“You have to look at the whole picture”: An exploration of influences on pharmacy student engagement and the use of digital data to monitor student engagement

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Contents

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Declaration of originality

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

Catherine Langran

Abstract

Within UK universities, student retention and preventing drop out is of key importance. Students dropping out of university has major financial and reputational implications for universities. For students, dropping out can be associated with negative mental, social and financial consequences. Tinto's model of student dropout outlines the longitudinal student journey throughout their time at university and the social and academic factors that may influence whether a student persists or leaves university.

High student engagement has been shown to be strongly correlated with student attainment and retention. Within the Master of Pharmacy (MPharm) degree, students are expected to have high levels of engagement as part of their professional responsibility to learn the necessary knowledge, skills and competence to be a pharmacist. Student engagement may be seen through attendance at teaching activities, accessing teaching materials on the virtual learning environment (VLE) and use of the university library. Learning analytics is a system of collecting and reporting engagement data to give a picture of student engagement. This may be used to identify students in difficulty and intervene to help support their re-engagement.

This thesis aimed to explore the influences on MPharm student engagement, and which aspects were most important for students. This thesis also explored students' perceptions of engagement monitoring systems and the potential impact these may have on changing their engagement behaviour.

Semi-structured interviews were undertaken with thirteen MPharm students at the start (October 2020) and end (March 2021) of an academic teaching year. Students were presented with their VLE engagement data every two to three weeks throughout the two academic teaching terms. Interview transcripts were analysed deductively according to Tinto's model of student dropout and the COM-B behavioural change model.

Participants described a multitude of factors that influenced their engagement. This included: a supportive family and social network, their pre-university educational experience, individual attributes, interactions with staff, and teaching approaches. Participants' goal related motivation to become a pharmacist was shown to be the most impactful on their commitment and engagement at university. Most participants enjoyed receiving their VLE engagement data and used this data to benchmark their engagement compared to the cohort average. Some participants described reflecting on the VLE engagement data and being motivated to change their engagement behaviours to be the same or better than the cohort average. Knowing how to change, confidence, time and workload were described as the main barriers preventing some participants changing their behaviour to be more engaged. All participants were accepting of their engagement data being collected by university, as long as consent was given, assurances of data protection were given, and the data was used by staff in a supportive not punitive way.

These findings have added to the literature on student engagement and will be used within the department and university to make improvements to engagement monitoring processes and supporting students. Recommendations include the introduction of peer-led student engagement support sessions, increased frequency of tutor meetings, and the introduction of an automated student facing engagement monitoring system.

Chapter 1: Introduction

The scope of this thesis is to explore undergraduate pharmacy student engagement and the academic and social contexts that promote or hinder engagement at university. Through collecting data on student engagement with the online virtual learning environment, I seek to investigate students' thoughts on their engagement being monitored. This will include the acceptability of being monitored and perceived accuracy of this data to portray their engagement journey over an academic year. Finally, I wish to explore the potential impact of this data to influence student engagement behaviour.

1.1 Thesis chapter outline

This introduction chapter will set the background, context and rationale for undertaking this research. Student engagement will be defined, and the differing dimensions of student engagement discussed. The importance of student engagement on student success and preventing student drop out will also be explored, alongside the consequences emotionally, financially and reputationally of students dropping out of university.

Chapter 2 will examine the current literature relating to influences on student engagement and introduces Tinto's model of student dropout to represent a student's longitudinal engagement journey. The literature review will explore current methods of using digital data to monitor student engagement, and the effectiveness, drawbacks and limitations of these methods. A behaviour change model will be introduced to consider what factors are needed to evoke a behaviour change in students.

Chapter 3 will detail the methodology and rationale for the qualitative research approach utilised. The processes of student recruitment, interviewing, transcription and analysis will be described. Ethical considerations will discuss how student confidentiality was protected throughout this research and measures taken to ensure that no harm was caused through participation. My role as an inside researcher, undertaking interviews and collecting VLE data on MPharm students I teach, will be considered, noting the benefits of insider research and steps taken to ensure I do not introduce bias.

Chapters 4 and 5 will present the key findings of this study, with participantquotes utilised to demonstrate their points of view. Chapter 5 focuses on the multiple influencing factors on student engagement. Whilst Chapter 6 focuses on the use of digital data to monitor engagement. This will include participants' perceptions on the acceptability and accuracy of attendance data, VLE data and a student's full digital footprint. The impact of VLE data on participants' engagement behaviour will also be explored.

Chapter 6 will discuss whether the findings have answered the research questions, or what remains unanswered and warrants further research. Findings will be reviewed to consider whether they support or contradict previous studies.

Finally, Chapter 7 will draw conclusions from this research and the implications of the findings for the pharmacy department, the university and the wider pharmacy and higher education sectors will be considered.

1.2 Background and context of study

This research is set within one programme at one UK university. The programme in question, is the Masters of Pharmacy (MPharm) degree. The university is a well-established (founded in the 19th century), research-intensive university, in the UK top 30 of the QS world university rankings 2022 (QS, 2022). At this university all teaching is delivered over two ten-week academic terms: autumn (week 5-15) and spring (week 20-30). The summer term (weeks 34-41) is solely used for student assessments.

At the time this research was carried out, there were a total of 493 students enrolled from year 1 to year 4 of the MPharm degree at the university. 67% of these students were female, 23% were international students, 34% of students commuted to university, and 16% were mature students.

1.2.1 Outline of MPharm degree

The MPharm is a four-year undergraduate programme, where students learn pharmaceutical chemistry, physiology, pharmacology, medicine discovery and formulation. Students learn about patient health behaviours and how to ensure medicines are safe and effective to maintain and improve a patient's health.

The MPharm degree is accredited by the General Pharmaceutical Council's (GPhC) and must meet their Standards for the Education and Training of Pharmacists (GPhC, 2021). These standards outline the skills, knowledge and professional behaviours a student must demonstrate at a "know how", "shows how" and "does" level. In order to assess these skills and behaviours a range of assessments are utilised in the MPharm, including essays, presentations, case or problem-based learning, written examinations and practical assessments. Students must pass a calculation assessment, a medication

dispensing practical and an objective structured clinical examination (OSCE). OSCEs comprise simulated clinical scenarios, such as counselling a patient on their medication, to examine a student's clinical, communication, professionalism and decision-making skills. After graduation, students spend one year working in a pharmacy setting (community, hospital, general practice or industry), during which they must demonstrate their professional competency against the GPhC standards and pass the GPhC's registration exam in order to become a Pharmacist (GPhC, 2021).

1.2.2 Teaching on the MPharm

Teaching at the university is delivered predominantly through on-campus teaching, comprising of lectures, related practicals and workshops. MPharm students typically have a full week of teaching activities, around 30 hours. Additionally, students are expected to complete 10 to 20 hours of self-directed study, such as pre-reading for workshops and practicals, writing up lecture notes, group work and coursework. Teaching materials, such as lecture slides and workshop handouts are all uploaded onto Blackboard, a virtual learning environment (VLE), which students are required to regularly access to engage in their learning. Students also submit assignments through the VLE and access on-line reading lists. Students spend around one week per academic year undertaking workplace-based learning in pharmacies, where they can apply their theoretical knowledge into practice.

1.2.3 Impact of COVID-19 pandemic on teaching

This research was inadvertently set within the context of the COVID-19 pandemic. Planning for this research commenced in 2019, however on 11th March 2020 the World Health Organisation declared COVID-19 a global pandemic (Cucinotta and Vanelli, 2020). On 26th March 2020, UK lockdown measures legally came into force (IfG, 2022) with all on-campus teaching cancelled and all examinations moved to online assessments. The interviews for this research were undertaken in

October 2020 and March 2021, in the midst of the COVID-19 pandemic and lockdowns. The impact of the COVID-19 pandemic had on teaching approaches and social distancing is outlined in the paragraph below.

On returning to university in September 2020, MPharm students had a blended approach to teaching, with most teaching delivered via the VLE as asynchronous online lectures and synchronous online workshops. Online lectures were pre-recorded by lecturers at home and uploaded onto the VLE by Sunday evening for students to watch asynchronously that week. Online workshops were delivered live on the VLE , with students timetabled to attend these virtually. Within the online workshops the lecturer would typically introduce the topic, then students would be moved into small groups (around 4-8) in breakout rooms to work on case studies or discuss ideas, before feeding back as a large group. Students had a limited amount of face-to-face teaching (up to 6 hours/week) for essential skills that could not be taught online. Throughout 2020-2021, there were local and national lockdowns, with restrictions on social distancing, sizes of groups that could mix and travel restrictions (IfG, 2022). Students and staff were asked to undertake regular lateral flow tests and not attend teaching on campus if they tested positive for COVID-19 or had any COVID-19 symptoms. In on-campus teaching sessions, students attended in smaller groups (20-25 students), staff and students had to wear face masks, regularly sanitise hands, wipe down surfaces and sit two metres apart.

1.2.4 Institutional context: engagement monitoring

For the past 14 years, recording attendance has been the mainstay for monitoring student engagement with the MPharm programme at the university. This was initially through paper registers, signed by students and passed around the class. Then as electronic card readers, which students would tap with their campus card and their student number electronically recorded in a spreadsheet. This attendance data was collated by teaching office administrators and shared mid-term with academic tutors, as a percentage of teaching activities attended by a student over the previous weeks. Academic

tutors were expected to discuss attendance with students within tutor meetings. Anecdotally, this was inconsistently undertaken by tutors. Additionally, there were concerns that the attendance data reported was not fully accurate. For example, students may forget to sign or tap in, or students may sign in or tap in for their friends. Sometimes the data was reported too late, for example after the tutor meeting.

According to the university's policy on student engagement: "*A student is academically engaged if they comply with the academic requirements stated in the University's Statement of learner responsibilities, in particular those requirements relating to engagement with the Academic Tutor System, attendance and participation in academic classes and submission of coursework" (University of xx, 2021).* In line with this policy, students with low recorded attendance are referred by either the teaching office administrators or their academic tutor to the Department Director of Teaching (DDTL) or School Director of Teaching (SDTL), who would initiate a stage one academic engagement meeting with the student. Within this meeting, the DDTL/SDTL would discuss with the student their reasons for low attendance, signpost to university study and pastoral support services, and agree an action plan with the student, for example, increasing attendance to 70%. The student's attendance data would be reviewed at an agreed time-point and, if the student had failed to meet the agreed target, they would be referred for a stage two academic non-engagement meeting with a Teaching and Learning Dean. This would follow a similar process to the stage one meeting, with another agreed action plan to improve their engagement and review date. At stage one and two non-engagement meetings students are asked if they wish to suspend their studies, if for example there is a non-academic reason they cannot engage at the moment, and they need some time away from studying. If a student continues with poor attendance and engagement with their programme, this would be escalated to the final stage three academic non-engagement meeting with the University Standing

Committee on Academic Engagement and Fitness to Study. At this point, a student may be asked to leave the course or university.

1.2.5 My position

I have worked as a teaching intensive lecturer, then Associate Professor, within the Department of Pharmacy at the university, for the past 12 years. Within this role I predominantly teach on year four of the MPharm degree and have undertaken several leadership roles such lead for clinical placements, lead for interprofessional learning, and lead for OSCEs. I have been the Senior Academic Tutor and I am currently the School Director of Teaching and Learning (SDTL).

As a lecturer, I started to notice a pattern of student non-attendance, for example around assessment deadlines and towards the end of the academic term. I wanted to explore this further, so in 2016/17, I undertook a qualitative study using the Theory of Planned Behaviour (Ajzen, 1985) to explore the subjective, normative and behavioural factors influencing student attendance. This study found engaging lecture delivery and peer support to be the most important influences on student attendance. Students were least likely to attend lectures if they were timetabled at 9am or 5pm or if they commuted. This was built upon in 2017/18, with a quantitative analysis of lecture attendance data in relation to student exam performance, which found a positive correlation between attendance and attainment. However, within the 2017/18 study, there were a small proportion of students with high attendance achieving lower grades or failure, and vice versa. The proposed explanation for this was students attending lectures but not engaging, for example going to sleep or playing on their mobile phone. Additionally, it was recognised that students study in different ways, and could be engaged and listening to lecture recordings at home, but the university recorded them as having a low in-person attendance.

In my role as the Senior Academic Tutor, I led the department's pastoral support of students, and as SDTL, I have led engagement, academic misconduct and fitness to study/practice investigations. Through these I have continued to gain an insight into some of the factors influencing our students' engagement. Whilst there were a number shared or similar experiences between students, such as all experiencing a heavy workload and assessment deadlines. There has also been a range of unique personal reasons that shaped their engagement behaviours. My interest in understanding the shared and unique influences on student engagement, led to this research.

This thesis aims to further explore the varying factors that influence pharmacy students' engagement. Building upon the projects mentioned above exploring lecture attendance, this thesis seeks to explore the use of VLE data to monitor and understand students' engagement. This is particularly pertinent in view of the increased use of VLE during the COVID-19 pandemic. The thesis will also explore whether collecting and reporting this engagement data can have an impact on student behaviour. For example, whether students have the ability, motivation and opportunity to self-regulate their engagement.

Understanding these concepts is vitally important to the Department of Pharmacy and University to understand the best approaches to monitor, support and influence student engagement. Dissemination of the findings nationally and internationally may further influence practice.

1.3 What is engagement?

The term engagement has been discussed within educational systems for decades. It is proposed that the first mention of engagement was in the 1980s by Natriello (1984, p. 14), who stated "*engagement exists when students are participating in the activities offered as part of the school program*".

Participation is a behavioural concept associated with attendance, responding to teacher-initiated directions, interacting with other students, coming to class prepared and completing set work. Finn (1989) added to this definition, by describing engagement as a combination of both participation and student identification. Where identification is thought of as an internalised concept associated with students' feelings and thoughts. Examples include, whether students have a sense of belonging in the learning environment, view school as an important part of their life experience, value success in school and feel connected with the school (Finn, 1989). Other more recent studies have supported both Natriello's and Finn's concepts of engagement, such as Bempechat and Shernoff (2012), which defines engagement as procedural and substantive. Procedural engagement occurs when students comply with expectations, for example through attendance or following task instructions. Whereas substantive engagement is defined as a deep and sustained psychological commitment which involves key emotional elements such as learning attitudes, self-motivation and sense of satisfaction (Bempechat and Shernoff, 2012). It is important to note, that these three studies, similar to the majority of the literature on engagement, are based within a school setting. Many argue that habits formed at school, such as study skills, work ethic, values and interpersonal skills are transferable from school to university (Bui and Rush, 2016, Cohen et al., 2009). Whilst others describe the disconnect between school climate and university culture, such as differing organisational structures, teaching and learning practices, and student-teacher relationships (Minor and Benner, 2018). Therefore, within the context of this study, the term engagement in the university setting must also be explored.

When describing engagement at university, most authors describe engagement as a multidimensional concept involving behavioural, cognitive and emotional factors (Gao et al., 2020, Dubovi, 2022, Maroco et al., 2016, Kümmel and Kimmerle, 2020). In relation to university, behavioural engagement involves attending and actively participating in not just teaching activities, but also social and co-curricular activities. Cognitive engagement encompasses a student's dedication to their learning, their

independent work ethic, and the amount of effort they put in to master the academic challenges of the degree. Emotional engagement refers to a student's positive and negative feelings towards academic staff, other students, the university, whether they enjoy being at university, have a sense of belonging and identify themselves as a "learner" (Gao et al., 2020, Trowler, 2010). Engagement may be also envisaged as the glue that socially, cognitively, emotionally and psychologically attaches a student to their education. The adhesion of the glue is shaped by multiple student, community, family and peer factors and the culture and structure of the academic setting (Lawson and Lawson, 2013).

Building upon this, Kahu (2013), described four key perspectives of student engagement: behavioural, psychological, socio-cultural and holistic. The behavioural and psychological aspects are similar to those mentioned above. However, Kahu also incorporates a socio-cultural standpoint, which acknowledges the impact that the ethos within the university may have positively or negatively on students. Kahu also highlights the importance of having a holistic overview of engagement, which involves the overarching impact of engagement on the student, for example their development and maturity as a person (Kahu, 2013). This supports the argument that going to university isn't just about attainment, but also the personal growth of the student as a person (Bryson and Hand, 2008).

Taking into account the definitions and dimensions of engagement described above, for this thesis exploring engagement in MPharm students, the working definition will be:

> *Engagement is a multifactorial concept involving student motivation, behaviour, participation, emotion, investment, self-efficacy and connectedness. Engagement is a two-way process involving commitment from a student, but also the university to create an engaging and supportive learning environment.*

The behavioural and participation aspects of this definition will be explored through the data collected on students accessing teaching materials on the VLE. All other emotional and cognitive elements, and student's perceptions of the university's contribution, will be explored within the student interviews.

1.4 Why is engagement important?

There is a wealth of literature supporting a positive correlation between student engagement and students' sense of belonging, personal development, academic success and retention (Bass and Ballard, 2012, Bonet and Walters, 2016, Svanum and Bigatti, 2009, Mehdinezhad, 2011). Highly engaged students have been proven to have lower university drop-out rates and higher quality outcomes (Krause and Coates, 2008). Conversely, studies have demonstrated the link between non-engagement with absenteeism, dropout and alienation from the learning environment (Rumberger, 1983, Tinto, 1975, Bean and Metzner, 1985, Seeman, 1975).

Despite research on engagement and university procedures and processes to promote engagement, drop-out due to non-engagement still remains a problem in higher education (Shacklock, 2016). In the UK, 8% of first year students leave university (academically drop-out or voluntarily withdraw) and up to 42% of students have thought about withdrawing from university (Thomas, 2012). Other studies have shown UK dropout rates between 5-14% (Times, 2016) and 10% (Bradley and Migali, 2019). Within the pharmacy context, data from 1994 to 2000 showed overall pharmacy student attrition rates to be between 9-18.8%, with significant variation (3.6-35.5%) seen between different schools of pharmacies (Hassell et al., 2007).

Student attrition from higher education is a global issue. In the US, it is reported that more students drop-out of college than remain (Tinto, 2012), with the highest drop-out rates during the first year of

college (Reason, 2009, Tinto, 2006). A US study of 55,155 undergraduate students' responses to the college student experience questionnaire, found that 18% of students self-reported they were "disengaged". These disengaged students had the lowest scores for interacting with academic activities, socializing with peers, and reported the fewest number of hours of study per week and achieved lower grades (Kuh et al., 2000). Although education systems differ between the UK and the US, understanding the contributing factors to student engagement and non-engagement is a transferrable concept.

Non-engagement leading to students dropping out of university has wide reaching social and economic impacts on the student, the institution and society (Sorey and Duggan, 2008). In the US, it has been shown that education is one the most influential predictors for health; the higher the level of education, the better the health of the person (Freudenberg and Ruglis, 2007). Those who drop out of university have also been shown to be less likely to find employment, have longer periods outside the labour market and earn less (McNeal Jr, 2011, De Vries and Wolbers, 2005, Brekke, 2014). A study of 67 full time undergraduate students who withdrew from a UK university, found that dropping out of university to be a mostly negative and traumatic experience. Students reported a sense of disappointment and regret, a knock to their confidence, and a feeling that they had let family and friends down (Quinn, 2005). As previously mentioned, in line with the GPhC regulations, you can only become a Pharmacist through completing a MPharm degree (GPhC, 2021). Therefore, dropping out from the MPharm prevents students achieving this professional title and career option.

For universities, student attrition has significant financial and reputation effects. Loss of student fee income can lead to economic instability, reduced budgets, staff redundancies or recruitment freezes, and subsequently poorer quality research and teaching (O'Neill et al., 2011, Strauss and Volkwein, 2004, Wild and Ebbers, 2002). Reputationally, having a high attrition rate compared to competitors is

also detrimental to an university (Maher et al., 2013). Student attrition, particularly for students from lower social economic classes or ethnic monitories, also undermines the UK Government's widening participation policy and social justice agenda (Quinn, 2005).

For society, high incidences of student attrition can lead to a less educated and skilled workforce and higher unemployment rates (Boswell and Wilson, 2004). A review of the global pharmacy workforce found there to concerning shortage of pharmacists (Bates et al., 2016). Pharmacists are seen as the most accessible healthcare provider and are a key part of the healthcare teams in primary and secondary care, ensuring patient safety and optimisation of treatment. A workforce shortage of pharmacists is considered a great threat to patient care and societal welfare (O'Neill et al., 2011). In the UK, pharmacist shortages have been shown to significantly increased pharmacist workload and workplace stress, leading to increased incidence of medication errors with the potential for patient harm (Johnson et al., 2014). This is despite a growing number of UK Schools of Pharmacy and increasing numbers of students on the MPharm programme (Wilson et al., 2006). MPharm student non-completion was shown to range from 9 - 19% over the period 1994-2000 (Hassell et al., 2007), therefore attrition of MPharm students is contributing to the shortage of pharmacists.

The examples given above demonstrate that universities have a social responsibility and self-preserving interest in promoting student engagement and persistence (McMurtrie, 2000). It has been proposed that it is more strategic to focus efforts on understanding and supporting engagement to prevent dropout, than to recruit more students (Shacklock, 2016). It is therefore critical for universities to have appropriate, accurate and effective systems in place to monitor student engagement, and intervene when non-engagement is identified to prevent student dropout (Buckley, 2013).

1.5 Research questions

This thesis is centred upon four research questions, which aim to explore the influences on pharmacy students' engagement and the use of engagement data to monitor and influence their engagement:

Research Question 1: According to Tinto's model of dropout, what are the key influences on engagement for pharmacy students?

Research Question 2: What are pharmacy students' perceptions of the use of data to monitor their engagement?

Research Question 3: Does the VLE engagement data collected in this study accurately portray students' academic engagement throughout an academic year?

Research Question 4: How does being presented with their VLE engagement data influence students' ideas or actions relating to engagement?

These research questions will be explored through in-depth interviews with 13 undergraduate pharmacy students, at the start of autumn term (October 2020) and the end of spring term (March 2021). Throughout the same academic terms, student VLE engagement data (time spent on VLE and number of hits/clicks on each module's VLE site) was extracted every 2-3 weeks and reported to the participating students. This thesis aims to understand participants'lived experience of having their VLE engagement data monitored; in terms of acceptability, accuracy and the potential to change their engagement behaviour.

Through exploring influences on the pharmacy students' engagement, this study may be able to ascertain which factors are most important for students, and which factors are modifiable by the student, the Pharmacy Department and the University. By understanding what influences engagement, universities can work towards providing academic and social environments that are

inclusive and provide all students with equitable opportunity of success (Krause and Coates, 2008). This enhanced understanding could lead to recommendations and actions to improve students' experiences, encouraging better engagement and improving students' success and retention.

Through understanding the acceptability of VLE engagement data monitoring, this study aims to determine whether participants are happy for their VLE data to be accessed and collected, and whether they view the data as useful to them. This study aims to establish whether participants believe the VLE data set gives a fair representation of their academic engagement. Students will be presented with their engagement data alongside the cohort average data, which will lead to questions around comparison to peers, and whether this comparative data motivates or demoralises them. Participants will be also asked about their willingness to reflect on their current engagement and self-regulation of their engagement. In particular, whether participants have the capacity, motivation, confidence, time and resources to change their engagement behaviour. Although not an initial focus for this research, the impact of the different teaching approaches during the COVID-19 pandemic on participantacademic engagement, alongside the impact of COVID-19 lockdowns and restrictions on social engagement will also be explored within the interviews.

1.6 Chapter summary

This chapter has provided an overview of engagement and the importance of engagement for student success and retention at university. Through discussion of the multiple dimensions of engagement, a working definition of engagement was formulated to encapsulate student and university involvement and responsibility for engagement. The context of this study within a UK School of Pharmacy and the need for engagement in teaching activities to ensure student

competence and professionalism was considered. This chapter concluded with the research questions that this thesis aims to answer.

Chapter 2: Literature review

The following literature review explores influences on student engagement, evidence for differing methods for monitoring student engagement, and how reporting engagement data to students may influence their engagement behaviour. Understanding student engagement and student learning experience is crucial for supporting transitions to university, establishing student attitudes and approaches to learning, cementing educational foundations for success and retaining students (Trowler, 2010). Tinto's model for student persistence and the COM-B behaviour change model will be introduced which will inform the thesis methodology, data analysis and presentation of results.

2.1 Influences on engagement

Engagement and dropout are proposed to be inversely correlated, with engagement or non-engagement seen as a long-term process that culminates in a student completing or dropping out of university respectively (Appleton et al., 2006). Tinto's model of student dropout (figure 1) was the first to conceptualise the route to student drop out in higher education (Tinto, 1975). Tinto's model portrays that before deciding whether to go to college and on entering college, the goal and institutional commitment is shaped by the student's family background, individual attributes and pre-college schooling. Whilst at college, the student's interactions with academic and social systems shapes their goal and institutional commitment, success, and completion.. The model suggests that no one factor influences a student's engagement and retention, but rather interconnected multiple factors, which may change through a student's time at university dependent on the context.

