. The role of learning analytics in Higher Education peaked during

this time and remains relevant beyond the pandemic with the rise of new approaches, such as the 'Flipped Classroom' model (Bergman and Sams, 2012). Although this model adopts a more blended approach, it promotes online learning by providing core materials online and then utilising learning analytics methods to monitor engagement, whilst supplementing these materials with in-person discussions. With models such as the Flipped Classroom centred around VLEs, the digital skills that teachers acquired over the last two years continue to provide them with enhanced means to support students' learning both on and offline.

Challenges faced by Higher Education Institutions

As LA relies on students' data to understand learning based on factors such as engagement, output, perceived barriers, and progress, it is unsurprising that many of the challenges faced in this field overlap with ethical issues related to privacy and data access (Siemens, 2012). As learning occurs in a wide range of settings and interactions both within and beyond educational settings, in order to gain full insight into the learning process, educators would also require access to data beyond VLEs such as data from social platforms and activity sensors, which is more personal in nature. This leads to ethical challenges in the field, as learning is a social process, yet integration of social networks and VLEs for learning, presents a host of ethical dilemmas related to student privacy and ownership of data (Prinsloo & Slade, 2016). The ways in which learning analytics is applied across HEIs will vary depending on the desired outcomes of each HEI, for example, whether the methods are used to enhance teacher or student outcomes. In line with the definition of learning analytics, the goal should primarily be to support students' learning without threatening their privacy (Kruse & Pongsajapan, 2012). When this goal is prioritised and students perceive the benefits of providing their data, the ethical issues regarding ownership and consent are lessened (Slade & Prinsloo, 2013). Although a standardised set of ethical guidelines is difficult to implement due to differences in the way learning analytics is utilised across institutions, Slade and Prinsloo (2013) proposed a guiding framework for HEIs to combat some of these ethical challenges. One of the core principles in this framework promotes the recognition of students as agents and collaborators, rather than producers of data (Buchanan, 2011). An additional ethical concern regarding the implementation of LA in HEIs is ensuring that technology is accessible to all students (Rahmah et al., 2020). An over-reliance on LA could isolate those that have limited access to VLEs due to digital inequalities such as lack of physical access to devices, as well as a lack of digital skills to navigate online learning environments. In order to minimise risk to students, it is important that teachers and the wider HEI community are cognisant of digital inequalities and ensure that key learning material is accessible to all students.

Attitudes and Experiences of Implementing Learning Analytics

In addition to the ethical challenges, a related and consistent theme throughout the literature is the lack of student representation in the design and implementation of learning analytics in HEIs. A recent study by Tsai et al., (2020) provided a comprehensive overview of trends and barriers to implementing LA by consulting with senior managers from HEIs across Europe. Findings from this review indicated that LA had primarily been used as a tool to enhance teaching and institutional management. These findings present conflicting evidence as the primary goal of LA should be to enhance student learning and success (Siemens & Long, 2011). There was also a lack of active student engagement with LA, despite the purpose of LA to develop self-regulated learning skills (Blackmon & Moore, 2020). Similarly, a study by Roberts et al., (2016) measured students' attitudes to the implementation of LA in HEIs

and found that the most concerning aspect was the absence of the students' voice. Following a series of focus groups, subsequent themes were identified which reflected students' lack of knowledge, privacy concerns and fears of their progress being measured solely by figures. These concerns aligned with some of the ethical challenges previously mentioned and also raised the importance of informed consent, to ensure that students are fully informed and involved in the decision-making process. The issues around privacy and informed consent were further represented in a study by Jones et al., (2020) which examined student perspectives on LA and found that increasingly, students were becoming concerned about 'being tracked all the time'. The need to include students in the design and development of LA is critically important to ensure students are aware that LA is for them, not against them. However, without student representation in LA, HEIs will continue to be confronted with greater ethical challenges. Teachers and academics raised similar ethical concerns regarding the protection of students' privacy as well as a desire to be included in the decision-making process (Howell et al., 2018), once again reinforcing the need for a collaborative approach to ensure the successful implementation of LA in HEIs.