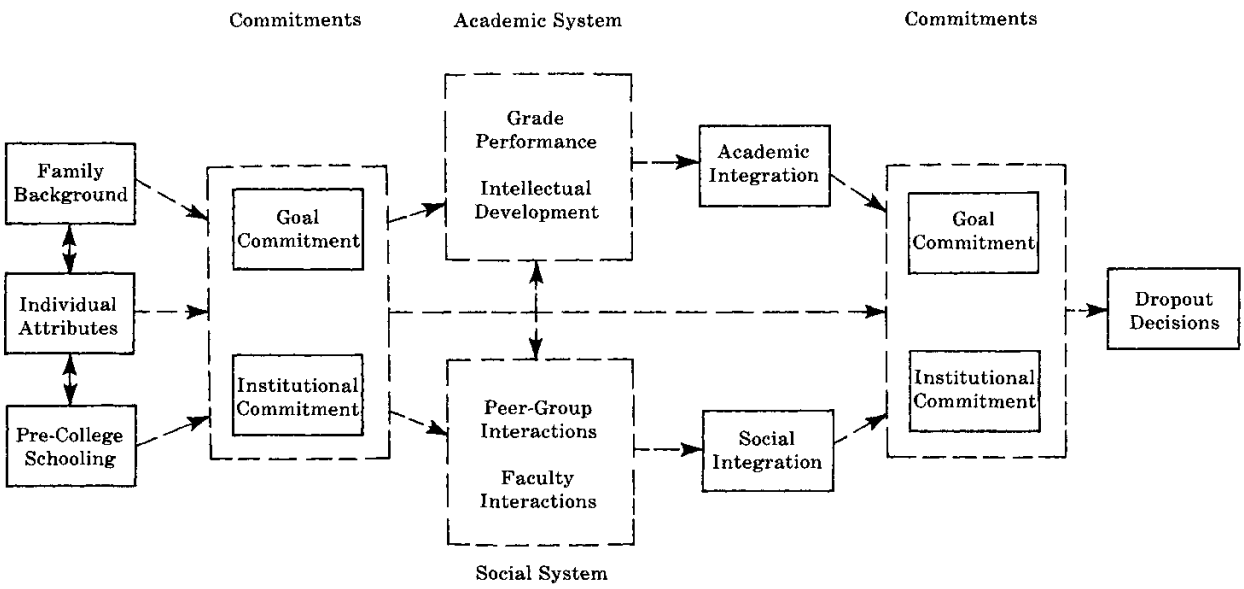


Figure 1. A conceptual model for student persistence or dropout from US College (Tinto, 1975)

Tinto's model was originally created to depict student drop out, however there has been widespread acceptance and support for Tinto's model to explore student engagement and retention (Arena, 2013, Deil-Amen, 2011, Dunn, 2018, Barrett, 2015, Fincham, 2020, Bourchak, 2020, Natoli et al., 2015). An example relevant to this thesis is the application of Tinto's model to explore the lived experience of pharmacy students experiencing academic difficulty at a US School of Pharmacy. These were students who had failed at least one module, and were repeating a module or academic year (Choi et al., 2019). This study found that pharmacy students in difficulty demonstrated feelings of inadequate academic integration, struggled with the workload, and felt under pressure after previously failing an exam. Various background factors and individual attributes such as being a mature student, the first in their family to go to university, and a lack of family support, all negatively influenced their confidence in their academic abilities. Despite the academic challenges, all students described positive social integration and interactions with academics and peers and felt connected to the pharmacy course. This study demonstrated the applicability of Tinto's model as a framework to understand the influences on pharmacy student engagement and retention. However, this study only had 4

participants, and further exploration of additional student experiences is needed to further examine student engagement.

Within Tinto's model there are four possible outcomes. Students with poor academic performance and low institutional commitment are most likely to drop out or be forced to leave due to academic failure. Students with adequate academic performance but high institutional commitment, remain until graduation unless forced to withdraw due to academic failure. Students with good academic performance but low institutional commitment, are most likely to voluntary withdraw or transfer to another course or institution. Students with good academic performance and high institutional commitment are classed as persisters and are mostly to graduate with a high grade classification (Tinto, 2012). UK studies exploring student university drop out have found four key reasons: poor judgment for course to study; failure to cope with demands of the course; disappointing experience of the course or the university; and events that happen outside of university, such as illness, financial issues and family circumstances (Yorke and Longden, 2004).

Engagement may also be viewed as both a process and an outcome (Bryson, 2014). The "process" relates to universities creating environments and opportunities for students to engage academically and socially. This may include utilising teaching and assessments that are inclusive, collaborative and authentic, partnerships and positive re-enforcement between students and staff, and respecting and accommodating student diversity (Krause, 2005, Zepke and Leach, 2010). The "outcome" is the student's individual psychological state of engagement (Bryson, 2014).

The next part of this literature review will present the evidence for each variable within Tinto's model, and their influence on student engagement and persistence. These themes will be built-upon and explored within the pharmacy student interviews, to establish which variables are most pertinent to them.

2.1.1 Family background

Degree choice is often determined by a student's interests, aptitude and aspirations. However, this decision making can be both aided and compromised by the influence of family expectations, with positive and negative impacts on their institutional commitment and persistence (Pizzolitto, 2021, Agbola and Cheng, 2017). Family expectations to attend university is often related to social status and continuation of family heritage (Eldegwy et al., 2022). However, where students go to university due to parental pressure, they have been shown to demonstrate a lack of engagement with studying and poor commitment to their university (Gollins, 2005).

Several US studies have showed that where neither parent is college educated, students are 5.4-25% less likely to achieve a bachelor's degree, compared to students with two college educated parents (Bettencourt et al., 2020, Toutkoushian et al., 2021). A recent UK study analysing the proportion of the UK population in higher education, found that first in family students were very well (68%) represented within university cohorts, they were more likely to be studying high-earning degrees (such as law, economics and management), but were less likely to attend a Russell Group university (Henderson et al., 2020). The study found that first in family students were statistically significantly more likely to drop out of university than students whose parents have a degree, even accounting for prior attainment, socioeconomic status, gender and ethnicity (Henderson et al., 2020). Explanations for poor retention include a lack of awareness of what university life entails (Gollins, 2005) and lack of familial role-modelling (Wainwright and Watts, 2021).

Family support and encouragement from parents and significant others has been strongly linked to student academic engagement and success (Benner et al., 2016), and argued to be the strongest predictor of persistence at university for traditional-aged students (Sorey and Duggan, 2008). Tinto (1975), proposed that parents who demonstrate an interest in their child's education, have an open,

supportive and democratic relationship with their child, give praise and motivational support, value education and have a high level of education, positively influence a student's persistence at college. A study of 267 Spanish university students, found a positive and significant effect of family support on student motivation and behavioural engagement (Descals-Tomás et al., 2021). Other authors have corroborated this, with positive emotions from family members increasing cognitive capacity amongst students and increasing behavioural coping strategies. For example, stable parental relations increased not only engagement but academic performance and serve as a protective factor against disengagement (Bempechat and Shernoff, 2012). The familial influence on students choosing to study pharmacy, go to university and their influence on students once at university will be explored further within the pharmacy student interviews.

2.1.2 Pre-college schooling

Tinto (1975) proposed that pre-college educational experience, such school characteristics and facilities, staff attitudes, student rank in class, and grade achievements can predict future college commitment and completion. This has continued to be shown by several other studies demonstrating that school achievement is a consistent predictor of short-term academic achievement, such as first year attainment, and long-term academic success and graduation (Ferguson, 2021, Westrick et al., 2015, Sammons et al., 2018). Misalignment of secondary school habits with university culture, can be a significant barrier for student engagement and sense of belonging (Romito, 2022).

Within the UK, the majority of students gain a university place through Advanced level (A-level) qualifications. However, an increasing number of students are now entering with Business and Technology Education Council (BTEC) qualifications and Access course qualifications. It is now estimated that 1 in 4 university students entered with a BTEC qualification (Smith, 2018). BTEC courses tend to include more practical learning and portfolio-based assessments, compared to A-levels, which use more didactic teaching and examinations. Several UK studies have shown that BTEC students

achieve lower marks and have higher attrition rates at university (Wharrad et al., 2003, Banerjee et al., 2017, Black, 2022).

Pre-university experience also influences how prepared and informed students are for university. Students who have developed and refined skills of time management, good written and verbal communication and group work at school, are more likely to have an easier integration and engagement with the academic expectations at university (Jansen and Van der Meer, 2007). A study of 1948 students at the Universities of Otago (New Zealand) and Groningen (Netherlands), found that 52.2% and 58.% of students felt well prepared for university by their high school, respectively (Jansen and van der Meer, 2012). Students who feel pressured to go to university, due to the expectation of their teacher or school tend to be less informed, prepared, committed and engaged (Ozga and Sukhnandan, 1998). Student's perceived self-efficacy and preparedness is thought to be a key predictor for their engagement and success (Bandura, 2000).

2.1.3 Individual attributes

Tinto (1975) proposed that individual attributes, such as ability, personality and gender can all affect an individual's goal commitment and ability to stay enrolled within a higher education institution. Numerous studies have shown that students ability, measured as A-level performance, is a strong predictor for university academic achievement (Vidal Rodeiro and Zanini, 2015, Bekhradnia and Thompson, 2002, Hoare and Johnston, 2011). However, others argue that A-level grades can be a crude or unreliable predictor of university attainment (McKay, 2006) and that school study habits of rote learning do not match the study behaviours required at university (Blumner and Richards, 1997). Ability alone does not predict student engagement and success, we must consider students' motivation to learn, study approaches, self-discipline and self-regulatory learning approaches (Richardson et al., 2012).

Within Tinto's model, it was originally suggested that students who dis-engaged and dropped out of university were seen as more impulsive, unpredictable, anxious and restless (Tinto, 1975). However, it is later noted by Tinto (2012) that care must be taken that non-engaged students are not labelled as "deviants" or seen as being lazy or lacking particular personality attributes. These negative stereotypes of non-engaged students can be misleading and damaging. Other studies have shown that students with "grit" personalities, demonstrate a perseverance and greater consistency, (Duckworth et al., 2007, Lam and Zhou, 2019) and adaptability (Datu et al., 2018). Higher engagement has also been shown by students with high levels of conscientiousness (Heaven et al., 2007), agreeableness, extraversion and emotional stability (Bosselut et al., 2020), self-determination (Reeve, 2012) motivation (Ahlfeldt et al., 2005), self-confidence and self-efficacy (Ferla et al., 2009).

Gender is thought to influence subject choice, engagement and attainment at university. Various studies have shown that females are more likely to enrol on education or healthcare degrees, and males are more likely to enrol on mathematics, computer science, construction management and engineering degrees (Charles and Bradley, 2002, Oo et al., 2018, Yazilitas et al., 2013). This is demonstrated within the pharmacy workforce, where 62.3% of registered pharmacists are female (GPhC, 2022) and at the study university 67% of the current enrolments are female. This may be attributed to females seeking a caring and empathic profession (Janzen et al., 2013). Studies investigating gender effects on dropout are mixed, with some showing higher drop-out rates for male students (Johnes and McNabb, 2004, Smith and Naylor, 2001), some with higher drop-out rates for females (Ishitani, 2003, Kronberger and Horwath, 2013, Nistor and Neubauer, 2010), and some with no significant differences (Murtaugh et al., 1999, Liljander, 1998). A UK study of pharmacy student attrition found that between 1997-2000, male students had higher attrition rates (10.7-29%) compared to females (7.2-11.8%) (Hassell et al., 2007). Conversely, a German study of 3703 students on STEM degrees and 6160 students on non-STEM degree, found that females had a 23% higher drop-

out rate than male counterparts on STEM degrees. However, on non-STEM degree the drop-out rates were much more comparable, with slightly more males dropping out than females (Isphording and Qendrai, 2019). This is explained through studies demonstrating gender bias in STEM courses (Moss-Racusin et al., 2018) and negative stereotypes of female abilities in mathematics (Good et al., 2012) negatively impacting female sense of belonging and engagement. Whilst other studies of student engagement behaviour have found that female students demonstrate better study skills, organisation, time-managing and note-taking (Fazal et al., 2012) and engage more with reading of course textbooks (Clinton et al., 2016), positively influencing their university engagement and persistence.

Student age at commencement of university is also thought to influence engagement behaviour. A study of institutional commitment of first year students at 51 US colleges, found that student age was a significant predictor of academic engagement, with mature students demonstrating higher institutional commitment scores, controlling for all other influences (Strauss and Volkwein, 2004). However, despite high commitment and engagement, mature students have been shown to have higher first-year attrition rates (Kahu et al., 2015). Mature students have previously described themselves to be lacking in confidence in their academic ability and being more worried about failing (Brine and Waller, 2004). O'Donnell and Tobbell (2007) proposed that mature students' academic and social engagement can be negatively impacted due to mature students being in the minority within university environments, mature students having less recent or differing pre-college educations, and typically having additional life pressures outside of university.

2.1.4 Goal and institutional commitment

A student's commitment to completing their studies, based upon their educational or career goals, is proposed to be the most influential predictor of college persistence, after student ability (Tinto, 2012). Goal and institutional commitments are situated twice within the model as they are both input and process variables, which dynamically influence persistence at college.

Institutional commitment is defined by a student's loyalty and attachment to the educational establishment (Bean and Metzner, 1985). Institutional commitment is determined by a myriad of perceptions, such as a student's sense of belonging, and their overall satisfaction with the university, teaching quality and social opportunities (Braxton et al., 2000, Hennig-Thurau et al., 2001). Students with a higher institutional commitment have been shown to demonstrate higher levels of engagement, persistence, academic achievement and personal growth; with social integration and sense of belonging being the strongest influence on their commitment (Strauss and Volkwein, 2004, Billups, 2008). Environmental factors, such as finance difficulties, time spent with friends not in college, and ease of transferring to another college, course or job, are thought to have the most negative effect on institutional commitment and fit, and can directly influence dropout (Bean, 1985).

High educational goal aspirations, such as achieving a good grade and graduation, are thought to positively influence a student's motivation, engagement and commitment (Wardley et al., 2013). Vocational goals, such as becoming a pharmacist, have also been shown to greatly influence a student's commitment to undertaking the training and qualifications to achieve that vocation (Sestito et al., 2015). Linked to this is perceived relevance or intrinsic worth, for example students may be more engaged with teaching activities with clear applicability to their future profession. With a claim that career-orientated programmes are highly motivating for students (Firestone and Rosenblum, 1988).

Bempechat and Shernoff (2012), proposed two types of goals: performance and mastery. Performance goals are a desire to appear competent, for example passing an exam. Whereas mastery is the continual and cumulative commitment to gaining knowledge and understanding. Mastery-related behaviours may be seen as mastery learning goals (desire to learn new things), mastery behaviours (persistence, self-discipline, effort invested), and mastery-emergent standards (high

personal standards for performance). Students with mastery behaviours have been shown to be more resilient and achieve higher grades (Bempechat and Shernoff, 2012).

2.1.5 Academic and social engagement

According to Tinto's model, universities can encourage student engagement by creating social and academic environments which inspire students to invest both emotionally, behaviourally and cognitively. This includes enabling and encouraging positive student interactions with the course, the institution, their peers and academic staff (Tinto, 1975). A student's experience and integration into both the academic and social structures at university is proposed to be critical to their institutional commitment (Meehan and Howells, 2018).

2.1.6 Academic systems and integration

Academic integration is seen as a student's intellectual development, academic performance and meeting the course expectations (Tinto, 1975, Bean and Metzner, 1985). Academic engagement is thought to be primarily student driven, through their individual study habits, self-awareness, drive, independence, time management**,** attendance and active participation in teaching activities (Krause and Coates, 2008). Drivers for academic engagement have been suggested to be practical work, appealing content, flexibility and a positive teaching and learning experience (Payne, 2019).

Central to academic engagement, is the rigor and intellectual stimulation of the curriculum and teaching (Elliott and Healy, 2001). Intellectual engagement involves stimulating and challenging students in their learning in order to continue their motivation and engagement at university. Intellectual engagement has been shown to set up the cognitive and emotional foundations for academic success (Krause and Coates, 2008).

This thesis seeks to explore students' perception on VLE engagement data. Therefore, academic engagement with online teaching materials is a concept to explore. Online resources have been shown to be useful to support different student learning styles, to reinforce and expand learning and network building. A study of 501 students found 55% of students expressed a positive attitude towards online learning, while 33% responded negatively (Pozdeeva et al., 2021). Within that study, advantages of the online learning included the flexibility of determining their work schedule, not having to travel or attend classes and working at your own pace. Whereas, disadvantages of online learning were cited as restricted communications with academic staff, IT or internet issues, lack of motivation when studying at home, monotony, eye strain and screen fatigue (Pozdeeva et al., 2021). The use of online resources has also been shown to be difficult for students with limited technological skills and those without access to their own computer or with poor internet connection. Additionally, social media is often described as a major distractor when working online (Krause and Coates, 2008).

Within Tinto's model, grade performance is shown as a key determinant for academic integration and success. Assessments are an integral part of academic rigor at university, assessing students' competency, knowledge or practical skills. Student's engagement with assessments is thought to be determined by four factors: the importance students place on the assessment, the amount of enjoyment a student has whilst completing the assessment, the perception of usefulness of the assessment, and the cost or sacrifices the student must make to engage in the assessment (Nichols and Dawson, 2012). For assessments to be engaging to students it has been suggested they should be authentic, relevant, allow students autonomy and allow the opportunity for collaboration (Bae and Kokka, 2016). Male students have been found to be more motivated by extrinsic rewards, such as grade performance, and females more concerned with intrinsic reward, such as their intellectual development (Tinto, 2012).

2.1.7 Social integration and engagement

Social engagement involves friendships, supportive peer group interactions, social fit and interactions with academic and administrative staff. Formulation of student identity is key to social engagement, and it is often governed by whether students feel they "fit" into university life, their sense of belonging and whether university life meets their pre-conceived expectations or not (Krause and Coates, 2008). Tinto's model demonstrates the importance of positive interactions with staff members and interactions with other students, for students to experience a sense of belonging (Tinto, 1975).

Student-staff interactions have been shown to be a positive experience when staff are enthusiastic, committed and skilled teachers, demonstrate empathy towards students, show an interest in their academic development and provide regular feedback (Borden, 1995). Positive interactions between academic staff and students can improve student wellbeing, engagement, satisfaction, promote the value of education and can improve grades (Peterson et al., 2001). A US study found that the more frequent the interactions between academic staff and students, the stronger the student's commitment to the institute and the less likely they are to drop out (Mayhew et al., 2016). Whereas, Billups (2008), found it was the quality of staff-student interactions, rather than the quantity, that created the institutional connectivity and social-bonding between students and staff. Academic staff who are caring and helpful, show a genuine interest and concern for students, and are accessible, contribute to a feeling of "student-centredness" (Elliott, 2002). This phenomenon is thought to make students feel welcome by academic staff, connected to the institution and overall more likely to engage and persist at university. Academic staff knowing and using a student's name also has a positive correlation with students' sense of belonging, engagement and satisfaction (Yorke and Longden, 2008).

Social integration is thought to be largely determined by students' relationships with peers; whether they match or deviate from the social norms, attitudes and values of their peers, and have established friendship groups. Social interactions within and outside the classroom are argued to be equally important for students' connectedness, engagement and persistence, as any academic measure (Tinto, 2012). Formations of a "community of learners" amongst peers, have been shown to have direct and indirect benefits on engagement and learning (Zhao and Kuh, 2004). Through working collaboratively and supporting each other, students can become more engaged, develop better study habits, make more effort and be more effective learners. During peer interactions, students can test, contextualise and expand their knowledge and develop key interpersonal and team working skills (Krause and Coates, 2008). Peer support allows students to ask trivial questions they might not ask an academic, which reduces student uncertainty and helps students engage better with the academic environment, particularly during their first term at university (Leese, 2010). Benchmarking of assessment grades between students can be either positive or detrimental to students' self-esteem, self-efficacy, motivation and engagement, dependent of whether students are above or below the benchmark respectively (D'Lima et al., 2014).

Beyond class social engagement may include extracurricular activities, such as joining university societies or sports teams. Integration into extracurricular events is projected to lead to social rewards and increases institutional commitment and sense of belonging (Tieu et al., 2010). A welcoming campus environment offering a range of inclusive extracurricular activities is thought to build students' connections to university life (Krause and Coates, 2008). Students who voluntarily withdraw from university report a lack of social interactions, cultural estrangement, social isolation or non-attachment to the university (Tinto, 2012). However, those who fail academically are often associated with excessive social interactions at the detriment of their academic studies.

2.1.8 The use of Tinto's model as a theoretical framework for this thesis

Tinto's model has been chosen as a theoretical framework to underpin this thesis. The literature presented above supports the correlation between student engagement and persistence, and non-engagement and dropout. Tinto's model represents the constructivist nature of student engagement; that students are active and passive participants in a multitude of academic and social contexts which shape their attitudes and behaviours. Therefore, Tinto Is proposed to be an appropriate model to study pharmacy student engagement. The influence of students' unique and personal backgrounds, individual attributes, family relations, and interactions with their peers, lecturers and the university, is explored during the participant interviews.

Whilst Tinto's model was developed over 50 years ago and set within the US college system, it can be argued that the key concepts are transferable to other higher education and university systems. The literature presented above has been drawn from a variety of educational settings in the US, UK and Europe and demonstrate the applicability of each dimension of Tinto's model in 21st century education. In particular, within the UK setting, Gollins (2005), Black (2022) and Henderson et al. (2020), demonstrate the current relevance of Tinto's model in understanding the influence of family background, pre-university schooling, academic and social integration on student engagement.

Tinto's model went through various validations and examinations in the 1980s and 1990s (Terenzini et al., 1981, Pascarella and Chapman, 1983, Cabrera et al., 1992). Leading to Tinto updating his model in 1993, to include "external commitments" which included factors such as students working part-time or having carer responsibilities (Tinto, 1993). Despite this updated version, the mainstay of literature still utilises Tinto's 1975 model. This thesis does not seek to validate Tinto's model, but rather is an exploratory study. Therefore, this thesis uses the original (1975) Tinto model as a basis for

exploring UK pharmacy student engagement with an aim to discover any new additions, interpretations, or understandings of pharmacy student engagement.

Despite having Tinto's model and numerous studies exploring student engagement and drop out factors, the issue of preventing student drop out remains unsolved. Understanding and predicting an individual's or a cohort of students' engagement remains complex, ambiguous and ever-changing (Krause and Coates, 2008). The first research question of this thesis aims to add to the literature on understanding influences on engagement and to recognize what interactions or circumstances are most influential on pharmacy student engagement.

2.2 Monitoring student engagement

Academic programmes with high rates of student retention have been shown to have effective strategies for monitoring engagement, which include identifying at risk students, and following-up and providing support to those students (Thomas, 2012). Monitoring student engagement allows universities to predict and examine patterns of students' behavioural engagement and performance (Siemens and Long, 2011, Fredricks et al., 2004). Engagement data may also be used as a quality improvement and assurance measure, allowing universities to use the internal data to make evidence-informed decisions on economic and pedagogical resources (Shacklock, 2016). This may include reviews of academic programming and teaching, making changes to enhance institution productivity and effectiveness, and educational outcomes, such as reduced drop-out, improved performance, progression and graduation (Daniel, 2015, Elias, 2011). The subsequent sections explore varying methods of monitoring student engagement, including attendance monitoring and learning analytics.

2.2.1 Attendance monitoring

As mentioned in Chapter 1, attendance monitoring is the mainstay of engagement monitoring at the study university. Absenteeism from teaching sessions can be seen as both a symptom of non-engagement and a barrier to engagement (Dunn, 2018). In line with Tinto's model, students who dropout have been found to have lower attendance and worse time-management skills than students who persist (Trotter and Roberts, 2006). Lack of attendance has been shown to impact not just that student, but alters the dynamics of the teaching sessions and limits the opportunities for other students to work collaboratively, which can have negative consequences on group assignments (Koppenhaver, 2006).

There has been much criticism of the use of attendance as a measure of engagement. Firstly, it must be recognised that university is a very different system to school, where attendance is legislated (Gollins, 2005). At university, students have an autonomy and independence to decide whether to attend or not, and what they feel is the best way for them to study. Students may also have valid personal, psychological or financial reasons why they cannot attend teaching sessions (Gollins, 2005). Universities with a "monitoring and chasing" model for student attendance, with punitive consequences for non-attendance, have been shown to generate negative consequences, for example mislabelling students and negative staff-student interactions (Payne, 2019).

2.2.2 Learning analytics

Learning analytics is the process of capturing, processing, analysing and collating a set of student's digital data and turning the data into real-time actionable information. This data may come from a wide range of student administrative interactions and operational activities including: attendance at teaching activities, attendance at tutor meetings, library activity (card swipes when entering and

leaving the library, number of textbooks taken out, viewing of e-books and journals), assessment submission and grades, interaction with the virtual learning environment (VLE), logging into the e-timetable and university computers (Thomas et al., 2017). These digital engagement factors are easily accessible and create binary measurements of a student's academic and behavioural engagement (Appleton et al., 2006). Learning analytics data is often presented in a dashboard to staff and/or students, which is thought to allow a more proactive approach of offering student support and allows opportunities for earlier interventions if a student's engagement appears to be low or impaired.

The use of digital data to monitor behaviour originated within commercial and business sectors. The collation and analysis of customer data has been utilised by companies to track and predict customer behaviour, target marketing and predict trends (Ferguson, 2012, Elias, 2011). However, the use of digital data within higher education is much further behind. A survey of 54 UK universities found only one had a full learning analytics system embedded across the entire university, nine (19%) universities had a partial adoption of learning analytics systems, 18 (38%) universities stated they were working toward learning analytics, and 25 (47%) universities had no implemented learning analytic systems (Newland et al 2015). The Higher Education Commission reported that no Russell Group institution currently used learning analytics, and there was no relation between university age, location or size and the adoption of learning analytics (Shacklock, 2016).

2.2.3 Evidence of using learning analytics in universities

Presented below are several examples of universities who currently use learning analytics. Each example has been selected to give an overview of differing learning analytic approaches, whether it be predictive or reactive, the different data sets collected and the differing ways of reporting the data to staff and/or students. In particular, learning analytics that utilised the use of VLE data are described

so as to connect with the approach of monitoring VLE data in this thesis. Drawbacks and limitations of learning analytics will then also be discussed.

2.2.3.1 Learning analytic systems utilising VLE data

A quantitative study of 133 students, over a period of 6 weeks at Qassim College of Medicine, Saudi Arabia, found there were five engagement indicators which correlated with final performance and predicting potential risk of failing or dropping out (Saqr et al., 2017). The first engagement indicator was VLE logins, and student were considered engaged when they logged in three days or more within a week. The next two indicators were course views and time spent on VLE, with engagement classed as students viewing course materials more than the mean views and spending more than the average time on VLE than other students. Interacting with the course forum, with more than two posts per week was classed as engaged. The final indicator was student participation in the formative assessment, regardless of their assessment score. Scoring across these five indicators generated an engagement percentage score, and any student with a score less than 65% was deemed at risk. Total VLE logins had the strongest correlation with final grade ($r=0.47$ $p<0.01$), followed by completion of the formative assessment (r-0.43, $p<0.01$). Forum interaction, VLE views and time spent on the VLE were moderately correlated with student grades ($r=0.29$, 0.25, 0.22 respectively). This learning analytics system was able to identify 53.9% of student who were at risk and predict with a 63.5% accuracy a student's final grade (Saqr et al., 2017).

Further studies have shown positive correlations between VLE log-ins, time spent on VLE and proportion of course viewed with better student attainment and retention (Atherton et al., 2017, Ferguson and Clow, Strang, 2017). An analysis of data of student activity over four undergraduate online courses found that for each variable listed in figure 2, the more the student interacted with the VLE the more likely they were to complete the course (Soffer and Cohen, 2019). These differences were found to be statistically different, demonstrating the value of each variable in predicting student success.

	Completion		Noncompletion	
	M	*SD*	*M*	*SD*
Video activity in days	7.42	7.04	2.99	3.12
Video views (%)	42.81	37.98	20.40	24.10
Minutes of video viewed (%)	73.95	87.46	39.00	78.18
Writing in forums	0.18	0.83	0.04	0.35
Reading the forum posts	12.67	15.63	7.24	10.82
Course homepage entries	102.56	66.60	56.14	49.55
Learning unit entries	34.60	48.55	11.79	13.94
Average unit page entries	1.26	1.43	0.42	0.71
Additional material entries	8.76	10.16	4.32	7.59
Total entries	306.44	210.28	142.02	115.47
Assignments submitted (%)	94.81	17.69	62.68	40.81

Figure 2. Means and standard deviations for 11 activity measures, according to course completion (Soffer and Cohen, 2019)

2.2.3.2 Use of learning analytics as prediction tools

Course Signals, at Purdue University (USA), is a predictive student success system, which provides live meaningful and actionable data (Arnold and Pistilli, 2012). The model predicts student non-engagement/dropout risk based upon four measures: prior academic history (high school grades),

student characteristics (age, residency, credits attempted), effort (VLE interaction compared to peers) and performance (grades). Each measure is weighted and analysed by the algorithm to create a green, yellow or red signal for each student, representing a high likelihood of succeeding, potential to succeed, and high risk of being unsuccessful in the course, respectively. This signal is posted on the student's VLE home page, with "red" students receiving an email and text, referral to an academic advisor and invitation to a meeting with the course instructor. Students cannot be placed at risk due to one single measure, as the algorithm determines the risk from the collective static and dynamic data across all four measures. Analysis of the course signals system, showed that students with two or more courses with the Course Signals (CS) reporting, had higher retention rates, compared to students with one or no course with CS system. Additionally, it was found that although students in CS courses had lower high school test scores they achieved greater academic success, than non-CS course students, potentially demonstrating that the system is more influential than the individual. Student feedback on CS was also encouraging, with 89% stating CS provided a positive experience, 74% stated their motivation was positively affected and 58% reported they would like CS on every course. However, a small minority of students felt demoralised by the repeated negative emails or text messages, or that the traffic signals were not updated often enough. Staff perceptions were mixed, with some praising the use of CS to intervene and support students sooner and observing positive impact on students engaging in assessments earlier. However, others were concerned about increased administrative workload, lack of consistent approaches from staff in supporting students, and fostering students' dependency rather than independence (Arnold and Pistilli, 2012).

In 2012, the University of Sydney, implemented a Track and Connect programme, which combined student demographics (students entering via alternative pathways, first in family to attend, rural students, students with low economic backgrounds, students with disabilities) with real-time engagement data (attendance, use of VLE, assessment performance). The programme allowed early

prediction (week 4 of term) of students at risk of non-engagement and drop-out and offered those students a range of personal and academic support resources. The use of learning analytics was shown to decrease overall student attrition from 19% to 7%, and early drop-out from 15% to 3.5% (Barnes et al., 2015).

2.2.3.3 Use of learning analytics to identify students with poor engagement

The University of New England (UNE) in Australia, utilises an early alert system (EAS) which collates and analyses student data from eight IT platforms within the university, and has 34 triggers to identify students at risk of disengaging from their studies (Villano et al., 2018). These triggers include elements from Tinto's model: student demographics (e.g. traditional or non-traditional entry pathway, previous enrolments at UNE), academic activity (e.g. VLE activity, assignment submissions) and institutional variables (e.g. course delivery online or on-campus). Unlike, other learning analytic systems which focus on behavioural engagement, the EAS incorporates emotional engagement. This is recorded through students' self-selected current emotional state (happy, neutral, I do not want to say, unhappy and very unhappy), which they select from an "emoticon" in their student portal. Each day, the 200 students with the lowest engagement scores are sent an email with signposting to support services and the opportunity to opt-into a tailored support programme. A quantitative study of 16,142 student EAS observations, over 156 weeks, showed that when controlling student demographics and institutional influences, the EAS was able to accurately identify students with significantly higher risk of dis-engagement and dropout. However, this accuracy decreases longitudinally, with the EAS algorithm shown not to be effective at identifying at risk students after 90 weeks of enrolment (Villano et al., 2018).

The introduction of an early warning system (EWS) into a blended IT course at the University of the South Pacific, was also shown to positively change student engagement behaviour and course success

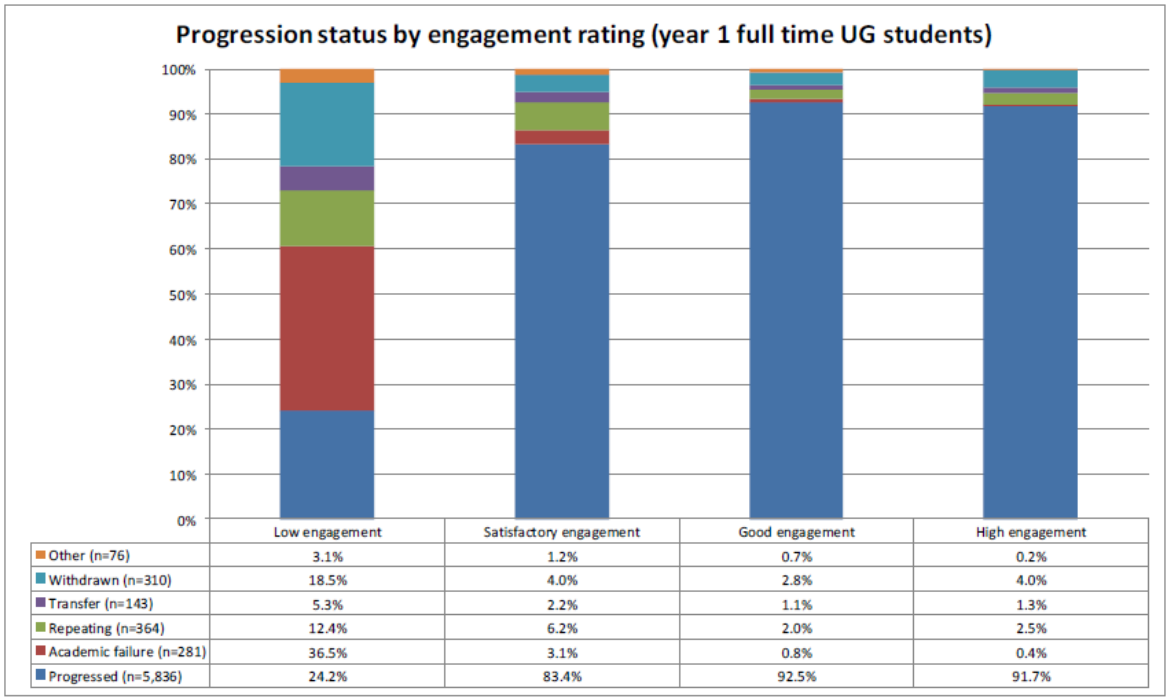
(figure 3). The behaviour change was explained through the concept of social learning, where students noticed their engagement was less than other students and this motivated them to engage more. In comparison to end of semester engagement reporting, the EWS allowed real time and continuous learning analytics reporting which gave students more opportunities and time to self-regulate their learning behaviour and seek help where necessary. Additionally, 90.3% of the students found the EWS a useful tool to help them keep up with the course (Jokhan et al., 2019).

	EWS	Mean
Average login/week	Before	2.9268
	After	3.1356
Average completion rates	Before	0.69
	After	0.8108

Figure 3. Mean weekly logins and course completion rates before and after Early Warning System implementation (Jokhan et al., 2019).

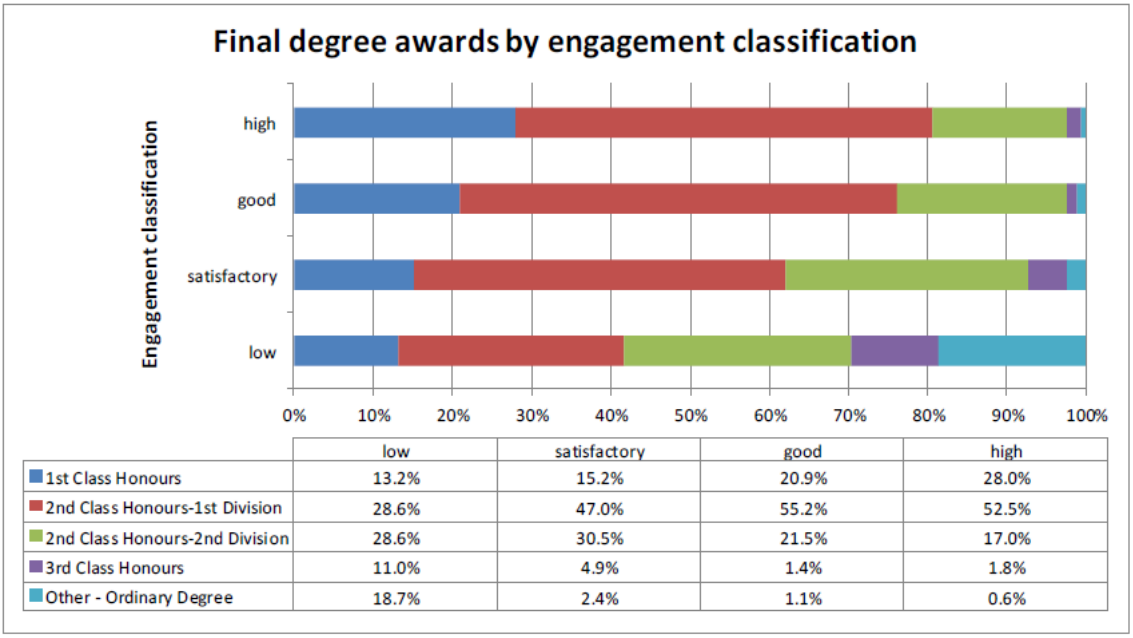
2.2.3.4 The Nottingham Trent Student Dashboard

The most extensive UK learning analytics system is the "Student Dashboard" introduced by Nottingham Trent University (NTU) in 2014. The dashboard was implemented to improve student experience, enhance sense of belonging, allow early identification of students in difficulty and to facilitate engagement discussions between students and tutors. The system collects data on student coursework submission, VLE use, library access and lecture theatre door swipes. The data is fed into a computer algorithm which converts this into a student engagement score of low, partial, good or high. Student are notified daily and weekly of their engagement score and that of the cohort average. Tutors are alerted when a students' engagement is persistently low (Sclater et al., 2016). Quantitative analysis of the NTU dashboard data found a positive correlation between levels of engagement and year one to two progression (figure 4) and with student final degree award (figure 5).



	Low engagement	Satisfactory engagement	Good engagement	High engagement
Other (n=76)	3.1%	1.2%	0.7%	0.2%
Withdrawn (n=310)	18.5%	4.0%	2.8%	4.0%
Transfer (n=143)	5.3%	2.2%	1.1%	1.3%
Repeating (n=364)	12.4%	6.2%	2.0%	2.5%
Academic failure (n=281)	36.5%	3.1%	0.8%	0.4%
Progressed (n=5,836)	24.2%	83.4%	92.5%	91.7%

Figure 4. Progression status of students vs engagement score (Sclater et al., 2016).



	low	satisfactory	good	high
1st Class Honours	13.2%	15.2%	20.9%	28.0%
2nd Class Honours-1st Division	28.6%	47.0%	55.2%	52.5%
2nd Class Honours-2nd Division	28.6%	30.5%	21.5%	17.0%
3rd Class Honours	11.0%	4.9%	1.4%	1.8%
Other - Ordinary Degree	18.7%	2.4%	1.1%	0.6%

Figure 5. Influence of student engagement score on final degree award (Sclater et al., 2016)

Figure 4 shows that students with low engagement were most likely to fail (36.5%) withdraw (18.5%) or repeat the academic year (12.4%). Of those with low engagement, only 24.2% of progressed from year 1 to year 2. As student engagement score improves their progression significantly increased, with 92.5% and 91.7% of students with good or high engagement progressing. Figure 5 shows that students with low engagement are significantly less likely to achieve a first class or 2:1 honours degree classification. Only 41.8% of students with low engagement achieved a 2:1 or first-class degree awards, compared to 76.1% and 80.5% for students with good and high engagement respectively.

A survey completed by 460 first year students at NTU found that 27% of students had changed their engagement behaviour because of the dashboard. Student reported logging onto VLE more frequently, checking-out more library books and attending more teaching sessions. Students described the impact of comparing their engagement data to the cohort average and enjoyed competing with each other to better their engagement scores (Sclater et al., 2016).

2.2.3.5 Exploring perceptions of learning analytics

A study at Southampton Solent University explored student and staff perceptions of learning analytics through interviews (Khan, 2017). Students were initially unaware of the concept of learning analytics. However, once it had been explained by the interviewer, they stated they thought data on attendance, VLE and library use would be useful to predict their academic success. Students were comfortable with data sharing with themselves, but more guarded about sharing data with academics and university support staff. Academic staff had good awareness of learning analytics, and felt it would enhance student retention, engagement and performance, and trigger a review and enhancement of teaching methods. For learning analytics to be most useful staff stressed the importance of accurate and thorough data collection, and a wide range of data must be included, for example student demographics, entrance grades, health and/or accessibility requirements. The study highlighted challenges of learning analytics, including timeliness and the complexity of the algorithms and

statistical analysis needed to convert all the data into a useful system to identify students at risk (Khan, 2017).

2.2.4 Challenges and drawbacks to learning analytics

Data analytics has the potential to drive systematic change within universities through "actionable intelligence". For example using data to predict and improve student retention, to develop early alert systems, and allocation of resources and organisational efficiency which will lead to the greatest academic success rates (Campbell et al., 2007). Despite the evidence displayed above on the use of learning analytics to predict student success, support students to modify their engagement behaviour and prevent drop-out, learning analytics is not a cure-all. The majority of the evidence for learning analytics focusses on the analysis and correlations, rather than concretely proving the impact on student behaviour (Elias, 2011). Historically, universities have been inefficient and tardy in their use of student data; for example only analysing factors influencing student drop-out at the end of the academic year, rather than proactively identifying factors and intervening earlier (Siemens and Long, 2011). The challenge is how best to use the data in a rational and evidence-based way it to improve student experience and learning processes at university (Pozdeeva et al., 2021).

Every day, students leave a large digital footprint which can be collected and analysed to demonstrate their academic engagement. It can be seen from the above examples, that within each HEI different data sets are collected at differing time points, analysed, reported and actioned in different ways. This lack of a standardised process can lead to concerns around the quality, reliability and completeness of learning analytics (Daniel, 2015). There is a debate as to whether student demographics should or shouldn't be included within learning analytic systems, as students may unfairly be at risk of dropout due to their unmodifiable demographics.

The success of implementing a robust and reliable learning analytics system is dependent upon a high functioning technological platform to mine, collate and analyse the data, and staff who are skilled to interpret and use that data in a supportive manner (Campbell et al., 2007). Implementation of a learning analytics system is costly, timely and complex. The adoption of learning analytic systems within UK universities has been limited due to accessibility of extracting the data, difficulties consolidating multiple different types of data into one algorithm, stability of IT systems (Daniel, 2015), and conflicting resource allocations (Siemens and Long, 2011).

We must also consider the ethical considerations of learning analytics, around student privacy, consent, data ownership and surveillance. Detrimental consequences may occur as a result of data breaches or hacking, mis-reporting, mis-interpretation, or lack of action or escalation of students in difficulty by tutors (Lawson et al., 2016). Traditional undergraduate students, are considered the "net generation", in that they grew up with digital equipment and internet content throughout their family and school environment (Pozdeeva et al., 2021). These students are thought to be fully digitally competent and aware that they are constantly being monitored digitally, for example through internet cookies tracking what they search for, their consumer behaviour data, social media activity data. Despite this awareness and acceptance of being watched digitally, it is vital to gain student consent and to reassure students of their data privacy, for example who will be accessing their data and how information will be shared (Campbell et al., 2007, Shacklock, 2016). Other studies on data analytics have found that students initially believe these systems to be an invasion of their privacy, however find it more acceptable when the purpose of using the data to support their attainment is explained (Roberts et al., 2016, Arnold and Sclater). There is also the potential to cause additional stress, demotivation and further disconnect for students, particularly those who are unsure or unable to take action to improve their engagement (Sclater et al., 2016).

Learning analytics is reliant on the accuracy of the data collected, and the subsequent processing and analysis to produce meaningful data. To ensure correct interpretation and application, information must be presented accurately, in a timely manner, and to the right people in the right way (Dron and Anderson, 2009). Although the NTU dashboard survey found that 27% of students change their engagement behaviour, this could be reflective of students cheating the system and artificially inflating their numbers to compete with their peers.

2.2.5 Gap in knowledge regarding learning analytics

The literature has shown that learning analytic systems in universities is a growing trend. However, the implementation of learning analytics within UK universities is still relatively slow and there is limited research evaluating its use (Shacklock 2016). As mentioned in Chapter 1, the Department of Pharmacy at the study university currently only records student attendance, no other learning analytics data is utilised. The implementation of a full learning analytics system would require a significant technological and financial commitment from the university. This research could establish whether there is a need for learning analytics and the potential benefits that it could bring to students, the department and university. Through listening to the students on their perceptions of the acceptability, accuracy and useful of a learning analytics system, the department and university can make evidence-informed decisions. Previous research into student engagement, performance and learning analytics has predominantly focused on quantitative methods, identifying factors and correlations. However, these are lacking in-depth exploration of individual's engagement experiences, influences and personal decisions (Payne, 2019).

Research questions 2 and 3 seek to add to the literature on students' perceptions of their digital engagement data being monitored and reported to them. This will include participants' perceptions

on the use of attendance data, VLE data and the full digital data sets utilised in other learning analytic systems. This will be investigated in terms of participants' acceptability of being monitored digitally, their perceived accuracy of each data set, and the emotional and behaviour response of having their engagement data reported to them. VLE was selected as the most appropriate measure of engagement during the time period of this research, as the majority of teaching was delivered on the VLE. Accuracy of the VLE data to represent each participant's engagement journey, will also be studied through plotting this data as a graph and exploring with participants whether this graph accurately, approximately or erroneously represents their engagement over two academic terms.

2.3 Data analytics and behaviour change

This section considers the potential effect of learning analytics data on student engagement behaviour. As previously mentioned most learning analytics are used for predictive modelling or to identify students in difficulty and offer them further support. However, what is yet to be explored is whether presenting students with their engagement behaviour evokes a significant change in their behaviour. This will be studied through the COM-B model for behaviour change (figure 6). The model depicts how students must have the capability, opportunity and motivation to change, in order to see a change in their engagement behaviour. The arrows shown in figure 6 show how each factor and the resultant behaviour influence each other, with monitoring and feedback loops to allow for reflection, adjustment and refinement. Each influence can be either encouraging, hindering or maintaining (Michie et al., 2011).

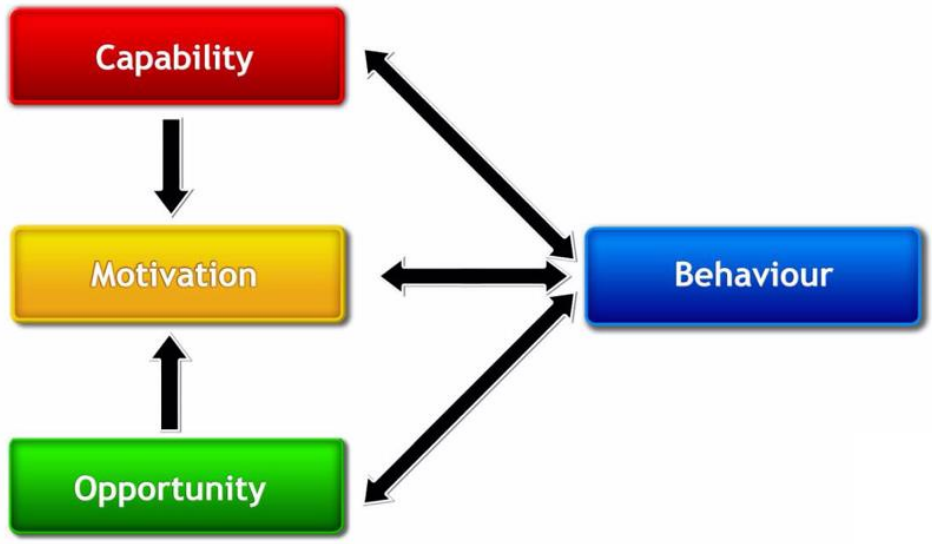


Figure 6. The Capability, Opportunity and Motivation model of Behaviour (COM-B) (Michie et al., 2011)

The COM-B model was originally developed within the legal system, and has been subsequently validated and used extensively to understand influences on health behaviour changes and inform behaviour change policies and intervention planning (Howlett et al., 2019, Keyworth et al., 2020, Sagar-Ouriaghli et al., 2020, Barker et al., 2016). Several recent studies have shown its applicability to educational settings. A UK study utilised the COM-B to explore of psychology students self-regulated approach to online learning (Garip et al., 2020). This study found students benefited from the accessibility and flexibility of online learning (opportunity) but were restricted by IT and language skills (capability). The same students described a high motivation to study due to vocational commitment, but had to balance this against competing priorities such as family and other commitments (Garip et al., 2020). A study of Chinese students found that personal capability and environmental opportunity positively influenced personal motivation and educational behaviour, and uncertainly and avoidance thinking played a negative role (Li et al., 2021). An Australian study of medicine, nursing and health science students, utilised the COM-B to understand student ethical academic writing and interventions to prevent plagiarism (Ayton et al., 2022).

Each element of the COM-B model will be discussed and applied to student engagement. Followed by the justification of the use of the COM-B model and knowledge gaps that this thesis will address.

2.3.1 Capability

Capability is a student's underlying expertise, experience and competency to change and become more engaged (Michie et al., 2011). Capability is also influenced by physical factors, such as stamina and fatigue, and psychological factors, such as self-belief or anxiety (Zimmerman and Kitsantas, 2005). These factors govern the amount of effort expended and persistence with a task. The physiological aspects of capacity are thought to have the most influence on a student's academic behaviour and attainment, with self-belief of their ability being the most dominant influencing factor (Richardson et al., 2012). Self-belief is proposed to be affected by a student's past experience of success or failure. For example, if a student receives a poor grade despite working hard for an assignment, that student may become despondent, embarrassed and they may lose the belief that they can change their behaviour (Ford, 2019). Whereas, continual positive reinforcements, such as good grades, positive feedback and positive interactions with faculty, have been shown to bolster a student self-belief which perpetuates the good engagement behaviour (Bloom, 1976). Conversely, students who have failed often report self-reactions of helplessness, disengagement, future task avoidance and lack of drive (Zimmerman and Kitsantas, 2005).

2.3.2 Motivation

Motivation is defined as the energy, emotional response and conscious decision making that directs the behaviour change (Michie et al., 2011). The intensity, quality and persistence of a student's motivation determines the achievement (Bempechat and Shernoff, 2012). Motivation is often a reflective process, with students self-identifying what they would like to change and why, setting goals and integrating habits (Michie et al., 2011). Motivation is thought to be driven by the expected

outcome and the incentive to complete the course of action. This may be attainment, social approval, or self-satisfaction and growth (Zimmerman and Kitsantas, 2005). The interaction between motivation and expected outcome is dependent on whether the behaviour guarantees the outcome (Lent et al., 1994). For example, if students perceive that the outcome is obtainable and worth the effort put in (Ford, 2019). In an education setting, students are told if they engage more, they will get higher grades. However, there will always be students who have fully engaged with teaching activities but still perform badly at exams. If the student outcome is unrealistic or unattainable this may leave students feeling unmotivated, frustrated and ineffective (Ford, 2019).