2. Current study

Based on the growing field of learning analytics, the acceleration of digital practices in HEIs students' learning outcomes and experience, we conducted a contextual study to understand attitudes towards implementing learning analytics in a university setting. In line with the goals of learning analytics and ethical principles, we ensured both staff and student voices were represented in this study and collected data through surveys and focus groups of staff and students from different disciplines across the university.

3. Methods

This study was approved by the Social Research Ethics Committee (SREC) in March 2022.

Surveys and focus groups were conducted with third-level staff and students across a HEI to measure their attitudes towards and understanding of learning analytics in Higher Education. Students were recruited through email invitations distributed to student mailing lists, Student Union email, and social media platforms, to take part in the student survey and focus groups. Of those invited, 60 students, both male and female, completed the survey, and three students took part in the focus group. Staff were also recruited through email invitations, distributed through staff mailing lists, to take part in the staff survey and focus groups. Of those invited, 24 staff completed the survey and seven took part in the focus group. Despite the large number of invitations sent to both staff and students, there was a low response rate to both surveys. As this was a contextual study, the low response rate could be due to a lack of knowledge regarding LA within this HEI, in addition to concerns regarding the use of individuals' data. Both the staff and student surveys were completed online using MS Forms. The staff and student focus groups were also conducted online via semi-structured discussions facilitated by a member of the research team using MS Teams. The prompts for the semi-structured discussions were adapted from the DALTAÍ student focus group on educational data. The protocols for both the surveys and focus groups were based on protocols outlined in previous projects (SHEILA & DALTAÍ) and adapted to suit a HEI audience, as well as to take into consideration the effects of the Covid-19 pandemic.

4. Findings

4.1 Quantitative findings

Staff survey

A survey was conducted to examine university staffs' perspectives of analysis of student data. Of the participants who completed the survey (*n=24*), 54% were female, 42% were male, and 4% were non-binary. Participants were either academic staff (59%) or support staff (26%). Figure 1 below provides a breakdown of staff reporting on the importance of LA. The most important reasons highlighted by staff were, for getting feedback on specific teaching initiatives (63%), enabling students to track their own progress (59%), and improving the individual students' educational experience (56%). Staff (67%) also reported that their university currently lacks an appropriate infrastructure to support the implementation of learning analytics.