Goal setting has been shown as a strong deterministic factor to direct and organise attention, guide and maintain behaviour, and increase the likelihood that the desired outcome will be achieved (Lent et al., 1994). Students with high motivation utilise self-control, mindfulness and focus to work towards their set goals, this drives their persistent with a task. Enjoyment in the task and satisfaction in the goal are key motivators to persistence of efforts and motivation to continue (Zimmerman and Kitsantas, 2005). Motivation is also linked to student emotions, with positive emotions, such as hope, pride and enjoyment correlated with higher reported motivation and effort levels. Conversely, negative emotions such as boredom, anger, anxiety, shame and hopelessness are correlated with less self-reported effort and worse academic performance (Pekrun et al., 2011).

2.3.3 Opportunities

Opportunities are external factors which may facilitate or be a barrier to behaviour change (Michie et al., 2013). This may include societal norms, physical and environmental opportunities. Opportunities that may facilitate a change in student behaviour have been found to be academic advice, wellbeing services, careers guidance (Picton and Kahu, 2022), effective learning environments (Davis and Taylor,

2019), mentoring (D'Lima et al., 2014) educationally stimulating and interesting tasks and projects (Hidi and Harackiewicz, 2000).

Barriers which may influence a student's ability to change their behaviour are more commonly thought about. These include lack of time, large class sizes, staff availability, difficulty of work, library opening times, working part time, carer responsibilities (Hidi and Harackiewicz, 2000), technical/IT difficulties and social media distractions (Upchurch et al., 2022), lack of resources, dis-jointed systems, lack of instruction or organisation (Crabtree et al., 2021).

2.3.4 Behaviour

In the context of this study, behaviour refers to the student re-engaging or being more engaged either academically or socially. Key to this cyclical process is that for students to be successful in modifying their behaviour they must have resources in all three phases (capability, opportunity and motivation). As depicted by the arrows in figure 6, the COM-B model is dynamic, and students must regularly self-monitor to ensure their task in on track, and to avoid any distractors or barriers. Students should assess whether their behavioural goal has been reached and which approaches have been successful. They may reflect on any mistakes and consider how to adjust their methods to improve outcomes in the next task (Michie et al., 2013).

2.3.5 The use of COM-B model as a theoretical framework for this thesis

The COM-B model is the second theoretical model used to guide this thesis' methodology. The literature presented above demonstrates the COM-B model's applicability to education settings, with relevant examples in UK and Australian university settings (Garip et al., 2020, Ayton et al., 2022).

In line with the working definition of student engagement given in chapter 1, the COM-B model the characterises the multi-dimensional components to student engagement behaviour. I propose that the COM-B model also represents the two-way process of engagement, with both the student and the university needing to expend effort and commitment to promote engagement. This makes the COM-B model a useful framework to explore student led factors and university factors that give students the opportunity, motivation and capability to engage.

The COM-B model acknowledges that it is not possible for students to be engaged all the time, but rather engagement waxes and wanes around certain deadlines, assessments or reflection on key events, based upon student self-reflection and regulation (Virtanen et al., 2015). Therefore, the COM-B model is also applicable to the exploration of the VLE engagement graphs in this thesis and can be used to understand students' fluctuating engagement behaviours.

2.3.6 Research gap and behaviour change

The literature presented in this chapter has shown there is a still is a literature gap on the effect on learning analytics on students' behaviour change. Through utilising the COM-B, this thesis aims to explore student behaviour and self-regulation of their engagement. In particularly, whether students have the capacity, motivation, confidence, time and resources to change their engagement. This will address the potential impact of learning analytics within the university.

2.4 Chapter summary

This chapter has presented the literature related to Tinto's model of student dropout, and its applicability in understanding the multiple factors which shape and influence student engagement at

university. The current literature on family background, individual attributes, pre-university experience, goal and institutional commitment, academic and social integration, will be explored further through the pharmacy student interviews.

This chapter then described the use of digital data to monitor, predict and influence students' engagement behaviours. Learning analytics systems at other universities were examined, in particular their reliability, success, and student and staff perceptions. The COM-B model for understanding behaviour change was described and related to a student engagement setting. The collection and reporting of student VLE engagement will add to the literature on the accuracy, acceptability and impact of learning analytics on student engagement behaviour.

Chapter 3: Methodology

3.1 Chapter introduction

This chapter covers the research paradigm and ontological and epistemological stance adopted within this thesis. The qualitative methodology will be described and justified. This chapter will outline the student recruitment process, timeframe, piloting and interview approach, and VLE data retrieval process. The transcription and coding of the interview responses will be outlined. This chapter also discusses the key ethical considerations, including steps taken to ensure student confidentiality and protect students from any harm during this study. Quality assurance processes will be considered, including minimising bias, and discussion of the implications of undertaking insider researcher.

3.2 Ontology, epistemology and research paradigm

All research processes are unique and dependent upon the research purpose, environment, participant characteristics, and the researcher's ontological view and epistemological stance (Basit, 2010). A research paradigm is a conceptual framework that allows researchers to organise and combine their beliefs about the nature of the social world and reality (ontology) alongside their beliefs about the nature of knowledge and how it can be acquired and examined (epistemology) (Ritchie et al., 2013). The choice of research paradigm directs researchers to the most appropriate research methodology to examine that knowledge. The three most described research paradigms are positivism, constructivism and pragmatism. Within the positivism paradigm, the ontology is that one single reality exists, and epistemologically that the knowledge can be measured using scientific rules, reproducible designs and reliable tools (Mertens, 2019). Whereas, the constructivism paradigm has the ontology that multiple realities exist, and reality is dependent on the people who live in it. The epistemological stance is that knowledge is socially constructed, and needs to be interpreted or explained to discover its underlying meaning (Basit, 2010). Pragmatism tends to bridge the positivism

and constructivism paradigms, where the ontology is that one reality exists and this reality can be viewed differently by different people. The epistemological stance is that knowledge should be interpreted using a flexible pluralistic approach (Mertens, 2019).

The research paradigm directs the choice of research methodology. Typically, the positivist paradigm aligns with quantitative collection of data to test hypotheses, prove cause and effect relationships, and analyse relationships statistically. This generates results which are objective, generalizable and undisputable (Cohen et al., 2018). The prominent research methodology for constructivist researchers is qualitative methods such as interviews, focus groups or observations. Qualitative methods allow researchers to gain an understanding of the social constructs held by people, through hermeneutical and dialectical interactions (Scott and Usher, 2011). The pragmatism paradigm is often used for consequence orientated or problem-centred research, and collects both qualitative and quantitative data either simultaneously or sequentially (Mertens, 2019).

Chapters 1 and 2 saw student engagement described as a multifactorial complex, unique and personal experience. Engagement is thought to be a socially constructed concept, experienced in different ways, in different contexts, by different students. Therefore, the constructivist paradigm best fits the qualitative exploration of students' engagement, as it allows interpretation of social reality as it is viewed by the students.

3.3 Qualitative methodology

Qualitative methods are used over quantitative methods when the phenomenon being studied is either a new concept, is complex or sensitive in nature, or is deeply rooted within a personal experience. In these circumstances qualitative methods allow the research to be explorative,

responsive, adaptable and sensitive, in order to unpack an individual's experiences (Ritchie et al., 2013). In the context of this study, student engagement is both a deeply rooted complex and sensitive phenomena.

The qualitative approach facilitates interactions between the researcher and participants which can assist the interpretation of the meaning of their lived experience and gain in-depth analysis of human behaviour or perceptions. Qualitative research acknowledges that reality is subjective, it is individually created and perceived by the human experience (Basit, 2010). Within the context of this study, students make sense of the engagement through their own experiences, and we cannot say what engagement is, only how some students see or describe it.

3.3.1 Qualitative case study approach

This study adopts a qualitative case study approach. Case study research involves an exploration of a phenomenon within its real-life context, with the aim of describing the phenomenon in-detail grounded in the perspective and accounts of participants (Ashley, 2012). The 'case' is usually a bounded system, such as time, place, activity or context. For this thesis, the phenomenon being studied is engagement, as experienced by MPharm students at one UK university, during one academic year.

Key features of case studies are that they are particularistic, descriptive and heuristic (Merriam and Tisdell, 2009). Particularistic refers to exploring a specific phenomenon, situation or event; in this study we are exploring the engagement behaviours and attitudes of a group of MPharm students. Descriptive in this context will be a rich narrative of participants' personal influences on their engagement. Heuristic infers that new knowledge will be obtained on student engagement and the impact of VLE engagement monitoring.

3.3.2 Qualitative data generation

Qualitative data is commonly collected through interviews, focus groups and observations, and the decision of the chosen qualitative research approach is largely determined by which is most likely to give you the best data to illustrate the research topic and answer the research questions (Ritchie et al., 2013). Interviews were the chosen data generation method in this study. This decision was based upon the capacity for interviews to gain a greater depth of focus and a detailed investigation into the individuals' context, personal history, experience, motivation and perceptions of engagement. Interviews also allow a more private setting, for topics which are personal or sensitive (Ritchie et al., 2013).

3.3.3 Case study sampling

Sample sizes for case study research can range from one to 50 participants, with little guidance on a minimum number required, and arguments supporting the value of smaller in-detail case studies, compared to over dilution in large samples (Dworkin, 2012). Data saturation, the point were no new information or themes are observed, may be used as a justification of sample size in qualitative research (Guest et al., 2006). However, data saturation cannot be determined until after data collection, so may not be used to pre-determine sample size (Boddy, 2016). Within this study, the proposed sample size was between 10 to 15 participants, as this was felt to give sufficient student accounts on engagement and there would be appropriate variation between cases. Other justifications for the sample size were benchmarking to sample sizes used by previous doctoral students, likelihood of recruitment numbers, and achievability of undertaking the interviews and analysis within the timescale.

Within the constructivist paradigm, a purposive approach to sampling is commonly used. Purposive sampling begins with consideration of the people or context where the phenomenon is most likely to be seen (Mertens, 2019). Participants should be sampled based upon those most likely to be able to provide thorough and in-depth answers to the research questions (Ritchie et al., 2013). Second, third- and fourth-year pharmacy students were selected as the sample population for this study, as these students would have experienced at least one full year at university. The first interview aimed to explore influences on their engagement, and the participants needed to draw upon their previous year(s) experience of university teaching, workloads, assessments, interactions with staff and peers, societies and social life. It was felt second, third- and fourth-year pharmacy students would be able to give more range, depth and reflection in their responses about university experiences, compared to first year students. There is already extensive literature on first year student experiences and transition to university (Mehdinezhad, 2011, Yorke and Longden, 2008, D'Lima et al., 2014, Freeman, 2009, Freixa-Niella et al., 2019, Krause and Coates, 2008). Therefore, it was felt that potentially the literature gap exists in exploring students in later years of their degree.

3.3.4 Recruitment

In October 2020, an email was sent to year two, three and four undergraduate pharmacy students at the study university. Attached to the email was an information sheet (appendix 1), giving further details of the study, including what participation involved, how their data would be used and stored securely, that participation was voluntary and how their identity would be protected. This resulted in a total of 13 students volunteering to participate.

As this study consisted of a longitudinal approach, of interviews at the beginning and end of an academic year, participant drop-out had to be considered. However, all 13 participants remained in the study and completed both interviews. It is thought this may be due to the reporting of VLE data

to students every 2-3 weeks, which kept participants interested and passively participating in the study, without being overly burdensome.

3.3.5 Interviews

An interview is a two-way conversation, that allows researchers the unique and valuable opportunity to step inside the mind of another person to experience and view their world, their beliefs, values, and attitudes (Ritchie et al., 2013). Two interviews were undertaken with each participant: one at the beginning of autumn term (October 2020) and the second at the end of spring term (March 2021). The first interview established students' baseline views on engagement and the second interview discussed their engagement journey over that academic year. Undertaking interviews at two time points allowed discussion of a wider range of circumstances that influenced their engagement, and to discuss any impact of the VLE engagement data intervention.

Semi-structured interviews were chosen as the interview framework within this study, to allow a flexible and responsive approach and thereby gain a detailed and unique understanding of the social phenomena from each participants' each own perspective and own priorities (Brinkmann and Kvale, 2015). Semi-structured interviews make use of pre-formulated open questions, with opportunities to ask follow-up questions or prompts linked to the responses to gain more elaborate in-depth responses. Interview questions were devised based upon the literature reviews (appendix 2 and 3). The first interview focused on Tinto's model of dropout/persistence, and explored the influences of family background, pre-university experience, motivation, goal and institutional commitment, academic and social systems and integration. The first interview also explored participants' attitudes towards attendance monitoring as a measure of engagement. The second interview, focused upon the participants' acceptability of their VLE data being collected and reported, the usefulness of this

data, and whether having the VLE data evoked a change in their thoughts or behaviour in relation to engagement. The second interview was an opportunity to explore the dynamic nature of engagement; the participants' engagement journey over the academic year, and how internal and external influences on their engagement changed over that time.

3.3.6 Piloting

The first and second interview schedules were piloted with two undergraduate pharmacy students, who did not take part in the main part of this study. The piloting tested the question understandability, acceptability, the question order and flow of the interview. Feedback from these two students was that the questions were mostly clear in their intention, and subsequently a few questions were re-worded or shortened to make them more student friendly. The two students felt the questions were not intrusive and would have been happy to disclose as much or as little information in their answers as they felt comfortable with. One student felt it would be useful to send students a rough interview guide before the interview, so that participants had time to prepare and reflect before the interview, rather than think of their answers on the spot. This was implemented and participants were emailed a list of topics that would be discussed in the interview a week before their interview.

One observation made during the piloting, was that the pharmacy students are very scientific in nature, so their answers were rather short and factual. Follow-up questions or prompts were added to some of the questions as a result. During the interviews periods of silence after asking the questions were extended to encourage participants to keep talking, and to be more verbose and narrative in their responses.

3.3.7 Interview process

Interviews were undertaken either face to face in a private meeting room on the university campus, or online via Microsoft Teams®. Interview location was determined by participants preference and COVID-19 lockdown restrictions. The majority of participants preferred to have an online interview, as it was more convenient with regards to time, no need to travel, and participants anecdotally mentioned they felt less awkward and more comfortable in their own home. Online interviews were also advantageous as they allowed video recording and auto-creation of interview transcripts. In-person interviews were voice recorded on a personal Dictaphone. After the interviews the voice recording and MS Teams® video recordings were saved on my secure university OneDrive and deleted from the Dictaphone and MS Teams.

Rapport building within an interview helps put participants at ease and establishes a relationship of trust, which facilitates the honest and open sharing of information. There is often a critical degree of rapport, between over and under-rapport (Basit, 2010). Lack of rapport, may lead to the participants resenting the intrusion of the privacy, fearing how their responses may be used, giving brief answers or cutting the interview short. Conversely, over-rapport can also be problematic, participants may give socially acceptable answers or exaggerate their answers in a bid to impress the interviewer. Several steps were taken to make sure participants were put at ease and to build rapport. Before the interview, participants were given the choice of interview locations (as described above). Participants were sent a brief overview of the topics that would be covered in the interview, to allow them to reflect, prepare and feel more comfortable about the subjects being discussed. For interviews taking place on campus, chairs were positioned so that the interviewer and the participant maintained eye contact and were a comfortable distance to each other. For those taking place via MS Teams®, computer notifications were turned-off and headphones were worn to allow full attention to the interview. At the start of the interview, participants were reassured of their confidentiality, that they

could refuse to answer any question they wished, and they could be as honest as they wished within their responses. During the interview, careful listening, responding, eye-contact and non-verbal mirroring, maintained interactivity and kept participants motivated and interested in answering questions and in as much detail and depth as possible (Basit, 2010). Before the second interview, the first interview transcript was re-read to familiarise myself with the participant and their previous responses. This allowed quick re-building of rapport in the second interview, for example demonstrating that the I had remembered they lived in halls of residence, or they had an older sibling at university, which made participants feel more valued and comfortable sharing their experiences.

With semi-structured interviews there is no need for equivalence or asking the same questions in the same way to all participants. Therefore, each interview was flexible and adaptive, dependent on participants' interpretation of questions, their personal experience, and the depth of their responses. The sequence of questions was also adapted to best suit the flow of the interview, with greater emphasis and time spent on certain questions that were more pertinent to the participant, and some questions were not asked if they are not applicable to that participant. The interviews ranged from 47 to 84 minutes, with an average length of 51 minutes.

3.3.8 Observation of Blackboard® engagement data

Within case study research, observations are commonly undertaken alongside other research methods, in order to gain a full picture of the phenomenon being studied (Basit, 2010). Collection and reporting of VLE engagement data allowed observation of the participant's engagement journey over two academic terms. Collection of the VLE data was not intrusive for participants, as they already routinely used the VLE, and the data was accessed without any disruption to them. All participants gave consent for access to this data.

In between the interviews, participants were emailed their VLE engagement data for each module every 2-3 weeks; detailing their time spent on VLE and total number of hits/clicks, alongside the cohort average (example in appendix 4). Before the second interview, participants were sent their data in a graph depicting their engagement over both autumn term (weeks 5 to 15) and the spring term (20-30). These graphs were discussed with participants during the second interview, to explore events that had led to changes in the VLE use at certain time points. These graphs are shown and discussed in Chapter 5.

The observer effect must be considered when considering the collection and reporting of participants' VLE data. The observer effect can mean that participants may modify their behaviour to please the observer, for example increasing their use of VLE. This effect is often seen in reality TV, where contestants are very aware and play up to the camera in the first few days. It has been shown that people being observed then become habituated and forget the are being watched within a matter of days (Basit, 2010). Therefore, although this is a consideration, it was assumed that participants could become accustomed to their data being collected and would forget they were being watched.

3.4 Data analysis

This section outlines the process of the transcription of the interview transcripts and the coding of the data into themes which answered this thesis' research questions.

3.4.1 Transcription

Transcription of interviews represents a change in medium, from verbal and non-verbal communication to a written script of what was said by whom. Care and attention to detail is needed to reduce any errors, such as simple typing errors or misspellings, or insidious errors from mis-hearing

or mis-interpreting what was said (Gibbs, 2007). In order to maintain accuracy and correct interpretation, all transcription was undertaken by myself as close to interview completion as possible, typically within one day to one week. This timeliness was crucial to remember what was said, for example if the sound was muffled in the recording, to remember the tone of the interview and sense of each students' character. Completion of the transcription by myself allowed use of professional understanding of technical terms used by participants students (such as module or assessment acronyms), thus increasing accuracy.

The process of transcription involved repeatedly listening to the audio recorded interviews to manually type the verbatim transcript. The recordings from MS Teams® automatically created a transcript, which needed thoroughly checking and editing, as often words or phrasing had been misinterpreted by the captioning software. Participants' natural speech was often not in well-constructed or grammatically correct sentences, for example there were pauses, repetition and filler words (e.g. umm, kind of, like). Participants also used slang terms or abbreviations. Despite the temptation to tidy-up or correct participants' responses, full verbatim transcription was undertaken to have a true version of what the participants said and how they said it.

Sound quality and participant accents occasionally made it difficult to accurately transcribe the interviews. In these incidences, the recording was re-listened to multiple times, and sentences before and after were used to help understand the context. In one instance, a participant was contacted via MS Teams to listen to the small segment and confirm the transcription. In addition to the written transcription, audio recordings and MS Stream videos were also listened and watched to note participants' expressions and tone, such as humour, sarcasm and emotion for certain topics discussed. Transcripts were double checked for punctation to ensure meanings were an accurate reflection of a participant's response and sentence structures had not been inadvertently altered.

3.4.2 Coding

A code is defined as *"a word or short phrase that symbolically assigns a summative, salient, essence-capturing and/or evocative attribute for a portion of language-based or visual data"* (Saldaña, 2021, p. 2). Coding can be described as a stepwise iterative procedure to describe, classify and interpret data (Creswell and Poth, 2016). The first step of coding involved listening/watching and reading all the interview recordings and transcripts to fully immerse myself in the participants' accounts and to gain an overall sense of the interviews and participants. Each transcript was examined for any contradictions, responses with possible multiple meanings and how the participant's tone or body language may have affected the meaning of their responses. Each transcript was then re-read line by line, to systematically and rigorously categorise the data into codes. Coding was undertaken within the computer programme N-Vivo® (version 12), to allow easy dragging and dropping of participant quotes into each code (sample coding provided in appendix 10). This allowed retrieval of all the text coded with the same label to combine passages that are all an example of the same idea, activity or phenomena (Gibbs, 2007). Coding was completed using insight, intuition and impression, to select a code that best described and categorised the participant responses (Creswell and Poth, 2016). Some codes were derived from the exact wording used by participants (such as "being watched", "stress", "support") and others used broader terms (such as "study behaviour", "reflection"). Care was taken to ensure that data was not decontextualised, minimalised or superficially coded (Gibbs, 2007). This was achieved by repeated re-reading of the transcripts and observing what was said before and after the coded sections to check interpretations.

Themes are considered as manageable overarching sets of information that consists of related codes aggregated to form a common idea (Creswell and Poth, 2016). Key themes had been pre-determined based upon Tinto's model and the COM-B model, and the codes described above formed sub-categories of the deductive themes (figures 7 and 8). The most commonly accepted approach is that data analysis is stopped when no new information emerges with additional data analysis (Mertens,

2019). Coding was initially undertaken sequentially; all the first interviews In November-December 2020, then later the second interviews in April-May 2021, and then horizontally across all transcripts to ensure all codes had been identified. Codes and themes were then examined, to confirm that each code within that theme was appropriately allocated or whether it sat better in another theme, whether codes within each theme collaborated coherently and meaningfully, whether there were clear and distinguishable differences between themes, and whether the themes and codes accurately portrayed the essence of the student's stories (Braun and Clarke, 2006). A total of 46 codes were generated.

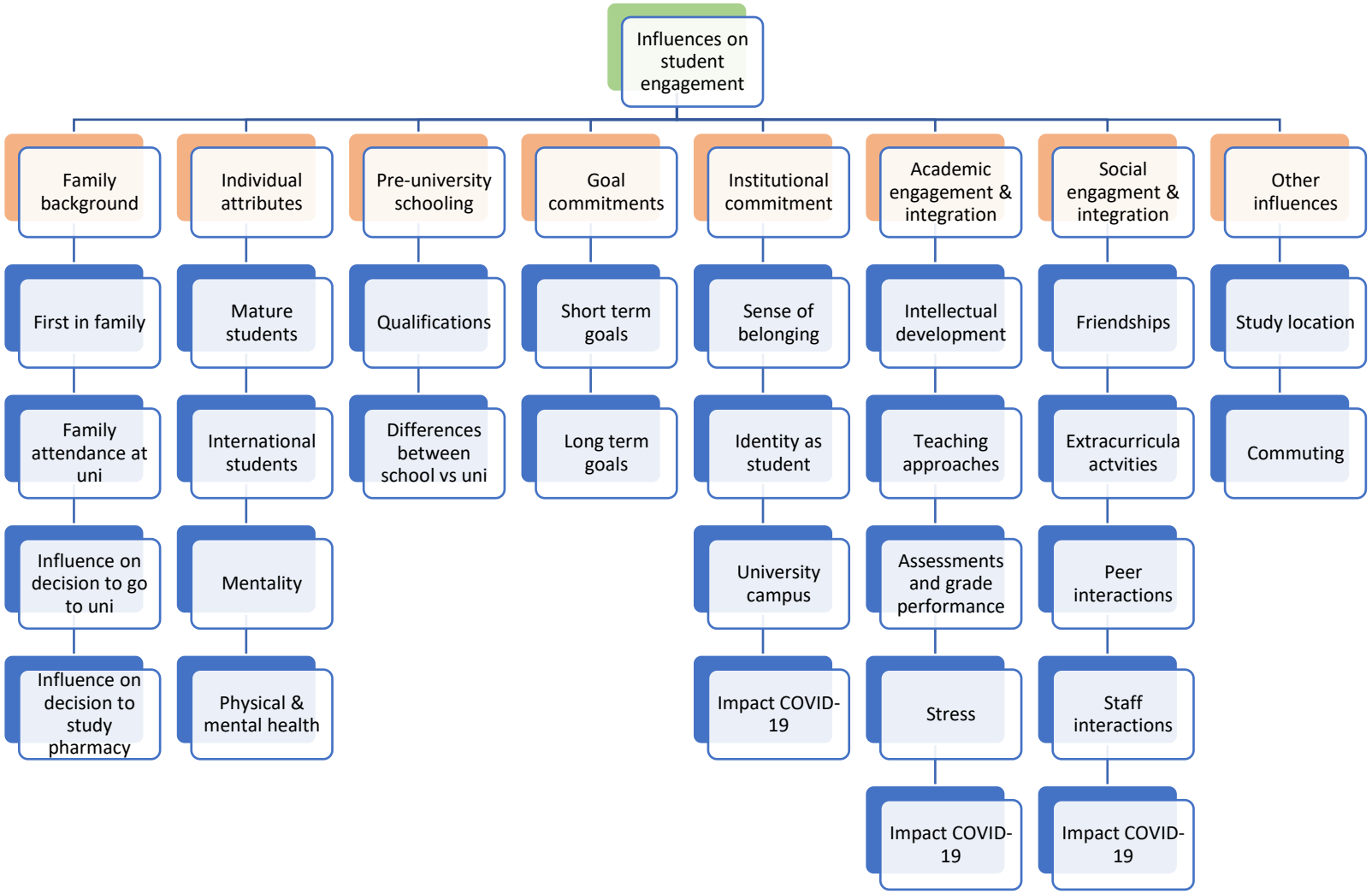


Figure 7: Themes (orange) and codes (blue) related to influences on participant engagement

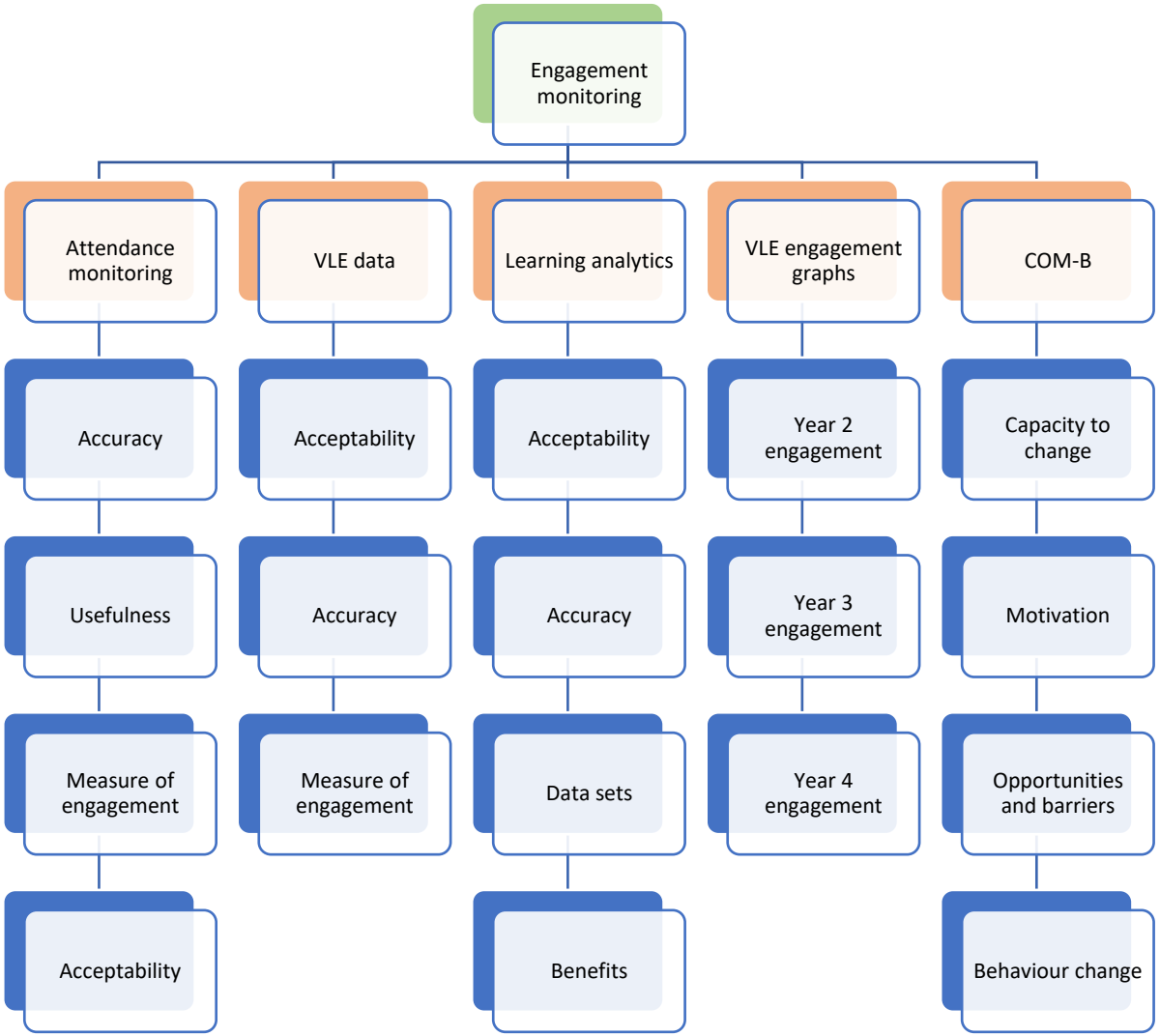


Figure 8: Themes (orange) and codes (blue) related to monitoring of engagement

3.4.3 Quality assurance during analysis

Quality assurance can be achieved through validity, credibility, authencity and confirmability (Mertens, 2019). Validity was established through adopting a systematic and thorough process to the transcription and analysis process. Credibility was ensured through checking that the themes and codes portray the participants' view as accurately as possible. Confirmability can be proven by describing the reasoning used to interpret data, and that qualitative data can be tracked to its source. Authenticity is demonstrated by the presentation of a balanced view of all participants' values and beliefs. This is imperative in the next chapter, where careful consideration was made to ensure that all participant voices are fairly and accurately represented.

An approach to increase validity is to send the transcript to participants for checking of accuracy (Rowlands, 2021). However, others argue that if the transcription has been completed accurately and thoroughly checked using the recordings, then this step is not needed for validity and can in fact bring in errors. For example, getting participants to view their transcript may lead to them changing their response, or asking for something to be removed, which may then lose or adapt the meaning of what they said or change the whole context of the interview. A participant's recollection of the interview will never be as accurate as listening to the interview recording. From a constructivist standpoint, the interview captured their beliefs and opinions on the day of the interview, and therefore should not then be altered if their opinions have changed several days or weeks later (Basit, 2010).

3.5 Ethical considerations

Ethics is at the heart of research, and studies must be designed, undertaken and presented in a moral, genuine and trustworthy manner (Basit, 2010). Ethics is the essence that participants are treated fairly and that I as a researcher have an ethical conscience and always put participants interests at the centre

of decision-making (Ritchie et al., 2013). This section will consider my ethical responsibility and the ethical implications of undertaking insider research. The ethical considerations before, during and after the interviews will also be discussed.

3.5.1 Ethical responsibility of the researcher

Four key ethical principles; autonomy, beneficence, non-maleficence and justice; should be an integral part of research planning and implementation (Beauchamp, 2007). Each of these will be considered below with their application to this study.

Autonomy is respecting the participant's freedom and choice, appreciating their capacity and perspectives, respecting their right to hold certain views based on their beliefs and values. Within this study this involves participant's free choice to participate, informed consent, listening to their accounts and talking about their engagement or non-engagement in non-judgemental way.

Beneficence is maximising good outcomes and the moral obligation to act for the benefit of others. This involves ensuring participation is useful for the students, for example for providing participants with their VLE data and prompting them to self-reflect on their engagement behaviour.

Non-maleficence is minimising or avoid unnecessary risk or harm, preserving the dignity and confidentiality of the participants, not causing any emotional, psychological or physical harm. Participants were consistently reassured of their anonymity, and that they should only share information they felt comfortable to.

Justice is ensuring research practice is carefully planned, rational, fairly undertaken, and non-exploitive. This was achieved through robust research design, considering all consequence of the research and taking all possible steps to protect privacy and minimise any risks. This also included ensuring the sample population was the most suitable and representative, and that a sufficient sample size was used.

3.5.2 Ethnical considerations: gaining informed consent

It is essential to gain voluntary informed consent before commencing any data collection (BERA, 2018). Participants should be fully informed on what they will be asked to do and for how long, what will happen with any information they give, who will use this information and how it will be used, how it will be stored, shared and reported, before giving consent (Graham et al., 2007). All this pertinent information was contained within the participant information sheet sent to the students in the invitation to participate email (appendix 1). This means participants freely volunteered to participate without any inducement or coercion and there were no repercussions if they did not wish to participate or wished to withdraw from the study. Participants knew why they were selected/approached to take part and intended purpose of the research. All participants in this study were aged over 18 years and had the mental capacity to understand what their participation involved and gave their consent, through signing a consent form (appendix 5).

3.5.3 Ethical considerations: interview process

During the interview, good ethical conduct is imperative. This was achieved through the interviews being undertaken at an unpressurised pace. For example, participants were given time to feel at ease, think about their answers, and given the opportunity to fully and honestly express their views. Care was taken to ensure the questions were not leading, badly worded or could cause any distress to

participants. Piloting of the interview questions confirmed that the questions were acceptable and not intrusive or leading.

During the interviews, some participants disclosed very personal stories about events that negatively influenced their engagement. Participants were re-assured throughout the interview to only share what they felt comfortable with, and if they wished to change the subject, decline to answer any question or stop the interview that was totally acceptable. It was decided to only give very limited details of participants' personal events with this thesis, and to maintain the focus on the resultant impact on their engagement, rather than what the event was.

Although participants only shared what they felt comfortable to, there was the potential that reflecting of their engagement and personal events may have caused distress. In order to prevent any distress and to support participants a post-interview guidance sheet was distributed to all participants at the end of the first interview (appendix 6). This guidance sheet signposted participants to university and external services to support their wellbeing or any difficulties they may be experiencing.

3.5.4 Ethical issues encountered during the study

In qualitative research, real-life experiences are complex, unexpected things happened, and decisions may have to be taken dynamically as the study evolves (Ritchie et al., 2013). Ethical dilemmas may emerge during the study that we cannot prepare for and must be considered on a contextual case-by-case basis. In this study, whilst monitoring the VLE data, it was observed that a couple of the participants'engagement with VLE had dramatically declined and remained low compared to the cohort average. Although I knew there were existing procedures in place within the department to identify and flag at students with poor attendance data (as described in Chapter 1). I was aware that attendance was not routinely being collected during the COVID-19 pandemic due to lack of in-person teaching. I was not confident that these participants would be identified by existing measures, and it was decided not to passively watch them struggle. These two participants were emailed and were

strongly encouraged to discuss any issues with their tutor or the university welfare team. Within the second interview, these two participants discussed these drastic changes in their engagement and the support they had received from their tutor, academic members of staff, family and friends.

3.5.5 Data protection and anonymity

Data protection, storage, access and reporting are all key ethical considerations. Following the interviews, the recordings and transcripts were always stored securely, on a privately owned secured network drive, which was only accessible by myself. The recordings were then deleted from the Dictaphone and MS Teams®. Once transcription was complete, all recording saved on the network drive were deleted. Participant responses were discussed with doctoral supervisors but only in broad terms and no participant identifiers were given.

All participants had the right to privacy and anonymity, which was achieved in the form of pseudonyms and removal of identifiable information when transcribing. When presenting the results, any distinguishable background details were excluded and care was taken so that any quotes did not contain any unique information that could possibly identify participants.

3.6 Insider research

Professional and educational doctorate researchers commonly conduct their research within their workplace (Drake and Heath, 2008). This is classed as insider research, which is thought to beneficial as the researcher is embedded and immersed with the research context (Sikes and Potts, 2008). However, there are several ethical concerns related to insider research, specifically the researcher's influence on participants and the potential impact on the workplace. How this relates to the pharmacy student participants and this university will be discussed below.

3.6.1 Insider research: ethical responsibility to students

Care was taken to ensure that the position of myself, as a lecturer, did not influence students' decisions about whether to participate. This was achieved by stating within the recruitment email, the information sheet and consent form that participation was voluntary and there were no repercussions if students did or did not take part, and that students could have withdrawn from the study at any point. At the beginning of each interview, participants were reassured about the confidentiality of their answers, and they could be as open and honest as they wished. It was important to make clear to participants that this research was unconnected to any discussions, meetings or correspondence regarding engagement with their tutor or the Director of Teaching and Learning. Ethical approval to undertake this study was approved by the Institute of Education Ethics Committee (appendix 7).

Attention was also taken to minimise insider influence through the sampling process. The mainstay of my teaching on the MPharm degree occurs in the spring term of year 4. The participating students should have only encountered me in a small amount of teaching in years 1-3. Therefore, they were not overly familiar with me, and I had no pre-formed ideas or knowledge of these students. My academic tutees were excluded from the study, due to potential conflict of confidentiality. To eliminate insider influence, I could have considered sampling students from a differing department or differing university. However, this would have limited the understanding of the pharmacy student education experience and MPharm course and it would have prohibited access to participant VLE engagement data.

Another consideration with insider research is the power dynamic within the interview. Where the position of the interviewer, as an authority figure may have influenced the participant responses. However, Basit (2010) argues that both the interviewer and the interviewee have a position of power.

The interviewer may have guided the interview, asked the questions, and possessed a prior understanding of the research issue. The participants, as interviewees, also have a power status. The participants were the information-holders, and they determined how much they wished to share and how honest they were.

3.6.2 Insider research: ethical responsibility to the university

When undertaking research there is often ethical responsibilities to sponsors, clients and stakeholders (BERA, 2018). Whilst this research was not funded, the university enabled this research by allowing access to students and VLE data. The university also had an interest in the success of the research and completion of my doctorate studies. Despite my duty to the university, as a researcher my ethical responsibility was to fully and truthfully report the findings, even if these may have been detrimental to the reputation of the department or university. Permission to undertake this study and recruit pharmacy students was sought from the Head of the Department of Pharmacy. This included explaining to them the study purpose, data to be collected, from whom and how the data would be used (appendix 8 and 9).

3.7 Objectivity, subjectivity and reflexivity

Within methodology we must consider how the researcher's values and beliefs may have shaped the research design, analysis and presentation. As discussed in Chapter 2, this study adopted a constructivist standpoint, therefore objectivity and detachment from values and beliefs is neither achievable nor desirable. Rather subjectivity and fully embracing the influence of the researcher, can be beneficial in social research, as it facilitates thorough and intuitive research outcomes (Cohen et al., 2018). Whilst others argue, that reflexivity, the ability to reflect and acknowledge the impact you may have on the research and take appropriate actions to control or minimise this effect leads to more

reliable and trustworthy findings (Loxley and Seery, 2008, p.16). Reflexivity ensures transparency and that research is not biased by preconceptions.

Firstly, to reflect on my motivation for choosing this research topic. Throughout the past 12 years I have experienced numerous students struggling to engage at university, feeling like they don't fit in and considering dropping out. I have taken the time to listen to them, learn about their situations and support them to stay at university. However, I am only one person, and I am aware of my boundaries and the need for all students to be supported. As a part-time doctorate student, I have been able to further empathise with our students. For example, experiencing imposter syndrome, fear of failure, and struggling to manage competing commitments. My motivation for this study was to further understand the complex and unique influences on students' engagement. Through this understanding my ambition is for the department and university to effectively support students, their engagement, sense of belonging and academic success. Despite this motivation to have an impact on students, all aspects of this research will be reported and not selectively reported to fit my own agenda.

An awareness of the researcher's life experience, values, beliefs and position must also be considered. I come from a middle-class, white background, and have never experienced racism or financial difficulty. I have always felt autonomous and fully supported by my family in educational choices and career decisions. As described in Chapter 2, individual attributes and family background both have an influence on student engagement behaviour. Therefore, I must be aware that my background and life experiences will be different to the participants and be fully open to listen and understand their lived experiences.

3.7.1 Minimising bias during data generation and analysis

Researcher's values and beliefs cannot and should not be disregarded, but rather being aware of the influence of these pre-depositions and critical self-questioning of influences at multiple timepoint throughout the study can avoid any bias (Coe et al., 2021). This will be considered with regards to interviewing and analysis of the data.

Interviewing is a largely subjective experience, with a risk of bias determined by how the questions were worded, how they were asked and how they were responded to. This bias was minimised through shaping the interview questions based upon the literature, gaining ethical approval for the interview questions and piloting of the interviews to gain student's perspectives of fairness of the questions. It was important to have an open mind for each interview, and not to have preconceived notions about students or engagement.

When coding the interviews, the aim was to analyse participant's words and expressions to understand their thoughts, experience or meaning. However, "*Words are given a meaning by their creator. But anyone who receives that communication can absorb, amplify, and even change its original intent"* (DeCarlo, 2018, p.14). Despite, re-watching and listening to the recordings, attempting to understand the students' responses, I cannot fully guarantee that I did not absorb, amplify or change their responses. However, assurances were made by the systematic and transparent approach to coding, the use of deductive codes derived from the literature, but also being fully open to new emergent codes. Whilst coding I continually self-checked that codes were assigned consistently, fairly, and as accurately as possible portraying each participant's story.

Throughout this research, I felt I was always reflective and receptive to new thoughts, knowledge and concepts, and took great care to avoid pre-empting the findings (Smyth & Holian 2008). The purpose of this research is the generation of knowledge, not the outcome.

3.8 Presentation of results

Within Chapters 4 and 5, findings are presented, grouped by the key themes described in figures 7 and 8. Findings will be presented as instances experienced by just one student and any shared experiences.

Within Chapter 4 participant responses are presented as one collective case study. Chapter 4 focuses on their responses to influences on engagement, and during analysis no significant differences in responses were found between year 2, year 3 and year 4 participants, i.e. year 4 participants gave similar responses about academic engagement to responses given by year 2 and 3 participants.

Within Chapter 5 participant responses regarding the VLE graphs have been separated into the relevant year groups. The rationale for this is that each year group of students have differing teaching loads and assessments throughout the academic year. For example. Year 4 pharmacy students undertook an independent research project in the autumn term (weeks 5-10) so did not routinely use the VLE during this time. In spring term (weeks 20-30) year 4 students had a much larger proportion of teaching and teaching material on the VLE.

Although the intention was to focus upon influences on engagement in the first interview, and perceptions of engagement monitoring within the second interview. There was overlap of discussions

within both interviews. Therefore, in Chapters 4 and 5 participants' quotes will indicate within which interview it was discussed (IV1 or IV2).

It was vital when presenting the results that each participant is seen as their individual person throughout this thesis and their stories are brought to life, rather than just as a minimalised description of their responses or a list of their quotes out of context (Radina, 2018). Comparison across participants allows us to explore how engagement varies between students, to consider and describe any patterns, similarities and differences. Although participants may share common aspects of engagement, their view of these will be shaped differently by each student's context such as social background, personality, relationships with others (Gibbs, 2007).

3.8.1 Participant pen portraits

After the interview, participants were given a pseudonym which matched their gender and ethnicity, and a pen portrait was created (table 1). The pen portraits aim to introduce the participants, giving demographic details and relevant background information, such as whether they were the first in their family to go to university, if they are an international or mature student and how close they live to campus. This detail around the participants is valuable to understand their influences on engagement detailed in Chapters 4 and 5.

Pseudonym	Year of MPharm	Gender	Demographic details	Pre-university qualification	University living arrangements
Adriana	2	Female	International student Second of siblings to go to university.	International Baccalaureate	University halls of residence.
Charlotte	2	Female	Mature student Third of siblings to go to university	Pharmacy Foundation Course	Lives independently Commutes to university (30 mins)
Harjot	2	Female	Third of siblings to go to university	A-level	Shared house close to campus (5-10 mins)
Krishan	2	Male	First in family to attend university	A-levels	Lives with family Close to campus (5-10 mins)
Jane	2	Female	Mature student First in family to attend university	Access course	Lives independently Commutes to university (45 mins)
Yousef	3	Male	Moved to the UK at 16 years old to complete A-levels Father is a doctor Second of siblings to go to university	A-levels	University halls of residence

Zara	3	Female	Both parents attended university Relative is a pharmacist First of siblings to go to university	A-levels	Shared house with other pharmacy students Close to campus (5-10 mins)
Marie	3	Female	International student Second of siblings to go to university	Diploma of Secondary Education (comparable to 3 A-levels)	Shared house, close to campus (5 mins)
Uma	3	Female	Sister is a pharmacist Second of siblings to go to university	A-levels	Shared house, close to campus (5 mins)
Evie	3	Female	Parents in healthcare roles Second of siblings to go to university Took a gap year	A-levels	Shared house with other pharmacy students Close to campus (5 mins)
Georgia	4	Female	Moved to the UK at 8 years old Second of siblings to go to university	A-levels	Lives with family Close to campus (10-15 mins)
Maya	4	Female	Second of siblings to go to university	A-levels	University halls of residence
Bruce	4	Male	Mature student First in family to attend university.	BTEC	University halls of residence

Table 1. Pharmacy student participants pen portraits

3.9 Chapter summary

This chapter has outlined the constructivist qualitative methodology adopted in this thesis. The process of participant recruitment, interviewing, piloting, and data analysis was described. Ethical considerations, including informed consent, interview conduct, data protection and insider researcher were explored. Recognising and minimising the researcher's influences on the study's methodology were discussed and reassurance given on processes undertaken to minimise influence and bias. The participating 13 undergraduate pharmacy students were introduced, with their background characteristics.

Chapter 4: Results

4.1 Chapter introduction

The next two chapters outline the main results of this thesis, to answer the following research questions:

Research Question 1: According to Tinto's model of dropout, what are the key influences on engagement for pharmacy students?

Research Question 2: What are pharmacy students' perceptions of the use of data to monitor their engagement?

Research Question 3: Does the VLE engagement data collected in this study accurately portray students' academic engagement throughout an academic year?

Research Question 4 How does being presented with their engagement data influence students' ideas or actions relating to engagement?

Within each chapter, key findings will be presented, alongside direct quotes from participants to illustrate each finding. Chapter 4 focuses on the first research question and will present influences on pharmacy student engagement. Chapter 5 will address research questions 2-4, as these collectively represent participants' view on the use of data to monitor student engagement and the influence this may have on participants' engagement behaviour.

4.2 Influences on student engagement and persistence at university

As set out in Chapter 2, Tinto's model (figure 1) outlines components that predict whether a student will engage and persist at university. Within this thesis, Tinto's model was used to deductively theme the participants' responses on the influences on their engagement at university. The following six sections will address the key domains in Tinto's model: family background, pre-university schooling, students' individual attributes, goal and institutional commitments, academic integration, and social integration. For each domain the influence on participants' engagement will be outlined. As mentioned in the introduction and methodology chapter, COVID-19 dramatically changed the way students were taught, their study behaviour and limited their sociability. Therefore, the impact of COVID-19 will be included within the academic and social integrations sections where applicable.

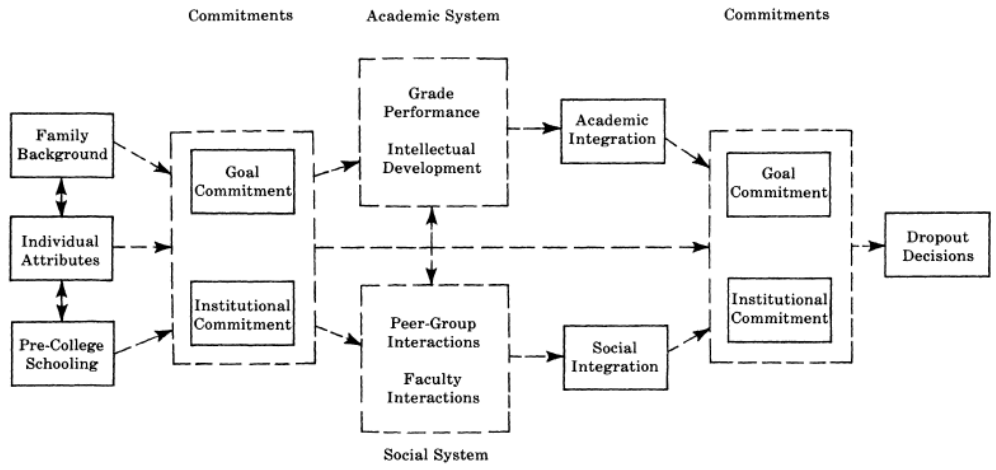


Figure 1. Conceptual model for student dropout from US College (Tinto, 1975)

4.2.1 Family background

Three of the 13 participants were the first in their family to come to university: Jane, Bruce and Krishan. For Jane, going to university and becoming a pharmacist was a long-held ambition. Jane was

unable to study science subjects or attend university when she was younger due to the culture and her family situation at that time. However, after several years' experience working, Jane was finally in a position financially to leave her job and fund herself at university. Jane demonstrates a high commitment to being at university and achieving her aim of becoming a pharmacist, completely independent from her family background.

> I've always been interested in chemistry and pharmacy, so I wanted to do it at school. But as a young lady in the late 70s, early 80s, we weren't allowed into the laboratories, we were taught housekeeping type skills, so it wasn't an option. And financially I just couldn't, my father was a coal miner so the chances of going to university were nil …. I've always wanted to be a pharmacist. So, I retired early and I decided that I would become a practicing pharmacist. I'm going to buy and run a community pharmacy.
>
> Jane IV1

Krishan describes being the first to attend university as setting him apart from his family, and his own personal drive to learn and better himself. His family are supportive of this time at university, and this supports his engagement and persistence.

> I decided to come to university because it's like, it's something that first of all my Mum and Dad didn't do. My Mum and dad didn't go to university and neither did my brother or sister. My relatives always told me that you need to do something that when you get out of bed in the morning you actually want to get up and do it. So, for me doing pharmacy was like something that I really wanted to do. I don't ever look at my studies as a chore. It's like wow, I'm just increasing my knowledge and I'm learning cool stuff.
>
> Krishan IV1

For Bruce, the lack of his parents' or family influence on his decision to come to university and his persistence at university, is a significant cause for concern regarding his engagement and commitment to the course.

> There's nobody in my family who's got a degree. My mum, she used to be a child minder, my dad's a joiner. And everyone else in my family is just brick layers, plasterers and mechanics. So, when I left school, I was never pushed towards going to college. I think because maybe nobody else in my family has an education like from university, nobody has ever seemed too bothered …. If I dropped out, I think my family wouldn't mind if I dropped out, they've said before.
>
> Bruce IV1

For the other 10 participants, there was a strong influence from their family on their choice of studying pharmacy and going to university. The reasons for this varied from role-modelling by older siblings at university, to the influence of parents working in healthcare settings. For Asian and international participants, the cultural expectation of going to university and obtaining a degree to get a reputable occupation, was a strong influence on their engagement and success at university.

> I have three siblings and they all went to university. They're quite a bit older than me, so when I was young, they were at university. So, like university was always going to be part of the plan.
>
> Harjot IV1

They've [parents] both got degrees, so you're more likely to go. And they would kind of be quite disappointed, if I didn't go to university, I think any parent, if you've gone to Uni, you probably want your kids to go to Uni too.