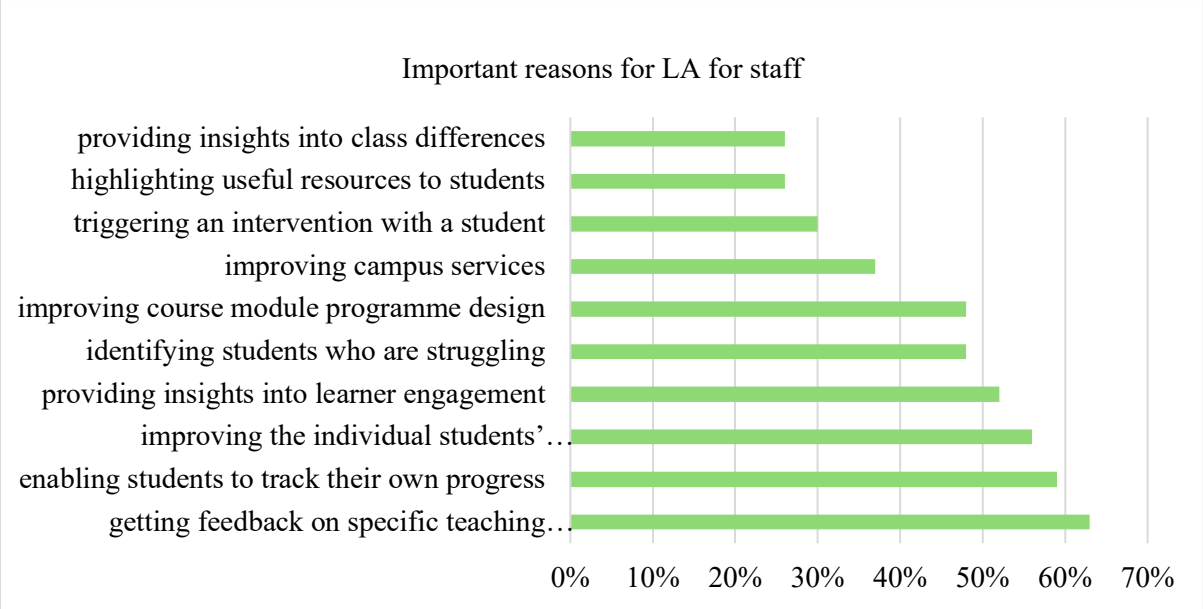

Figure 1: Staff reporting of important reasons for using learning analytics

Student survey

A survey was also conducted with a sample of students (*n=60*) to examine their perspectives of analysis of student data. Figure 2 provides a breakdown of the percentage of students from each of the four colleges in the University. Figure 3 provides a breakdown of student reporting on the importance of LA. The most important reasons for LA highlighted by students were, improving teaching quality (70%), improving course design (63%) and identifying students who are struggling (63%). However, when asked if they knew what data the University was collecting, 38% of students responded by saying they were *'not aware'* that the University collects data about them, and 53% said they were *'somewhat aware'*.