Zara IV1

They [parents] both work in healthcare, so like I've always grown up in that environment, even when I was younger I always wanted to kind of work in hospital. So it's influenced me a lot. And they were always quite keen for me to go to university, and like recommended that I did something where I would be able to go into some sort of employment.

Evie IV1

It's like basically expected in our culture, like everyone after school goes to university. They really value education, like you have to study, you have to make something of yourself. The idea of not going to uni is a bit unheard of.

Adriana IV1

Because I'm Asian background, like the thing is to go do medicine or something like that, if you're not a doctor or a pharmacist or anything good, then you're pretty much a failure. And, so my sister is also a pharmacist as well. So I guess there was always this pressure on me to do something you know, in the medical field.

Uma IV1

Marie and Yousef both mentioned making their parents proud as a motivator for continuing to be engaged and succeeding at university.

> Definitely making my parents proud because they came here with like no education. So then I feel like they raised me to feel like I need to do something good in my life.
>
> Marie IV1

> My biggest motivation would be that I don't want to let my parents down, especially my dad 'cause he's paying so much money for me to be here, all the international fees, lawyer fees, I don't know what other fees. And I know how difficult it is for him to have me in a different continent. So I feel like I should at least reward him with good grades. That's my biggest motivation.
>
> Yousef IV1

These findings suggest that for most participants family expectation or role modelling, influenced their choice to go to university and to study pharmacy. Family support during their time at university encouraged participants to continue to be engaged and succeed academically.

4.2.2 Pre-university schooling

Bruce, Charlotte and Jane are all mature students who made their own independent decision to study at university. They were able to achieve this through BTEC, foundation and access courses respectively. Bruce and Charlotte describe how having time away from studying and coming to university via non-traditional routes was challenging and described having to work harder to be at the

same level as other students.

> I feel like a lot of other students because they've gone to college and then straight to university, they've got an advantage that they can do exams and they know how to study already. Whereas because I've had so many years out and when I did go to college, I did a BTEC, so I did no exams ever, it was just practical based assessments. Then when I've come here I feel like I have to do a bit more. I think I have to study for longer because I don't have that experience that they have.
>
> Bruce IV1

> The first few weeks was very overwhelming for me. I thought “what have I done?”. Um, not having been in education for so long. And it was a new way of learning, and the amount of content as well. I knew it wasn't going to be easy.
>
> Charlotte. IV1

For Jane, her experience within her access course had been a small, dedicated group of students. Jane found adapting to the much larger groups sizes at university a daunting experience which negatively influenced her engagement.

> [in the access course] there were just six of us and you almost got one to one tuition and we were very friendly as a group of students. When I first arrived at this uni, I found really hard the fact that there were so many students. That there are 170, it was just really overpowering, and sometimes I didn’t go lectures, just because the groups were too big.
>
> Jane IV1

Participants coming from the traditional background of A-levels to university, also described key differences between school and university. For example, different teaching styles, lack of feeling comfortable to ask questions, getting lost within the larger cohorts, lack of accountability, and long teaching hours, all potentially being detrimental to their engagement.

> At school, I used to be able to say my thoughts, and ask a lot of questions in class, like if I don't understand I can stop the teacher and be like “oh, can you please repeat that? Can you please explain that?” But at uni, I can't do that 'cause like I don't want to stop the lecture at midway in front of 200 people, asking them to tell something again. I found a big difference with the teaching here, and I found myself like not being able to study in the beginning, finding it difficult, I didn't know how to really engage with it.
>
> Georgia IV1

> There is nobody here asking you have you done your work? have you done this or that? It’s just you and you're responsible for yourself, in terms of my schedule, and studying. And ‘cos the class sizes are much bigger, you know, over 100 people in one room. It kind of becomes less personal because it's at school normally your teacher would recognize your face, know your name, but in Uni they are less likely to recognise your face or even know your name. You kind of become like anonymous, and if you're not there may be no one would notice.
>
> Maya IV1

> There were lots of 9am to 6pm and obviously you've only done like 9am to 3pm, so the longs days trying to pay attention and stay engaged, were pretty intense. And there's like a picture of me, one of my flatmates took it where I was asleep with my jacket and my rucksack on, like I was just exhausted.
>
> Zara. IV1

The above results demonstrate that all participants, whether from the traditional A-level, or the BTEC and access route, faced challenges when starting at university. All participants could remember and describe their feelings and experience during the first few weeks or months settling into university.

4.2.3 Individual attributes

Jane, Bruce and Charlotte all discussed how being a mature student influenced their academic and social engagement, motivation and sense of belonging at university.

> I do feel a bit of a Granddad. And when I go out with my uni friends, I don't feel like I'm probably joining in because I'm not getting absolutely hammered. So I don't feel like a student in the terms of like lifestyle, and fitting in, you know.
>
> Bruce IV1

> When you're older you find that you're going to university for different reasons. I'm not bothered by the social side. I think of university as if I'm doing a job. I'm very disciplined, I put

> my phone away and plan my day to study from 8am to 6pm. I think I'm much more focused than other students.
>
> Charlotte IV1

Participants who were international students described their experiences of coming to the UK to attend university. Influences on their academic and social engagement included language barriers, differing cultures, missing family at home and making friends.

> I just struggled so much with understanding people, and I needed more time to understand their accents, it was definitely harder to make friends at first. And sometimes I get a bit homesick, and then it's hard for me to concentrate on my work because I just think about my family at home rather than just think about my lectures.
>
> Marie IV1

> it's very different from back home. In Jordan, all the shops and everything stay open until like 1am. So like sometimes, on campus and in town it's very dull, it's very quiet, it's a different culture to what I'm used to. But it's also been nice, like making friends with people from different cultures and different areas of the world.
>
> Adriana IV1

When participants were asked about the most influential factor on their engagement at university, all participants felt it was their own personal drive or motivation to study, that kept them most engaged at university and working toward their goal of becoming a pharmacist.

> I’m very passionate, when I decide to do something, I'm going to study and keeping going no matter what it takes me or how it's hard would be.
>
> Harjot IV1

> I would say just my own mentality and wanting to put the effort in. Honestly, the only thing that stops a student engaging is themselves. Like, the uni can try and force students to engage, by like making stuff compulsory and saying “if you don't attend you will fail your course”. But essentially, it's up to the student whether they actually want to attend and, whether they actually pay attention.
>
> Georgia IV1

Yousef and Zara both describe their competitive mentality and how this personally helps drive their engagement and attainment, to be as good as or better than other students.

> If your friends are doing well you kind of feel the pressure, you need to keep up with them. And one of my friends is really smart, and in some ways it's motivating, cause I'm always like I've got to do better, engage more.
>
> Zara IV1

> I have this competitive mentality that I have to be one of the best. So, if I see someone on the course that is doing better than me then I will actually study more just to catch up with them
>
> Yousef IV1

Many participants (Uma, Georgia, Bruce, Jane and Krishan) mentioned personal mental and physical health problems which affected their ability to engage with the course. This may have been one-off instances or recurrent issues that affected their engagement.

> Things like just happen randomly that throw you off balance, like sometimes people have like hidden illnesses. And people don't really realize that that really does affect your engagement. Like when I can't even get up in the morning and can't come into uni for example.
>
> Uma IV1

> in first year, I had some like problems with my mental health and that made my engagement academically really really difficult. Then I like got some help and stuff so it was starting to get better. But I think it still goes up and down.
>
> Georgia IV2

> It felt like, what I could only imagine like a mini heart attack. And because that was happening quite regularly, I spent most my days in bed, I missed quite a few practicals and workshops. It's better now, but at the time, I couldn't concentrate on uni work and really fell behind.
>
> Bruce IV2

These findings show a range of individual attributes influencing participants' engagement. Participants found being a mature student, an international student or experiencing mental or physical health issues, to be barriers to their engagement at university. Participants described their own self-drive to do well academically and become a pharmacist to be a key motivator for their engagement.

4.2.4 Goals and institutional commitments

All participants described both their short term and long-term goals that encouraged their engagement at university. Short term goals were typically focused on the next assignment, end of year exams, and for final year students graduating. For most participants getting good grades was seen as strong motivator to engage and study hard.

> I've always just kind of been someone who wants to do well academically. I think it probably stems from encouragement and maybe a bit of pressure from like family and teachers. I would be probably disappointed with anything below 2:1. So that is important to me.
>
> Evie IV1

> To be honest with you, grades are really important to me, like in each test you're like trying to a 2:1 or first. I remember spending hours and hours on coursework because I genuinely wanted the best grade possible. For me getting good grades at uni is incredibly important. Otherwise, I wouldn't have to go through all that effort.
>
> Krishan IV1

Whereas, for other participants (Harjot, Bruce and Jane), grades were described as being less important, and completion of the degree, regardless of the degree classification, was the higher priority.

> The marks don't really bother me. If I was to get a 2.2 or a third it wouldn't bother me because the end requirement is to run my own pharmacy. Nobody's going to come in and ask what grade was your degree. So it's not about scoring marks, it's literally about understanding and enjoying it and finding out more than I know.
>
> Jane IV1

Every participant had the same long-term goal of becoming a pharmacist and described this a constant motivation to engage and complete the course.

> Just getting to the end and achieving the qualification that will enable me to work as a pharmacist. That's what motivates me to get to the end goal. And the course is not easy, sometimes you know there's ups and downs. But just thinking about the goal, that I can be a pharmacist, gets me through this degree and that's what I want to do.
>
> Maya IV1

> You know I'm gonna be a pharmacist at the end of it. That's the goal when I started and that's still the goal. My career, and I guess financial stability. Having my degree and being a pharmacist, that's my main motivation.
>
> Charlotte IV1

Zara aspired to work for a pharmaceutical company, which is a very competitive career option. This motivated Zara to engage both within her studies and engage with opportunities that helped her meet this goal.

> Knowing how many other people are studying pharmacy and knowing the competition to work in industry is really high. So, I know I need to do better than them, like get a first, build my CV. In second year, I got this mentor, who works at GSK and just speaking to her really motivated me more. I really want to work there. So, I need to study hard to get there, it's my end goal.
>
> Zara IV1

Participants' short- and long-term goals were described to be key influences on their engagement. For all participants the goal of becoming a pharmacist was the most influential on the amount of effort and determination attributed to engaging and persisting at university.

4.2.5 Institutional commitment

All participants stated that they enjoyed being at university and strongly identified as a student. Key influences on their sense of belonging were an inclusive university culture, diversity of students, intellectual stimulation of the course and the campus environment at the university.

> I like learning things, I love learning from people who have done this research, people who are like this is something they've discovered, I'm like "wow, I'm sitting here in front of you and you're telling me about stuff that no one knew before you knew it". I feel like being at uni is a once in a lifetime, it's so different from anything else you're going to do in life.

Georgia IV1

> I enjoy everything about being a student. I enjoy studying, I enjoy the social aspect. I enjoy having something to do. I understand the ethos of the University and things, and I think that it's a very diverse university with lots of people from lots of different backgrounds, cultures. When I'm on campus I love how it flows with everyone being there.

Krishan. IV1

> I love being on campus, and just the whole university environment. Where everyone is students, and there are students of different ages, different backgrounds, it makes me feel kind of like that place where I belong.

Maya. IV1

Most participants also described the stark contrast of the university campus before and during the COVID-19 pandemic. For example, describing the campus as a "ghost town", with most shops and cafes shut, and social distancing restrictions in the library and teaching during the pandemic. In both their verbal and non-verbal cues, there was a sense of sadness around missing being on campus.

> It's really different. I haven't really wanted to go on campus because it just feels weird. Like a great part about being on campus in the past two years is everyone else is there. It doesn't really feel like a uni if there's no uni students.

Uma IV2

> I am definitely not happy seeing the campus empty because I miss seeing my friends, miss seeing people. Now when I go to campus I super rarely see people, most of the time it's empty.
>
> Marie IV2

These results show the importance of the campus environment and university ethos on participants' sense of belonging, and the detrimental impact of the COVID-19 pandemic on student institutional engagement.

4.3 Academic integration and engagement

This section will focus upon the influences on participants' academic engagement and integration. These were coded into: intellectual development, online teaching, impact of COVID-19, assignments and stress.

4.3.1 Intellectual development

All participants described that finding the pharmacy course intellectually stimulating, challenging, enjoyable and interesting was a key driver for their academic engagement.

> I enjoy what I study, I enjoy the course, and I enjoy doing the work. I'm learning about things that I'm very interested in. So for me it's motivating, I don't just want to finish uni with any degree, I wanna finish uni and feel like wow, I've actually learnt so much.
>
> Yousef IV1

I find the course is so like varied and there's so many different subjects. I love that having that range because I don't feel like I'm always doing the same thing all the time. A huge part of it for me is like actually liking what I'm doing, so I then want to put the effort in.

Adriana IV1

I find it challenging for sure. But it's in a good way. I don't think I should be doing a course where I know everything, or it's too easy. So for it to be challenging I'm finding it motivational, if it's hard then I have to go learn it, so I have to, do outside research and stuff like that. I think it is intellectually stimulating for sure.

Evie IV1

Some participants found differing parts of the course more intellectually stimulating than others, leading to varying degrees of engagement.

if I don't see how it connects to pharmacy, then I'm like, “nope” and I switch off completely. But, if it's something that I'm interested in and I can see the connection and I'm like, I definitely need to know this. Then I am like really intrigued and engaged.

Harjot IV1

It’s about 50-50. I prefer the science side of things, more than some of the pharmacy practice. That part is quite boring. If it's something I'm really interested in, then it’s easy to stay focused all the way through.

Yousef IV1

> I'd say it kind of depends what module you're working on. I think everyone just has like a few modules they just really don't like. I found the biology part really interesting. But the organic chemistry, I didn't like it and I didn't engage with it properly and I really struggled.
>
> Charlotte IV1

The above findings demonstrate that participants found the pharmacy curriculum intellectually stimulating and challenging, which encouraged their engagement. Participants demonstrated variable engaging with the different topics/modules within the curriculum.

4.3.2 Teaching approaches

All participants described how they found different teaching approaches and certain lecturers more engaging than others. Some participants described being selective with their attendance and engagement based upon what would be the best use of their time.

> Some of the lecturers make it extremely interesting, you know they bring life to the subjects. A lecturer can actually make or break a subject. So for example for, let's say, lecturer A, half of the students would attend, but for Lecturer B you'd see almost full attendance.
>
> Harjot IV1

> There's been some lectures where, I'm very embarrassed to say I have fallen asleep, but not even realised I've falling asleep. I've been daydreaming with my hand on my head and nodded off. So I think a lot of it's the lecturer's themselves, and whether they keep us engaged.
>
> Uma IV1

All participants described how interactive teaching, such as practicals, interprofessional learning and placements were much more engaging than didactic lectures.

> We have a lot of practical work and I think that this is the best part of a pharmacy degree. Because if we have only lectures and we do not have like in the interprofessional sessions, group work and placements, I don't think that I'd be so engaged.
>
> Marie IV1

> Lectures cannot just grab my attention and keep it for long. But when I know that I'm gonna prepare some medications myself or talk to real patients about their conditions, I'm more engaged with learning more. For me, it's about applying my knowledge in real settings.
>
> Jane IV1

With regards to online learning, most participants described finding the VLE (Blackboard®) easy to navigate and a valuable resource for their learning. Most participants described using Blackboard® to view lecture slides and recordings, in particular using them to use as a revision aid or if they were unable to attend the lecture.

I love having the lecture recordings on blackboard. Because I really struggle in lectures, I can't listen to someone talk and make notes at the same time. So, if I can listen to the recordings at home, I can make notes in a more detailed fashion, I can make notes in a better way.

Krishan IV1

Blackboard's good, it's a good way of accessing lecture slides and I really, really appreciate the recorded lectures. It makes life so much easier to catch up if you miss something. And the fact that like almost everything we do is upload it on to Blackboard is a lifesaver because I can just find things, especially if I lose like a sheet for a lab or something.

Adriana IV1

In my third year when I had my health problem, my attendance dropped like massively. Luckily though, because all the lectures were still available online, that was the only reason that I was able to keep up. If it wasn't for that, if my engagement was based mainly on attending lectures, so if there was content I couldn't get at home, only in the lecture, I probably would have failed.

Bruce IV2

These findings indicate that participants enjoyed the variety of teaching approaches utilised on the MPharm programme. Participants found interactive and experiential teaching approaches easier to engage with and found the VLE a useful and accessible resource.

4.3.3 Assessments and grade performance

Grade performance was a key motivator for most participants, with these participants associating higher levels of academic engagement with doing better in assessments.

> I feel like if your engaged with your work, then you're more likely to understand it, and do well in exams and coursework.
>
> Evie IV1

Zara describes reflecting on her grade performance in an assessment, and subsequently being more engaged.

> We had a practical and I got like 55% and I was like, “Oh, that's rubbish”. So obviously I was a bit disappointed. Then like it made me determined to do better, so I feel like this time when I did the practical, I was like really making an effort.
>
> Zara IV1

A few participants (Krishan and Yousef) also described how assessments forced them to be engaged and regular assessments maintained their engagement throughout the academic year.

> I think assessments greatly influence someone's engagement, because that is the point they are forced to engage with material and content. I think assessments put the pressure on a student to make sure they understand everything. And it’s completely dependent on

> pressure. If I haven't got a deadline, I'd say my engagement is pretty low. But when it comes closer to deadlines it's much more intense and I'm a lot more focused.
>
> Krishan IV1

Maya and Uma describe how assessments can be beneficial and detrimental for her mental health and engagement.

> There's always something to do, there's always an assignment or group work workshop to do. It can be good and bad. So like it's stimulating to be busy, but also like your whole life is just consumed by this course.
>
> Zara IV2

> I get so anxious like I literally bite all my nails off during each exam, it was so bad. I just know that I don't do well in exams. And it isn't because I haven't revised, it because it's an exam and I know that's going to impact things and then my head starts going all these places and I'm like "Oh God, panic!'. And then yeah, it just doesn't work out well for me.
>
> Uma IV1

These results illustrate how assessment performance was important to participants and encouraged their engagement with the MPharm programme. For some participants regular assessments kept them focused, whilst others felt overwhelmed with the assessment burden and associated stress.

4.3.4 Impact of stress on academic engagement

The majority of participants felt that stress was constant throughout their time at university and related to academic workload, group work and assessments. Most participants felt that low levels stress was beneficial to encourage them to engage academically.

> I think if the stress wasn't there I would probably never study. I think the stress is a good thing. I think it's more of a motivator, a healthy focus.
>
> Bruce IV1

> The stress isn't always bad stress. It can be quite good thing and you feel incredibly rewarded when you finished a massive essay or you've met a massive deadline.
>
> Yousef IV1

Some participants described that stress was experienced least in year one, as this year does not contribute to their degree classification. Levels of stress increased as a student progressed, with the most stress felt in year four as their exam performance directly influenced whether they graduate.

> It's very stressful, like trying to keep up with, to keep on top of your work. You guys give us a lot of material and then it just piles up and then when it piles up you start stress about it.
>
> Adriana IV1

> The biggest stressor has been the workload and feeling like I'm falling behind or feeling like you don't know what's going on. And the deadlines and assessments, you end up spending hours and hours on one assessment and then obviously preparing for the upcoming exams as well, that is a lot more stress. I would say previous years were stressful but I would say this

year [year 4] is more added stress because it’s the final year and if you are unsuccessful it can affect your graduation.

Maya IV1

I feel like from the time the course starts to when it ends in June, there's always a stress there. Like, there is never a point in pharmacy where I didn't have some degree of stress. and not worry about something that I should be doing. Like if you have like a billion lectures you need to be catching up on. There are periods of time where like you're doing so much in a week that you get burned out. It is stressful.

Georgia IV2

A few participants described stress as the least enjoyable part of being a student and that too much stress is more likely to make them disengage. Jane mentioned that being stressed as university appears to an accepted norm and that this should be challenged. Action should be taken to prevent the stress in the first place, rather than reactive mental health support for students.

For me being stressed doesn't motivate me. Stress is detrimental for me, it doesn't make me want to work harder, part of me just wants to give up. I think it’s not about helping students deal with the stress they have, it’s about not causing that stress or reducing that stress caused in the first place. But I don’t know how that would work because uni inherently feels like a stressful time because it’s a lot of things to do in a short amount of time.

Jane IV1

The results above show that the academic requirements of the MPharm put a continuous stress upon participants. Low amounts of stress were seen to be helpful to encourage engagement with a task, but often this stress built up and became detrimental to student engagement and wellbeing.

4.3.5 Impact of COVID-19 on academic engagement and integration

Almost all participants expressed a real pleasure of being able to come onto campus for teaching, compared to their peers on other courses studying solely at home. Participants found the purpose of coming onto campus was motivating, and they enjoyed seeing their peers and lecturers.

> I think as pharmacy students we were very privileged to actually still go on to campus whilst others weren't. I really liked going on to campus whenever we did. It was really motivating to go to and it was just really nice to just see other people, it was really nice to be able talk to someone.
>
> Adriana IV2

Due to social distancing and mask wearing, there was limited interaction between students and staff. Participants gave mixed responses on the impact of this on their academic engagement. Some participants felt this was positive in terms of less distractions and being more focused and engaged with their work. A few participants also appreciated a higher staff to student ratio and getting more individual attention from staff members. Whilst other participants reported not engaging due to difficulties hearing or understanding each other and they missed the usual liveliness of workshop sessions.

> Before [COVID-19] I used to chat with my friends all the time when I was in workshops, just because it was a chance to see them and chat to them, but I wasn't massively like focused. But now, I'm a lot more focused, just because there's a lot less people around. I feel like I'm getting more out of the teaching. And there's more staff about so I can more individualised attention from them.
>
> Evie IV2

> It's sad, 'cos it's completely lost the element of group discussion and seeing what other people think, which I think is important to our learning.
>
> Harjot IV2

Engagement with the asynchronous pre-recorded lecture screencasts was mixed amongst participants. Some participants were more engaged and liked the ability to stop, pause and rewind the lecture videos. This meant they could work at their own pace, had time to look up anything they didn't understand, or they could take a break at the mid-point of the lecture. International participants liked the caption function to assist their note taking and understanding what was being said. Some participants found the online delivery much less distracting than in-person lectures and they could just focus on their work at home.

> Before [COVID-19], some lecturers I don't really understand fully, because of the accent barrier. But now with the subtitles, it's very easy to read what they're saying. So I feel like I'm more engaged.
>
> Marie IV2

> I'm finding that because the lectures are online I'm getting like less distracted. Because I find when I'm in a lecture theatre, there are people coming in late and other little distractions. And I find the lecturers because they're recording the podcast at home that they can concentrate a lot more on what they're saying. And if I don't understand something like I can just pause it and kind of rewind it a little bit or just take a second to kind of process what they're saying or let me search something. So from a lecture point of view I'm actually finding it a lot easier to learn this year.
>
> Jane IV2

Other participants found there were more distractions when watching the lecture screencast at home, such as social media. A few participants missed the opportunity to directly ask a lecturer a question and found some of the online lectures less engaging and quickly zoned-out. There was also frustration amongst a couple of participants if lecture was uploaded late onto blackboard.

> They really didn't work for me. I would sit down and I would like be listening for the first 10 minutes. And then, I don't know if it's the fact I'm at home, or if it's because no one can see me, like no one's watching what I'm doing. And I have a second screen as well on my computer at home, so I just go on YouTube or start gaming. I find it really, really hard to focus, I zoned out like almost every single lecture.
>
> Georgia IV2

A key influence on student engagement with online learning during COVID-19 was student autonomy to choose when and where they viewed the lectures. For some participants this was beneficial, it allowed flexibility to manage their workload around other assignments or family commitments, work at a time and place that suited them best to study, and consequently were more productive and

focused. Participants who were commuters enjoyed the benefits of gaining that commuting time back to study.

> I would say it was good because you were able to kind of plan your day anyway you want to plan it. So normally you have to go in for a lecture from 9am till 6pm. But this way we could select the time, like if I wanted to do lectures in the morning I could, if I wanted to do lectures in the evening I could. And I could do different things, have more time to do different assignments or whatever needed to be done.
>
> Maya IV2

> If it wasn't COVID, I would still be travelling into uni and that would be wasting a lot of my time with the commuting. Whereas I could get up, go straight to my laptop and not have to drive 30 minutes, so I could use that time to actually do the work.
>
> Charlotte IV2

> I can log on wherever I am just and be able to do the work. My engagement I find is better because I find that I get less distracted. And I found that I have more time to do stuff because I don't have to like go to the lecture.
>
> Evie IV2

Some participants found this autonomy and lack of accountability detrimental to their engagement. These participants recognized that the previous structure of attending university every day had encouraged them to be engaged. These participants described struggling with motivating themselves, planning their workload, and found this responsibility stressful.

> Personally I don't really like having that much freedom doing that. Because I don't get motivated to study that much. I like procrastinating, giving myself excuses not to study. So in the previous years when I had to wake up at 9am and go into the lecture theatre, I just feel way more productive, because first of all I am waking up early and then I feel like I am doing something with my day.
>
> Yousef IV2

> It's harder because there's not something keeping you accountable. Like there isn't other people sitting around you that are engaging. There isn't a lecturer standing in front of you that you want to listen to. It's just you and a screen and at any point, you can decide if you really wanted to, to pause it and then go do something completely different.
>
> Zara IV2

Participants' engagement with the live online workshops was also found to be variable. Some participants found it was useful to have workshops that were timetabled, as it helped give structure to their week, gave them a break or re-focus from the other online learning, and there was a motivation to engage as they couldn't gain the learning elsewhere.