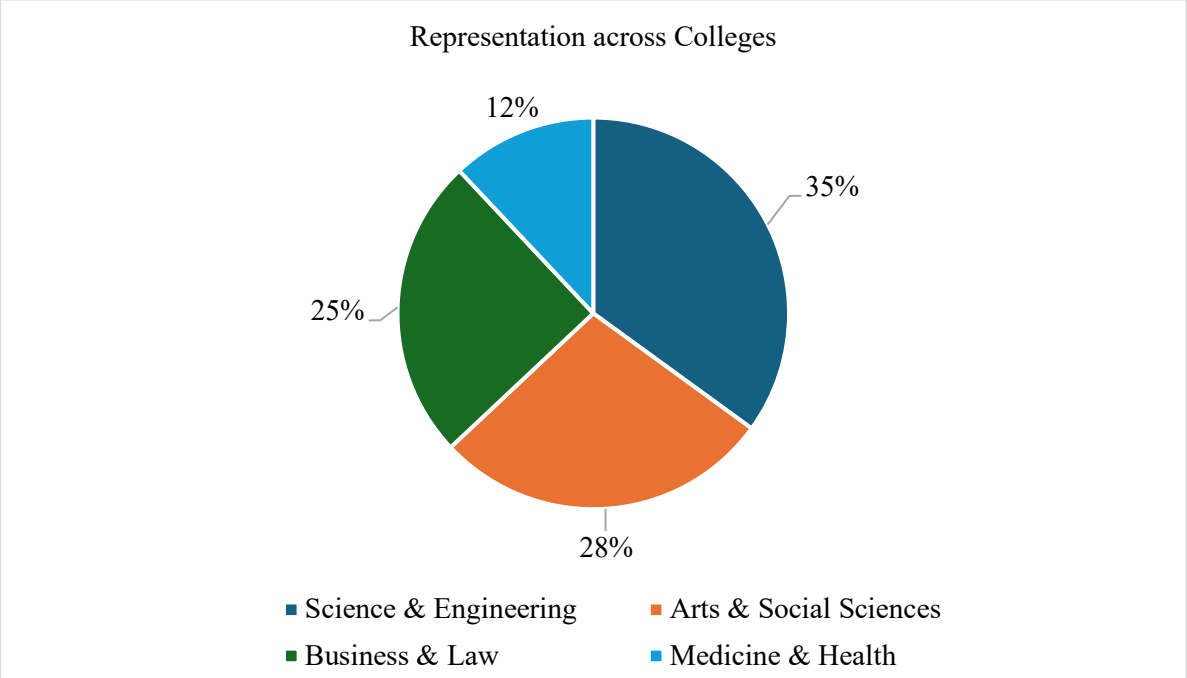

Figure 2: Percentage of students from each of the four Colleges

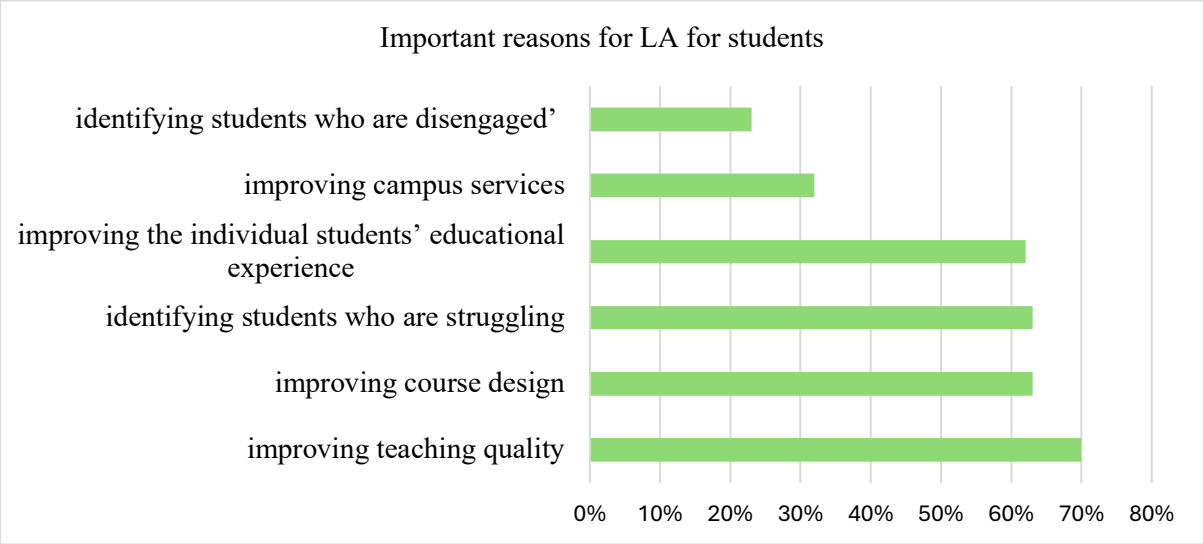

Figure 3: Student reporting of important reasons for using learning analytics

4.2 Qualitative findings

Student focus group analysis

A qualitative analysis was conducted on the data generated by the undergraduate student focus group, and three main themes were identified. These themes comprised of –

1. Lack of awareness of data use and learning analytics.

2. Concerns at an individual level.

3. Empowering students.

Theme 1: Lack of awareness of data use and learning analytics.

When asked about their knowledge of the data that is collected by the University, students expressed a lack of awareness at the level of data collected, particularly at an individual level. One student mentioned data collected from library services and in relation to clubs and societies, but overall, the students had little to no knowledge of the data collected on VLEs regarding their learning process. *''I don't think it's very clear what data is and isn't collected…particularly on VLEs…''*

This experience was common among the students, and they communicated that they had little understanding, not only of what data they were generating when they interacted with the university systems, but also that they had not considered how the data were being used. Students also commented that although they had a vague awareness that they were generating data, similar to when they interact with social media, they had limited understanding of how it was used, either in teaching or institutionally, for example, related to the student experience.

Theme 2: Concerns at an individual level

Once the level of data collection was brought to the students' awareness, they all agreed it would be beneficial to have to improve the students' overall learning experience, but they remained concerned about individual-level data and if this granularity added any benefit for the student. This was supported as students commented that the use of such data and its implementation in any subsequent learning analytics might not be reflective of the students' learning process, commenting that using data in this way ''*loses a lot of the nuances''*.

These comments related to how students were concerned that the data might not be reflective of the individual challenges faced by students and if a simple "number" based on attendance or achievement accounted for what was affecting performance and learning, *''…sometimes it's very hard to know based on just figures alone or based on just Canvas alone if someone's doing badly…''*

It was evident from the data that although students were appreciative of the use of data and the attempt to analyse it to improve learning and student experience, the data should be interpreted in ways that are collaborative, involving student consultation that is cognizant of the myriad factors that could be affecting the data, E.G., attendance, or assessment performance.

Theme 3: Empowering students

Following from the concerns about the applicability of the data a similar but distinct theme emerged related to empowering students. The students communicated that they liked the idea of having access to their own data, '*'to enable self-reflection and self-improvement''*.

This was in opposition to a type of top-down approach to collecting and analysing the data at a lecturer or college level. This was important to students as they felt that they had a unique perspective, not only on what might be the causal factors related to learning and engagement,

but also what remedial action was most appropriate in given circumstances. Students liked the idea of data being used to improve their overall learning experience, teaching materials and quality, but would prefer if this was done at a more general level rather than at a personal level. One student also stated that they would rather be contacted by a tutor or *"…someone more relatable*" than his lecturer if their engagement was low, and even considered how engagement might be further facilitated if the use of analytics related to engagement was carried out by a concerned third party, rather than immediate lecturing staff with whom they might have an existing relationship. This idea of the separation of the data analytics from the immediate teaching staff is interesting and the students seemed to unanimously agree that this would make them more comfortable about the use of their data in learning applications. Students felt it could negate instances such as that in the quote below where they received an email from a lecturer*"…if I got an email saying 'hi, your engagement is really low' it would feel like an attack rather than helpful criticism.''*

The theme of empowering students is interesting as it emerged as students spoke positively about the use of learning analytics. It was evident from the data that the students were not communicating a desire to disengage with or preclude such analytical models in teaching and learning, but preferred a more collaborative and inclusive approach.

Staff focus group analysis

A qualitative analysis was conducted on the data generated by the undergraduate staff focus group, and four main themes were identified. These themes comprised of –

1. Empowering students.

2. Support for staff.

3. Application of learning analytics to teaching enhancement.

4. Alerting students who are disengaged.

Theme 1: Empowering students

Interestingly, the initial theme to emerge from the analysis of the staff focus groups was empowering students. Similar to the theme that emerged from the student data, it was evident that staff were concerned about student awareness of the use of data. It was important to staff that their students are fully aware of what data is being collected on them from the outset and that they understand how this data can be of benefit to their learning, '*It's just so important that they understand what is being collected, why it's being collected…and how they can use it to their advantage…''*

In addition, the staff communicated that there were opportunities for these data to be leveraged to empower students to action their own engagement with learning through the use of analytics. Automated systems were discussed, such as, *"Traffic light signalling"* on Canvas, to let students know that they have not spent enough time engaging with certain aspects of the course. It was important to staff that this was not seen as a punitive measure, but more so a motivational strategy and a way of introducing them to the differences that are involved in third-level learning. The idea that action is not seen as punitive was important to staff and they were interested in how the use of data could be communicated to ensure that students saw the actions as facilitative and designed to initiate supports for students. Central

to this however was that staff needed more training and support themselves to access and use data properly.

Theme 2: Support for staff

The second theme highlighted an interesting trend related to the use of student data. Staff seemed to feel uninformed about how to use learning analytics properly and wanted to know more about what is already happening in the institution. They mentioned that not all staff have the technical skills to access and analyse the data that is available to them. In response to this challenge, staff discussed supports such as a specific department for learning analytics that, *"needs to sit…pretty high in the sphere of departments."*

This theme highlighted the need for further support for staff, either centralised or at the departmental level to provide support for staff, both in terms of technical expertise and analytical methods to utilise data to support student learning.

In addition to the institutional supports the idea of a Community of Practice was broached by a participant,*"…the analytics basically have a story to tell…if we can hear those stories from our colleagues to know how [it's done…if it was done through case studies and brought to life."*

Staff communicated that that they would like to have the support of colleagues who are engaged in this type of work and hear more about the applications of learning analytics from colleagues. This community of practice would also serve to allow them to discuss challenges they faced in their own teaching.