> I like the online workshop because they help with motivation. 'cos there is something happening, and you can't just leave and do it again later, I have to get up. And then I'm engaging with what's happening because I'm someone who will speak in a breakout room because I hate the awkward silence of just sitting there. Those have been good for motivation and engagement, and I've gotten a lot out of a lot of them.
>
> Georgia IV2

A few participants described enjoying the opportunity to virtually interact with other students and staff. Marie found the random allocation of students to breakout rooms, allowed her to get to know other students on her course that she otherwise would not have sat with.

> I actually really enjoyed them just because you actually would focus. And when you are put in breakout rooms with people you wouldn't particularly talk to normally, like it's just a different mix of people, it was good.
>
> Marie IV2

However, other participants talked about the frustration of students not interacting with each other. This may have been due to shyness, lack of accountability, or logging into the session but not engaging and doing something else. There were also issues with poor internet connection which made a couple of participants disconnect with the session, and when they re-connected, they had either missed key discussions or were put into a different breakout group.

> I don't find them as engaging, when you're behind your screen, it feels easier to sit there and not have to join in as much.
>
> Bruce IV2

> I feel like, even though you [the lecturers] are trying to put in effort to keep us engaged and to make it interesting, but I feel like it's not working. Because like people sometimes just get on and then leave their laptop and do something else. Or sometimes people are shy, they

> don’t want to say anything. Usually people don’t open their cameras or their microphones and they just like type things out. It’s annoying, ‘cos this our opportunity to interact but other students can’t be bothered.
>
> Harjot IV2

These findings demonstrate the significant impact that the COVID-19 pandemic had on participants’ academic engagement. Almost all participants enjoyed being able to come onto campus for face-face teaching and described the academic benefits (more focussed groups, better staff:student ratio) and social aspects (interacting with lecturers and peers). There was a mixed response with regards to engagement with online syncrohnous and asycrhonous teaching, with some participants enjoying the flexibility and autonomy, and others struggling to stay engaged.

4.4 Social integration and engagement

This section describes participants' social integration, their peer engagement and faculty interactions, and how this influences their university engagement and goal commitment. This will also cover the impact of COVID-19 on participants’ social engagement.

4.4.1 Social integration and friendships

Social integration at university involves making friendships, living with others and extracurricular activities. As previously mentioned within individual attributes, Bruce, Jane and Charlotte, who are mature students, described being more concerned with academic engagement and less involved with social engagement at university. However, for all other participants social integration was a core part of their engagement at university.

> For them [traditional students] their first year was like their party year. Whereas that's not for me anymore, you know, I'm here to study not party.
>
> Charlotte IV1

> I love being able to go out my friends and being able to live with them. I feel like I've actually made genuine friends that care about me and care about how I'm doing, so for me that's really important. I think like having good support and activities to do outside of studying helps me to stay here.
>
> Evie IV1

Yousef felt that social engagement was just as important, if not more important than academic engagement at university.

> The whole point [of university] is to honestly, just have a good time. So if I get a choice between, let's say getting 90% in every test but not having any amazing memories from uni or let's say getting a lower grade but having more memories - I'd go for that. Although education is really important for me, I feel like there's more to life than education and you want to make memories so that when you're growing older you don't think that oh what did I do in my life.
>
> Yousef IV2

Most participants describe a balancing act between socialising and studying at university. In particular, sometimes socialising too much and the potential detriment to their academic engagement.

> I feel like at uni I should live a little. So I need to study but then at the same time I'm gonna go out and see friends. I do usually try to have a work to-do list and have things that I need to get done, but it does usually end up being overtaken by like social things.
>
> Adriana IV1

> I want to have fun with my friends, but then I've also got this like mountain of work that I needed to get done as well. So I feel like trying to balance out, having a good social life with studying.
>
> Marie IV1

> I worked really hard in my first year. But found in 2nd year I spent less time in the library, I spent less time working just because I kind of got more into the swing of university and was being more social with my friends.
>
> Uma IV2

Living arrangements greatly influence participant's social integration. For example, Georgia lives with her parents close to the university, which she felt limited her opportunities to make friendships and gain peer support.

> I didn't have the experience of being in uni accommodation or living with flatmates and getting to know people that way. The only way I really got to know people was in the course. In the

> first year, it was weird, because at first everyone was super friendly. But soon after, everyone got in the groups or cliques and I felt isolated again. Um, it got better in second and third year, I started to make a nice group of friends on the course, I think probably due to group work.
>
> Georgia IV2

Zara and Harjot found that their flatmates were motivators and distractors to their engagement.

> Sometimes I'm probably not as focused because I'm enjoying hanging out with my flatmates. But then other times, if they're doing work, then I'm like, I really need to study as well. So I guess a bit of both, like in some ways it can increase, but in some ways it can like decrease my engagement.
>
> Zara IV1

> My flatmates can be quite helpful. Cause I tell them, "you need to kick me out the living room now, please help me to go and do my work". But also, they are a lot more chill about their workload, so it can slip into being less productive, the more I'm around them.
>
> Harjot IV1

Maya and Marie found living with flatmates that studied different and less content heavy courses, a potential source of tension. And that they sometimes missed out on socialising for the sake of studying.

> Pharmacy is quite a demanding course. So I'd wake up at 9am and then I come back maybe at midday to get something to eat. And you'll see the other flatmates just coming out in their pyjamas and it makes you feel mad because they just wake up anytime, it kind of reduces your engagement a little because you feel like jealous of courses that have less demanding schedules. Because you're always in lectures so you don't get that much time to socialize.
>
> Maya IV1

> My housemates study something different to me. So, they are not really useful for my engagement because they don't have that many lectures and workshops. So, they have much more free time and they're always like "Oh, let's go to the cinema, let's go to the café, let's go somewhere at night" and I can't go because I have work. So that's not very helpful. I just try not to go out with them during the week because they stay out very late. So I'm not going to be in the proper condition for my work the next day.
>
> Marie IV1

Uma and Evie both describe how their friends are crucial for support their wellbeing and maintaining their engagement.

> I think, they help me in terms of engaging in my wellbeing. Because there are certain things that people would notice about you that you don't really notice about yourself. So for example, like 'clean room, tidy mind'. Like if my friends would come into my room be like "Uma, it's messy in here, are you alright?" Then we'll have a chat about everything that's going

on and they'll be, “OK so how you gonna move on from this”. And like some days I'll just feel really down, but my friends would genuinely help me.

Uma IV1

When I feel stressed out and overwhelmed like I will just go and vent to them and that always really helps. Sometimes we all are struggling with something or we all feel so lazy and we're all like “ehh I can't be bothered to do this” And then we're like “no, we have to do this” and we try to motivate each other. Yeah, I think my friends have a positive effect on my engagement.

Evie IV2

Bruce lives with his girlfriend at university and has found they has really helped maintain his focus and motivation to study.

We moved in straight away together and having her, has been a really big help. If I'm feeling pretty lazy, and can't bother to study, and she starts studying it kind of influences me to start. And having somebody like around you 24/7 who's also studying and also is a student and isn't into partying as well, quite career focused as well. That's really helpful.

Bruce IV2

These findings demonstrate the importance of social integration at university with regards to a sense of belonging, engagement and persistence. Mature students appeared to be less concerned with

social engagement and felt they did not fit into the typical student behaviours. Friendships were shown to support participants engaging academically and were important for pastoral support.

4.4.2 Extracurricular activities

Seven of the participants mentioned joining university societies, such as pole fitness, Bulgarian society, Nepalese society, board games, orchestra, church society and rowing. However, most subsequently left them as they felt they did not have time for the societies around their busy teaching schedule.

> My plan was to go there every week, I think it was on Tuesday evenings. And then our Tuesdays were quite full, with lectures til 6pm, and in the end I stopped going because the course got too demanding.
>
> Maya IV1

> I just didn't have the time for it, and sometimes I didn't have the energy for it, I'd be too tired from the week. It just added on extra stress as it meant I didn't have Wednesday afternoons off. So what stopped me was commitment, and my courses is too intense to commit to anything else.
>
> Adriana IV1

Other participants (Harjot, Bruce, Jane and Evie) did not join societies, either because they felt there wasn't a society for them, they found some sports societies elitist or that a large focus of the societies was drinking alcohol or partying.

> I did go to freshers fair and walked around all the societies and nothing really jumped out at me. I'm not a very active person, not very sporty or anything. So I don't know. I just never found anything.
>
> Harjot IV1

> A lot of their sports clubs are like if you are not really good then they don't want you on the team. I didn't wanna go out of my own comfort zone join a group and then later on be told that I wasn't good enough.
>
> Bruce IV1

> They organize like parties, but the next day at 9am I have a practical, so I just can't go. Then I get mad because I really want to go. We all have lectures and stuff to do. And if you've been on campus like all day there's no time to get ready.
>
> Evie IV1

Extracurricular activities appeared to be less important to participants' social integration and engagement at university. Participants either did not feel the need to join a society or left the society due to competing academic demands.

4.4.3 Pharmacy student peer interactions

For most participants, their course mates were a key motivator for their engagement at university. They described their year group as a friendly group, who interacted with each other daily in classes

and at social events organised by the pharmacy student society. This social engagement was seen as important to participants; they motivated each other to attend classes and undertake studying, they gave peer support for example helping each other understand difficult topics and reminding each other of deadlines.

> I feel like it's the people on the course that motivates me the most, for example, doing group study, or going to the library together. If we're revising, I find it better to work with a group of friends just because we can test each other and it's a bit more of an interactive way of learning. We kind of help each other. It's like you're all in this together. So I find that quite good and supportive.
>
> Adriana IV1

> In terms of a support network, I think it's very good. If my pharmacy friends don't understand something in a lecture I'll happily help them, and vice versa. They're always talking about deadlines, pieces of coursework, lectures. And that's something I appreciate because obviously that's going to motivate you, and it's going to keep you on the on the right track
>
> Krishan IV1

> My flatmates are also pharmacy students, and sometimes they are my only motivation to come to lectures. They're like "come on, get up, if I'm going to the lecture, so should you", so that's helpful.
>
> Zara IV1

However, Jane found that other students were competitive and weren't always willing to help each other and support their engagement.

> I find it really competitive when we do workshops together, they don't want to share or help others. For example, if I asked another student "how did you do that", they reply "no, I'm concentrating, work it out for yourself". And I found that quite strange, because we're all going to come out with a degree at the end of it. There's not just one degree between all of us.
>
> Jane IV1

Krishan and Yousef talk about comparing themselves to others on the course, to benchmark and then increase their engagement and studying.

> So like I'll compare how much I'm studying, and sometimes grades. Like when I'm Snapchatting my pharmacy friends and I see them like in the library, I'm like, I need to stay on track. And they'll messaged, like "come to the library", which is really good and I'll do the same with them. So that definitely like boosts my engagement.
>
> Yousef IV1

> When you see other people studying, you get motivated and you're like "Oh I should study too".
>
> Krishan IV1

Whereas Bruce found comparison to his peers to be de-motivating and he felt he was not up to their academic standard.

> In my group of friends on the course, there's always one or two students who seem to do a lot better than me. When I hear what grade they got, it's a little bit belittling, it makes me feel really bad. And sometimes, if I'm working on an essay, and I say I'm finding this hard. Sometimes they can be like “Oh well I've already done it, why have you not finished yours yet?”, and it might be playful, but sometimes it makes me feel like I'm a slow. And it kind of builds up over time, and it starts to get you down, so you don't want to tell them what grade you've got or what your problem is. So I've just tried my best to stay away from it because it seems more intimidating than anything else.
>
> Bruce IV1

Peer-group interactions is a key component within Tinto’s model, and this is supported by these findings. Although, in contrast to Tinto’s model, participants found their peers to be most influential and supportive of their academic engagement rather than their social engagement.

4.4.4 Staff interactions

Almost all participants felt that most academic staff and their academic tutor were approachable and supportive of their engagement. Some participants were more hesitant to talk to academic staff in their first year as they felt shy or intimidated, but as they got to know academic staff they realised they could approach them.

> The large majority of lecturers are great, very approachable. Lecturers C & D, students absolutely love them, 'cause they're always really like upbeat and willing to help us out. But there are a few who I would probably avoid, they can be a bit blunt, and make me feel stupid if I ask a question.
>
> Marie IV1

> When I was in first year, I was a bit scared to ask a lecturer something. But I found the padlets on Blackboard® really good actually, because they are normally anonymous, so you don't feel embarrassed to ask a question. Now, I feel I would go to them to ask a question, I feel more comfortable with them now.
>
> Evie IV1

> I needed an extenuating circumstances form, and I emailed my academic tutor and I asked him for advice, and he gave me really great advice and I got an extension on work, and it was perfect for me. It just worked out really well.
>
> Jane IV1

However, a few participants described a reluctance to be honest with lectures or tutors, over concerns that they may get in trouble or be forced to suspend from their studies.

> There is kind of worry that if you do something wrong, you'll get in trouble. Like I missed a compulsory workshop and it meant my portfolio grade would be capped. I felt so stressed out and I very well considered just keeping it to myself and pretending I went to the workshop

because I was so scared. But then I decided against it, I was like OK, I need to fess up. And thankfully I was able to attend with the second years at the time. But there is that concern of getting in trouble, that keeps the students, including myself, from being completely fully honest with the staff.

Georgia IV1

When I admitted to my tutor about my mental health issues their first response was “do you want to stop the year and suspend it?.” And I panicked because I was like “oh my God I can’t, I really didn’t want to do that”. It felt like I was being pushed or persuaded to do that. I think other students have that fear of “if I admit that I am really struggling with the course then they’re going to say to me like you’re not fit to study or fit to practice right now, why don’t you suspend the year”. And I think that has an impact on if students want to reach out or not when they’re struggling, and I think a lot of students are scared to always be truthful.

Uma IV1

Faculty interaction is also a key component within Tinto’s model for student social integration. Participants described faculty interactions as supporting them both academically and pastorally. It was concerning to hear that a few participants did not disclose information to their tutor for fear of being suspended.

4.4.5 Impact of COVID-19 of social engagement

Most participants described how not being able to mix socially with friends outside their household during the COVID-19 pandemic was a difficult and challenging time for them. These participants described a real sadness at missing social interactions, and many participants felt isolated or lonely.

> You are just kind of a bit stuck in your own room. The low point is just not seeing and engaging with other people as much. I really miss the social side of uni, not seeing people around campus that you know, not going to the union, I found it hard.
>
> Evie IV2

> I was a bit lonely really and you feel like you're doing a whole degree on your own, and then that's a little bit demotivating. I felt like if I was in uni, I would be making more relationships with my lecturers and other students as well.
>
> Charlotte IV2

Some participants felt that COVID-19 social restrictions made them more focused on their university work, as there were no other distractions. However, other participants missed those social distractions as they were vital stress relief mechanisms.

> There's nothing else to do, there's no shops to go to, you can't go out to eat. So you'd might as well do some work.
>
> Krishan IV2

> The fact that our social lives have been so affected I think makes things more stressful because before they were a reduction of stress, like a relief.
>
> Georgia IV2

During the COVID-19 pandemic university societies were either put on hold or delivered online. Some participants quickly disengaged with this online delivery and stopped attending. When some societies were allowed to meet again, these participants reported a lack of atmosphere due to social distancing requirements.

> I used to do orchestra. But I don't really enjoy it as much this term, 'cos we have to sit 2 metres apart, you can't reach out to anyone. It's a bit weird so I felt like I probably won't continue that.
>
> Evie IV2

These findings demonstrate the largely detrimental effect of the COVID-19 pandemic on participants' social engagement with friends and societies. Although a few participants felt that the lack of social distractions made them more engaged academically.

4.5 Study location and commuting

Within the interviews, other influences on student engagement were mentioned, which do not fit within Tinto's model. This includes participants' reflections on their study location (home vs library) and the impact of living on or near to the university campus compared to commuting.

4.5.1 Study location: university library

Almost all participants describe frequently going to the library to study individually or as a group. They described the library as an engaging environment to study, and most participants felt motivated by other students working around them.

> I'm a lot more focused in the library, I think because everyone around me is doing work. I can't just like get out my phone and sit on it for an hour. It puts you in the mood to actually do your work. I found that I can study for a lot longer in the library. Like if I'm at home, I'll probably do one hour and then do something else. But in the library I can stay there all day, which is a lot better.
>
> Harjot IV1

> Last year I'd always go to the library. Like I could rarely study at home. Because whenever I'm at home, I'm always distracted. You know, I want to look at my phone or my PlayStation next to me, so it's really hard to focus.
>
> Yousef IV2

> A huge part of me being able to find motivation to study was going to the library every day and sitting amongst other students, who are all focused and studying to. It's a good environment where studying is happening.
>
> Georgia IV2

For several participants (Charlotte, Marie, Uma, Adriana and Georgia), the library also served as a separation between their university and home environment.

> I would go to the library and do any work during the day and I'd kind of treat it like a 9am-5pm. And then when I was home, I was home, like that was my time where I could just to relax and not think about uni work.
>
> Charlotte IV1

> I study at the library mainly because I feel like I like to have a separation, like in my room my bed's right next to me so like I'd just like go sit on my bed and not do work. But in the library I go for a set number of hours, actually do work and then come back so like it helps with separating like work and better use of my time.
>
> Adriana IV2

A few participants recognised that they would go to the library with good intentions, but that their engagement was dependent on where they studied in the library. For example, in group study areas students would often get distracted by their friends and be less engaged and productive.

> It depends on what part of the library I am, because if it's like group study or like the open areas, I get easily distracted. If I go to the library with my friends, I might want to work, but I

> won't do it because we are going into chat all the time and I cannot get all my mind focused in the work I have to do. That's why I prefer to go to like the private study areas.
>
> Marie IV1

Jane was the only student to not use the library as a study space.

> I don't use the library. I don't use the books, I don't use the systems, I don't go in there. I felt like an idiot when I walked in and you didn't know where to sit or where to find things or where to find books. And it's also really noisy in there, so study for me is at home, where I can have peace and quiet and really focus on my work.
>
> Jane IV1

As outlined in the literature review, library data is used within some data analytic systems as a measure of student engagement. These results show that for most participants library data may be a useful measure of their academic engagement. However, for a few participants, the library was not a focused learning space, or they did not use the library at all. Therefore, for those students their library data would not reflect their study behaviour or engagement.

4.5.2 Living on campus vs commuting

All participants described differences in their engagement based on whether they lived on or near campus, or they commuted to university. For example, living on or close to the campus, helped some participants attend more teaching sessions, access the library and socialise with friends.

> It definitely makes a difference to my engagement, there's not really any excuse not to attend lectures because the uni is so close by, and the library is close by, any time I might need a book or something I can just pop to the library, 5-10 minute walk. Yeah, and also, I'm able to meet other pharmacy students, so it just I think the whole atmosphere improves engagement.
>
> Maya IV1

Charlotte and Jane both commute to the university and described differing influences of this on their engagement.

> Commuting does influence engagement a lot actually. Sometimes, if I had a lecture in the morning, maybe just one hour, I would miss it. There wouldn't be much point coming in. But if I had like a full day, I'd happily do the journey there and back. But a lot of time if my travel time was more than my lecture time, I wouldn't go. And it's hard to make friends, because I think people on the course go back to each other's flats and hang around on campus and do things together. Whereas I commute to the car park, walk in on my own, I sit down on my own and then walk back to the car. It definitely was harder to make friends.
>
> Charlotte IV1

> I honestly don't have a problem with commuting. I'm really lucky, I was given a parking space so I can park wherever I like. So I always make the effort to come in, even if there's just a few lectures. I try to make my commuting time productive, so I'll listen to the lecture recordings on my way in and that helps me remember the topics.
>
> Jane IV1

Distance to the university campus was shown to influence participants' academic and social engagement. For participants living on or close to campus, it was felt it was easier to attend teaching sessions and meet up with friends.

4.6 Chapter summary

This chapter has presented participants' accounts of influences on their engagement. For most participants, their parents and siblings were seen as key influences on their decisions to go to university and their decision to study pharmacy. Participants discussed differences between their school culture and university culture and how this shaped their initial engagement and sense of belonging at university. Factors affecting mature students and international students were reported. Participants' goal commitment to become a pharmacist was reported to be the most important influence on their engagement and persistence at university. Participants discussed varying factors related to their academic and social engagement and integration at university.

Chapter 5. Results related to data analytics and student engagement

5.1 Chapter introduction

This chapter presents the results to the following research questions:

Research Question 2: What are pharmacy students' perceptions of the use of data to monitor their engagement?

Research Question 3: Does the VLE engagement data collected in this study accurately portray students' academic engagement throughout an academic year?

Research Question 4 How does being presented with their engagement data influence students' ideas or actions relating to engagement?

This chapter will present participants' perceptions of attendance monitoring, VLE data and full learning analytics systems. The use of engagement monitoring will be considered in terms of participants' acceptability of being monitoring, perceived accuracy and the usefulness of the data to participants.

Participant's VLE engagement data will also be presented to illustrate each participants' VLE engagement journey over two academic terms. Participant's narratives will describe whether the VLE engagement data does or does not portray their engagement. Finally, utilising the COM-B model, participants responses related to capacity motivation, opportunity to change their engagement behaviour will be presented.

5.2 Students' perceptions of data to monitor their engagement

This section will explore participants' perceptions of attendance monitoring, VLE data monitoring and a full learning analytics system. Participants reflected on the acceptability, accuracy and usefulness of these differing types of data.

5.2.1 Students' perceptions of attendance monitoring

The most prominent finding was that the majority of participants' perception of the inaccuracy of attendance monitoring. This was related firstly to students cheating the system, for example tapping their friend's card. A few participants explained this was done so that they didn't get in trouble, or called into a meeting with the Director of Teaching and Learning for low attendance. Some participants found it frustrating when other students attended just for the register, as they then didn't engage and were distracting those participants who actually wanted to be there.

> Students can cheat and they are getting even better because they just have to. Sometimes maybe we cannot attend every, each session for today. And I have seen my colleagues just tapping other people's cards and that's something very usual.
>
> Marie IV1

> A big portion of people have just turned up for the sake of like having their attendance taken. And they would just sit in the back and talk and like be quite disrespectful. And then obviously that ruins it for the people that are actually trying to listen and everything. Um, yeah. I think just because you're, there doesn't necessarily mean that you're engaged at all.
>
> Harjot. IV1

The biggest criticism of attendance monitoring was its inability to tell whether a student is engaged. Some participants explained that engagement is more than just attendance, but rather their active participation in teaching sessions. For example, through being focused, paying attention, active listening, answering and asking the lecturer questions.

> It I won’t actually tell you how engaged they actually are on the course because just attending a lecture, it doesn't reflect the actual engagement. Because you don't know whether they actually listening or whether they could on their phone, asleep or they could be talking to a friend for the whole lecture.
>
> Uma IV1

> If I go to lectures, I still don't think that's like joining in. I think I have to go and participate, like asking questions and that kind of thing. Rather than just turning up for the sake of that tick on the register.
>
> Zara IV1

Most participants felt strongly that attendance monitoring must not be used in a punitive way, and that scaring student to attend lead to more students cheating the system, thus perpetuating the inaccuracy of attendance monitoring.

> There's been a few lecturers that just constantly drill into us how important it is to attend. And I think putting the fear of God in us, saying that if you don't attend the university might

> kick you out. I think it's quite detrimental. And sometimes I've got a genuine reason why I can't attend and then I'm sat there scared, thinking oh god what will happen to me if I don't go.
>
> Georgia IV1

Most participants agreed that if attendance monitoring was solely used in a supportive way, it would be valuable resources to detect if a student is in difficulty and intervening to offer the support to re-engage.

> I think it's a good idea as long as it's done for the right reasons. Like a safety net, a way of saying, “I know you're struggling, you’re not turning up at lectures, I'd like to encourage you to engage, is there an issue here?”
>
> Adriana IV1

> In my third year I missed quite a lot of lectures, because of my heart condition. I had lecturer E ask me “Is everything okay? Is there anything I can do? Am I still able to keep up?” And I think if the register wasn't there, and they didn't see that I wasn't attending then I probably wouldn't have approached them first. So that was really really good actually, just checking up of me.
>
> Bruce IV2

Many participants had the perception that using attendance registers was more of a school approach and was not treating them like adult learners. Participants felt they had the autonomy to choose when and if they wanted to attend lectures.

> I don't like it [attendance monitoring] at all. We're at university, I'm 20 years old. At the end of the day, if I wanna turn up to a lecture that should be entirely my responsibility. I feel like having a register feels like I'm at school. I feel like I'm being treated like a child.
>
> Krishan IV1

> When I was giving attendance data, it was a bit sort of "ooh how dare you?" What's that got to do with you? I'm a grown up. I know how I learn best, and that might be learning at home rather than sitting in a lecture theatre.
>
> Jane IV1

These findings show that participants felt that the current approach to attendance monitoring is paternalist, inaccurate and not utilised in a supportive manner. The punitive nature of attendance monitoring may encourage some students to cheat the system leading to further inaccuracies.

5.3 Student perceptions of VLE data

VLE engagement data monitoring was a new concept for participants , and this was the first-time participants were emailed their engagement data. The following sections explores participants' perceptions on the acceptability and accuracy of VLE data.

5.3.1 VLE data: acceptability

Almost all participants felt comfortable with their VLE data being accessed, monitored and reported

during this research. However, Maya felt that VLE data was a little more intrusive than attendance monitoring, as it was tracking what participants were doing at home, rather than within a university environment.

> I was okay with it, but it felt kind of intrusive because it's like you are being tracked or monitored outside of uni, which I have never experienced that before. Like the attendance monitoring is stuff I do on campus. And you just don't expect to be tracked outside of uni.
>
> Maya IV2

5.3.2 VLE data: accuracy

Most participants felt that the VLE data was somewhat accurate and gave an indication of their engagement. However, there were multiple ways that the data could be inaccurate, for example downloading the content rather than watching it on the VLE or leaving the VLE tab open.