Theme 3: Application of learning analytics to teaching enhancement

The third theme to emerge was teaching enhancement. This theme was related to how teaching staff viewed the application of learning analytics to enhance their teaching. Staff were asked in the focus group, which use of learning analytics they considered to be most useful. One of the most popular answers was to,''*Present teaching staff, or tutors, with a profile of their teaching practice and how it influences the engagement and achievement of their students.'*

The idea of engagement was very relevant to staff, and they felt that analytical methods could be used to understand the level of student engagement, both in their classes and with any subsequent teaching materials, E.G., watching videos or reading texts. Interestingly, however, the staff also communicated that there was another relevant consideration and that was whether engagement related to student learning rather saw the best use of analytics was to seek to understand if this led to an improvement. *"The aim of analytics to me is to try and ensure that students understand the material and that I'm transferring the material in a way they can understand."* Another participant commented that,*"…it [Analytics] should always be used for the positive side of things, to improve teaching and learning."*

The idea that data should not just be used to monitor engagement and attendance is particularly relevant in learning analytics and it is encouraging that staff were considering the applicability of these data to improve student learning. In fact, a relevant sub-theme emerged related to how teaching staff through analytics could be used to reflect on their own teaching. Some of the staff feel that the data they were using now gave them detailed information and was forcing them to be more reflective of some aspects of their own methods of delivery.

Some staff shared that they have already used aspects of learning analytics to reflect on their teaching, stating that, *"If 80% of students are getting it wrong, the problem is mine."*

Statements such as this are a good example of how having quantitative, as well as qualitative, data that give clear evidence of where students are at, and therefore prompt honest self-reflection about student learning, can be beneficial.

Theme 4: Alerting students who are disengaged

The fourth theme to emerge was related to student engagement. Staff unanimously agreed on the benefit of an Early Warning System in assisting retention rates. Many of the participants had experiences where students who had not logged into Canvas were likely gone from the course. The idea of a system for flagging this lack of engagement before the student drops out completely was very popular, *"What I'd want is something that flags and says these ten students haven't logged on in whatever timeframe [I] gave it."* The following response was also ticked on the earlier poll when asked about useful supports for staff, ''*To alert teaching staff early if students are at-risk of failing a course or if they could improve their learning."* One participant said that anytime she had done a follow-up with the students who are not engaging with the course, it was *"...key to keeping them on the course."*

The use of warning systems to alert staff to the potential that students are about to disengage was seen as particularly useful in HE settings where large classes meant that lecturers often were not aware when students were about to leave a course.

5. Discussion

Based on survey findings, both staff and students rated *'improving teaching quality'* and *'improving individual students' educational experience'* as some of the most important reasons for collecting and analysing student data. The reasons highlighted by both staff and student responses reflect the primary goal of learning analytics, to enhance the students' learning process (Kruse & Pongsajapan, 2012). Findings from both the staff and student focus groups also reflected the desire to use analytics for the key purpose of enhancing the students' learning experience. Both the staff and student focus group shared the theme of *'empowering students'*.

Although students were supportive of using analytics for the benefit of students themselves, a concern was raised when the topic was initially mentioned, due to a lack of awareness on the part of the students that the University collects data related to their online learning. Although a learning analytics department does not currently exist in many HEIs, the fact that the data is collected means that students should be made more explicitly aware of this, to comply with relevant ethical principles (Slade & Prinsloo, 2013). Students were also less likely to rate *'identifying disengaged students'* as an important reason to use analytics, compared to staff, and expressed concerns about data collected at an individual level. These concerns may relate to a desire for students to maintain a level of anonymity from their lecturers, as well as a recognition that the student learning process occurs across a range of contexts, so data reflecting a seemingly disengaged student may be less accurate and important to consider. In the student focus group, one student mentioned that they would prefer if a *'peer'* or *'tutor'* alerted them to an apparent lack of engagement, rather than if a lecturer was the one to *'call them out'*. This is an interesting finding as it highlights, from the student's perspective, that not only is the use of the students' data important for maintaining student engagement, but the ways in which students are notified about their engagement is also important. This is

meaningful both in terms of how students understand what data is being gathered, how that data is analysed and most importantly how those findings are communicated to students. The concerns raised by students may represent a lack of understanding regarding the educators' primary aims for using student data and an expectation that they are trying to '*'catch them [students] out''* rather than support them. Understanding students' expectations regarding the use learning analytics from the outset is critically important for successful implementation (Roberts et al., 2016). Schumacher & Ifenthaler's (2018) study measured student expectations of LA and identified similar themes related to autonomy, understand of personal circumstances, and individualised communication methods. However, more work is needed to ensure students' expectations are heard and realised.

In addition to the student voice, staff expressed a desire for the use of learning analytics in enhancing their teaching methods. Interestingly, staff communicated that they were concerned that students might not fully understand the breadth and scope of the data that was being collected on them. A finding backed up by the students' data and in line with ethical concerns regarding informed consent. In addition, some staff reflected that they were not fully aware of exactly how platforms such as VLEs collected and used data. This finding highlights the idea that both staff and students required support and guidance on how their data is being used. One clear example is how learning analytics can be used to assist them in identifying and supporting disengaged students by tracking progress on student dashboards. One staff member suggested using a traffic light systems approach, which would provide coloured alerts, depending on the students' levels of engagement. As mentioned previously, the students highlighted that the development of interventions based on student data should be collaborative and include the students' views of how interventions should be implemented. The need for a collaborative approach has been echoed in several studies evaluating the effectiveness of learning analytics in HEIs (Tsai et al., 2020; Howell et al., 2017). The implementation of a collaborative approach is a key recommendation for future work which aims to implement learning analytics in HEI, as it reflects the needs of both students and teachers and allows for a more a personalised and in turn, a more effective method of supporting students' learning. Designing VLEs for the students, and in part, by the students, would address ethical concerns by increasing transparency regarding privacy and the use of student data (Jones et al., 2020). Students would also have more autonomy in deciding what data gets collected, how their progress is tracked, and in turn, how that progress is reflected back to them. The use of visual tools such as personalised timelines and reminders on their dashboard has been beneficial for both staff and students in tracking progress and engagement (Celik et al., 2023). Developing a supportive infrastructure for both staff and students within a HEI would enhance the implementation and effectiveness of learning analytics.

6. Limitations

The present study has a number of limitations, including, some of the earlier questions in the staff survey asked about attitudes towards the hypothetical implementation of educational technologies to support staff and provide greater insights into students' online engagement. Given that the majority of learning analytics research was conducted prior to the Covid-19 pandemic, the way we teach and learn has drastically changed since this time and these initial questions may now appear dated. Instruments developed to measure attitudes and understanding of learning analytics in Higher Education prior to the pandemic may need updating to align with the increased level of knowledge, and skills, that third-level staff now possess. The number of staff who participated in this survey was also quite low and so

findings cannot be generalised across populations, however, presented together, the quantitative and qualitative data do form sufficient bases for the analysis presented.

7. Recommendations for Future Research

The majority of staff agreed that learning analytics is useful; however, some staff expressed concerns within the focus group about the level of knowledge and supports available within their HEI for learning analytics to be implemented successfully. The idea of a 'Community of Practice' was broached by a participant who mentioned that they would like to see case studies carried out to learn from other colleagues about *'how it's [learning analytics] done'*. Related work is currently underway within this HEI to evaluate the implementation of learning analytics across four separate colleges. Future work should adhere to the primary aims of learning analytics and consider the students' voice in the design, planning and implementation of LA for the benefit of students' learning. Initial steps for promoting student engagement with learning analytics would be to establish a student advisory group to work alongside staff within a community of practice.

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