> I would say it is a fairly accurate, like it kind of shows you roughly how engaged we are, and most of numbers did make sense. For example, when there were deadlines for the integrated practical, you could see the numbers go up on that module and down for the other modules. But I wouldn't say its as simple as a straight correlation.
>
> Evie IV2

> They [the numbers of hours on VLE] were definitely a bit short on I had done, because I was downloading the lecture recordings and then accessing them through my OneDrive. So I support it doesn't account for people studying in different ways
>
> Bruce IV2

> I think there is room for error too. Like if you just leave the browser open all day and you don't log out of blackboard, it might just keep adding up the hours. And also the amount of times, I've been trying to look for something and I've clicked through all the modules and loads of different folders, just to find one thing.
>
> Marie IV2

Similar to attendance data, some participants felt that the VLE data does not show holistically how a student is engaged and doesn't show other engagement activities they may be undertaking.

> It [VLE data] might show that they've watched a lecture but not whether the information has actually been taken in by the student and it's not going to show your understanding. Engagement isn't like how many times or hours you spend on a thing, it's how much you're learning something.
>
> Charlotte IV2

> I didn't see it as like a direct measurement of me engaging with the course. You can't just look at Blackboard to measure the engagement of a student, it doesn't fully reflect that. And you can't just look at attendance as well, you have to look at the whole picture I would say.
>
> Maya IV2

> The data is great but you need qualitative like responses as to why the data is that. What are the reasons for an increase in hits in the autumn term weeks 1 to 5? and then why does it decline so much in December? For me it was a completely different reason as to what the average students would have been. If you presuppose a load of reasons as to why the data is what it is, you'll come to conclusions that aren't actually reflective of a reality into why engagement is how it is.
>
> Krishan IV2

These results demonstrate that the monitoring of VLE data was mostly acceptable and gave a somewhat accurate indication of participants' academic engagement. Similar to attendance monitoring, participants recognised that engagement data can only describe behavioural engagement and cannot capture their emotional and cognitive engagement.

5.4 Student perceptions on a full learning analytics model

Within the interviews, a full data analytics and student engagement model was discussed, such as the one at Nottingham Trent University (as described in Chapter 2). All participants were supportive of learning analytics and felt that gathering multiple data sets was advantageous and could give a more accurate reflection of students' engagement.

> I think having the extra measures would be a benefit, to get more of an overall view of everything. Because I think that someone who is submitting their coursework on time, goes to all their tutor meetings, has good attendance, uses Blackboard a lot, that almost 100% is an engaged student. I think all of them in a sense come together and give a better picture of how engaged you are.
>
> Zara IV2

Some participants felt that the library engagement data may not as a reliable measure of engagement within a learning analytic system, due to huge variability in productivity and focused study time.

> I don't know if tapping into the library is that helpful. Some people go to the library and just sit there. I've seen it. Or they will sit there as a place to chat. Some people never go to the library, but they're super engaged with a course.
>
> Uma IV2

> it would only be useful for students that feel that they study better at the library. But I know a lot of students that don't feel like they need to go to the library at all and it doesn't make them more or less engaged.
>
> Marie IV2

Georgia felt strongly that no learning analytics system or collection of digital data would ever be able to capture full behavioural cognitive and emotional elements student engagement.

> Nothing objectively tells you how much a student is engaging, I don't know if there is a way. Unless you probe their brain to see if they're genuinely engaging with what they're looking at.
>
> Georgia IV2

Most participants felt a full data analytics system would be acceptable, wouldn't be intrusive to their privacy and that universities had an obligation to use the data available on students to help support them in the best way.

> I don't think it's intrusive, like because all of the data is already there, you're just connecting it and looking at it so it doesn't make that much of a difference.
>
> Adriana IV2

> I think the university should monitor its students' activity, it's for their benefit most times. Like lecture attendance and library attendance is essential to being at uni.
>
> Harjot IV2

All participants were able to reflect on what they felt the benefits of being reported their VLE data, and postulate what the benefits of having a learning analytics system with a student facing dashboard might be. They felt it would help motivate students to continue to be engaged or change their behaviour to be more engaged.

> For students it [learning analytics] would be useful to keep on track and see how much you are doing. Like are they doing the right amount of work. I think for some students it would affect a big change because they will be like "oh wow I have actually realised that I am not doing enough compared to everyone else".
>
> Yousef IV2

> I think it [student engagement dashboards] would motivate you to engage. And then it means that student get better grades, if it can have that much of an impact then they should be seeing better results.
>
> Evie IV2

Some participants described that for university staff the key purpose and benefit of learning analytics was early identification of students in difficulty and offering them support to engage. A few participants also felt that staff could use the data to analyse what works well and what could be improved to engage students more or where to invest resources.

> I think its most useful for academics to find out the students that aren't engaging, and like check if they are okay. They would know what students are on track, or who needs more help. And then maybe that way they could provide help as well to those students, so everyone does well and passes.
>
> Zara IV2

> It could show if things are working in the course. It might tell you what people are struggling with, what times are people the most engaged, when in the year engagement going down the most, where they should change things up.
>
> Charlotte IV2

> You could do an analysis, like if people actually engage with this or that, they achieve these results. Then maybe staff and students know how to best spend their time and their effort. And like for the whole uni, it may show that students who actually engage more with library get higher marks. Or what sources are connected with higher grades. Then maybe you would

> know how you should spread your resources. Like if you know that people are actually using the library and it helps them, you can invest more in the library.
>
> Marie IV2

As mentioned in Chapter 2, there was a suggestion that some students at Nottingham Trent University cheated the learning analytics system, for example taking books out of library that they would never read just to increase their engagement score. Within this research, most participants felt that playing the system would be futile and a waste of student and staff time. Or the only reason for trying to increase your engagement score, was to avoid being punished by staff

> I don't see why anyone would be that bothered to cheat an attendance and an engagement system, unless it has consequences. Unless there is some kind of reason for them to decide oh I need to kind of fix this number because I'm going to get in trouble if it's not high enough, if there is no consequence to it then I don't see a reason why anyone would cheat the system.
>
> Adriana IV2

The concept of learning analytics was unknown to participants, however they appeared to welcome this approach and could describe the benefits of such systems to encourage their motivation and engagement. It was felt that collating a large amount of student data could give a more rounded picture of student engagement but could also then be more inaccurate. Learning analytics was also

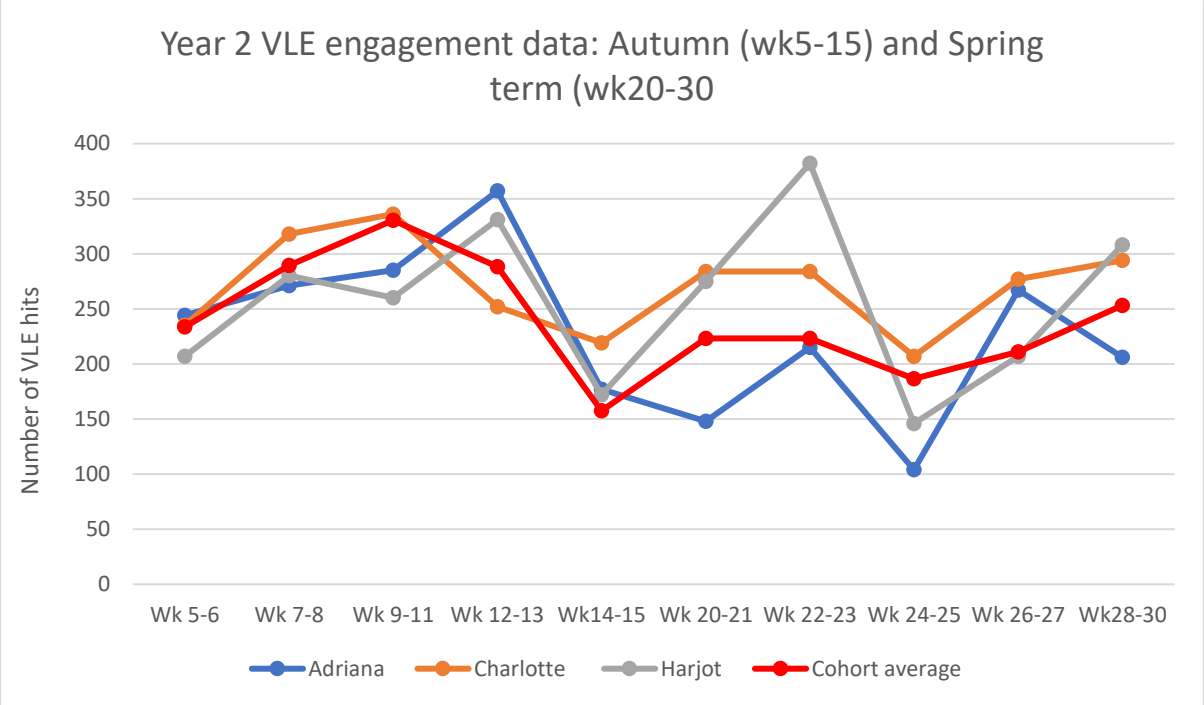
seen to be helpful for academic staff to identify students in difficulty and to analyse teaching approaches or resources to improve student engagement.

5.5 VLE data as a representation of students' engagement journey

Within this research participants were sent a graph demonstrating their and the cohort average VLE engagement data throughout the academic year. In the second interview, participants were asked to discuss these VLE data graphs and whether they reflected their engagement. This is presented by year group.

5.5.1 Year two VLE engagement data

Adriana, Harjot and Charlotte's VLE engagement data was grouped together as they approximately follow similar engagement journeys and the cohort average data (graph 1)



Graph 1. Adriana, Charlotte and Harjot engagement data: number of hits/clicks on VLE

Adriana, Charlotte and Harjot all described how their engagement felt the highest at the start of autumn term (Weeks 5-11), as they came back to university refreshed and excited to learn after the summer holidays. They described that workload started to build up in the last few weeks of autumn terms (week 12-15) so they engaged less with the VLE. In spring term, Charlotte believed the graph represented a fairly constant level of engagement, Adriana described more efficient with her time on Blackboard®, whereas Harjot's graph showed high and lows of engagement. In spring term there were more assessments due which are not shown within the VLE data, and they explained this maybe why VLE data is lower in spring term compared to autumn.

> So the beginning of each term, you are more motivated because it's like a fresh start. And then, I find that naturally, I get tired as term goes on so I can't engage as much. There also tends to more lectures at the beginning of term, then later in term is more practical stuff and

group work…. I would say in spring term I had a better study plan, I made weekly plans.

Charlotte IV2

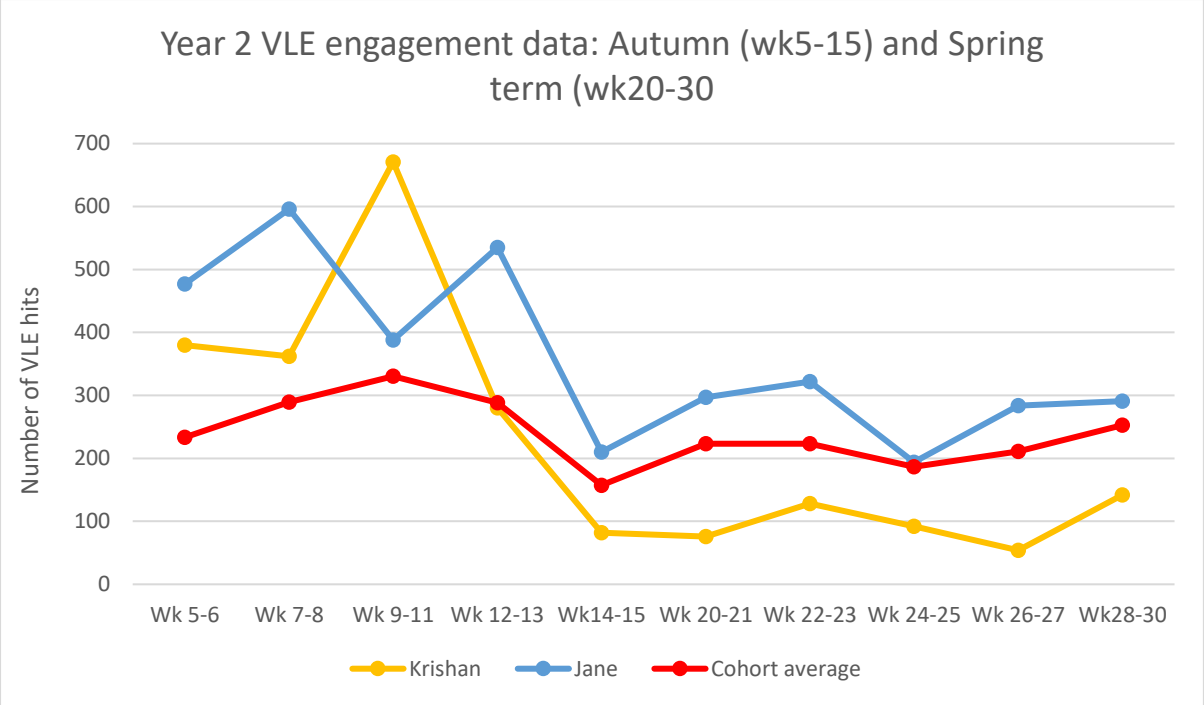
There are some weeks when I did loads on each module, but then I also try and give myself a bit of a break so, yes I think that makes sense that it goes up and down throughout the year …In spring term there was loads of coursework and tests, and because these aren't on blackboard, I guess we spent more time on other stuff and less time on blackboard.

Harjot IV2

In the autumn I spent ages watching and making lecture notes and I'd have to go through blackboard over and over, like more than once. But like in spring, I think my numbers are lower as I got better and quicker at making my notes, I did them online rather than writing them, so I only had to watch the lectures once then could move on.

Adriana IV2

Krishan and Jane's engagement data is presented in a separate graph (graph 2), as they both were significantly above the cohort average in the autumn term (weeks 9-12). However, both described significant events that occurred in the last few on autumn term (weeks 14-15), which subsequently affected their engagement during spring term (weeks 20-30).



Graph 2. Krishan and Jean engagement data: number of hits/clicks on VLE

In December, I went through something really bad, like emotionally distressing stuff. So like before, I was in a really good workflow, I was enjoying the university, I was smashing everything out. Then yeah, it just went completely sideways, I couldn't focus on work. I did the compulsory stuff like assignments, and some of the workshops. But I haven't done any lectures since December, there were weeks when my Blackboard hits were almost at zero.

Krishan IV2

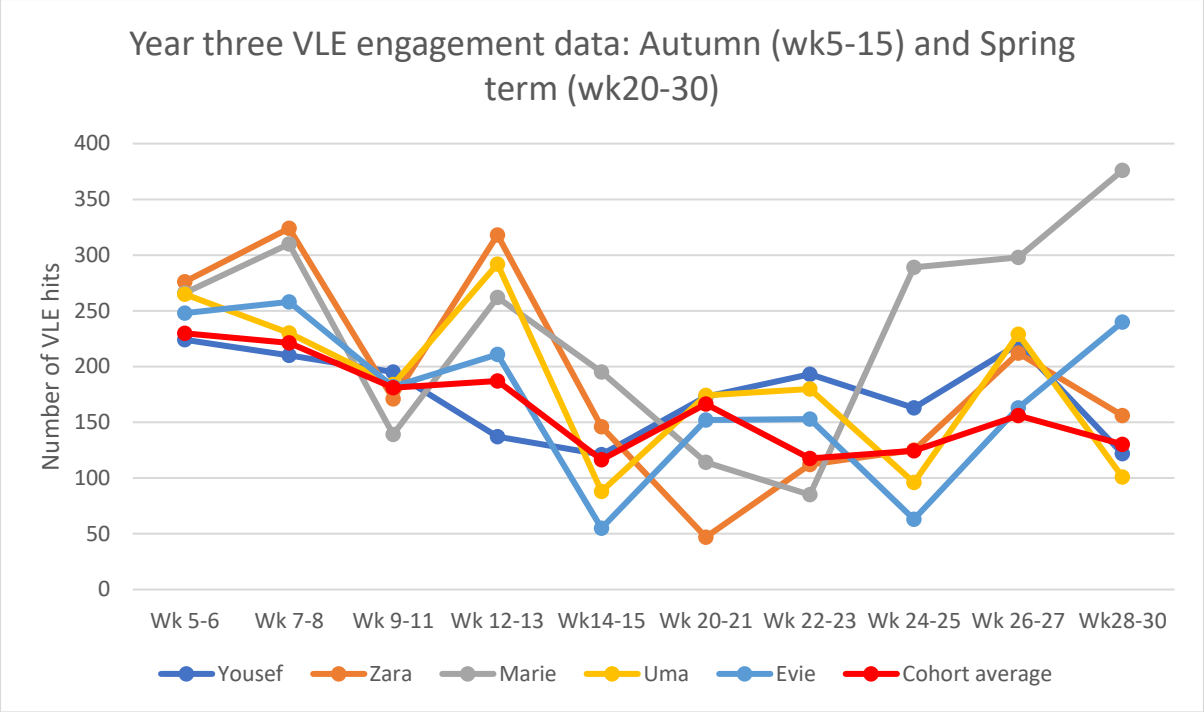
So, in the latter part of autumn term, I was in a group and they got caught cheating on the xxx coursework. Some of the group had a friend in the year above and they were basically copying their work. We'd split up the group work, so I had been working on my bit unaware the rest

> of the group were plagiarising. I only found out on the day of submission, and I was so cross. They were going to submit it with my name on because we were working in a group. So, I spoke to my tutor, then I spoke to the DTL and they investigated it. It was decided we had to re-do the coursework, and I did it on my own, I didn't want anything to do with the group. So my time on Blackboard and on my lectures has really dropped.
>
> Jane IV2

5.5.2 Year three VLE engagement

All five students in year 3 are shown in graph 3. The participant engagement data demonstrates high variability with lots of peaks and troughs throughout the year.

Similar to year two participants, the year three cohort average VLE engagement peaks at the beginning of autumn term and spring term and declines gradually over the term (graph 3). The participants' engagement data demonstrates high variability with lots of peaks and troughs throughout the year.



Graph 3. Year three student VLE engagement data: number of hits/clicks on VLE

Zara and Uma had very similar VLE engagement peaks and troughs, and both described weeks when they had more motivation and were on top of their workload and weeks when it was significantly lower.

> Sometimes it was a good week, sometimes it was a bad week. I feel like the spikes at week 12-13, were when I was catching up on lectures, to pull myself up a little bit. I also had Corona during January and I struggled to do all the work, and my motivation after that went low and group work also got in the way of things.
>
> Uma IV2

> it was quite interesting because in some weeks I recognised that I am using Blackboard so much more than the other students. But during the other weeks I preferred to work on my portfolio or to prepare my coursework and then I didn't engage with lectures so much, so my use of Blackboard dropped.
>
> Zara IV2

Marie described her engagement as having a "tank of energy" which slowly depleted over time, but then realised in the last weeks of spring term (weeks 24-30) that she needed to catch up with work to prepare for the summer exams.

> I kind of had a tank of energy at the start of autumn and it's just kind of been going down and down and down. And then the last half of spring term I realised I needed to catch up, so I went on blackboards loads more again.
>
> Marie IV2

Evie described being more engaged at the beginning of autumn term, with a decline at the lowest seen just before the Christmas break (week 14-15) due to socialising more with family and friends. Evie also described a spike in her engagement at the end of spring term related to revising lecture content for exams.

> At the beginning of term my engagement is a lot more because I wanted to get on top of everything while I was kind of fresh minded. And then towards the end of term, especially the last week of term I know that I am not going to get any work done, because it's near Christmas

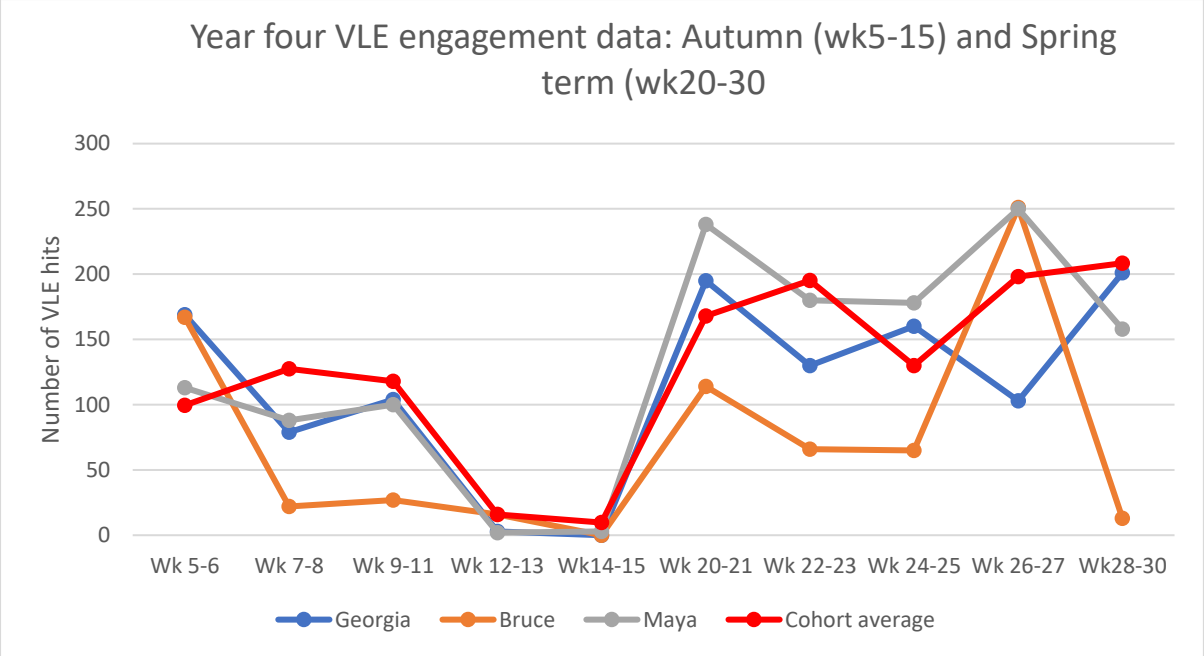
> and more stuff is happening socially. Then it goes back up at the start of spring term, 'cos I'm really engaged again. Then towards the end I was like, okay exams are approaching, I have go back through all the lectures in order to revise.
>
> Evie IV2

Yousef described having consistent VLE engagement, with small dips around the time of assessments.

> I would say it definitely represents how much I have engaged with blackboard during the term. For autumn term I tried to stay on track week in, week out. But then we got two assignments at the same time, so the drop at week 12 is when I had to focus on the assignments instead. And then pretty much the same in spring term, I made a plan to do lectures every week. There were two more assignments, one due midterm and one at the end of term, so had to prioritise doing them over going on Blackboard.
>
> Yousef IV2

5.5.3 Year four VLE engagement

The VLE engagement data for Georgia, Maya and Bruce is shown in graph 4. These three participants described how the graphs reflect the workload in year 4, with the autumn term spent working on their research dissertation and the spring term consisting of a taught clinical module.



Graph 4. Year Four student VLE engagement data: number of hits/clicks on VLE

Georgia and Maya describe how they spent the first half of autumn term (week 5-9) accessing the recorded lectures and reference materials on research methods. The rest of autumn term (week 12-15) they spent undertaking their research data collection and writing up, so were not using Blackboard at all. Georgia and Maya followed approximately the same engagement journey in spring term, with a large spike related to viewing all the new module material and remaining fairly high all term.

> Yeah, that [the VLE engagement graph] looks how I feel. In autumn I was working on my project, initially looking at all the stuff on blackboard, then working independently on my project. At the start of spring, I was really excited, so I open blackboard a billion times trying to look through all the stuff, and then it goes down steady. There were definitely weeks in spring term, when I got overwhelmed by work and my motivation went down. Then in the last

few weeks of term, I realise the end of the year is coming and things start going up again.

Georgia IV2

Autumn term I was focussing on my project and not really going onto blackboard. I would say the start of spring term, I was at my highest engagement. And then around February, I kind of felt a bit more tired, and we had so many assessments going on, so I saw my engagement will start to go down It's [VLE engagement graph] very representative, yeah I could definitely see how it reflects my engagement.

Maya IV2

Throughout the academic year Bruce's VLE engagement was significantly less than the cohort average. Bruce described taking on a new role at the start of spring term, and working night shifts, which negatively influenced his ability to study. Bruce described consistently feeling like he was behind the rest of his cohort, but just about keeping up.

In autumn term I didn't look at many lectures, I was mostly working on my project and having regular meetings with my supervisor. And after Christmas my work rota changed, my work schedule changed to a night shift. So, the first two weeks were very hard, trying to change my sleep schedule. I was just tired all the time. So, my studies took quite a hit. I was asleep during the day when the workshops and the teaching were scheduled, so I missed a lot of them. Later in the term I tried to catch up with the online recorded stuff.

Bruce IV2

The VLE engagement graphs were used to facilitate discussions with participants about their engagement over the academic year. All participants were able to recall and describe key events that caused peaks and troughs in their VLE engagement data. Overall participants felt the VLE engagement graph gave a good representation of their engagement journey.

5.6 Influence of VLE engagement data on students' engagement behaviour

This section explores whether being presented with VLE engagement data can trigger a behaviour change in participants. As outlined in the Chapter 2, the COM-B framework (figure 6) demonstrates that in order to change behaviour you need the motivation to change, the capability to change and an opportunity to change. Each of these categories were used to deductively code the participants' responses related to reflecting on their VLE engagement data, planning a change in their behaviour, facilitators and barriers for change, and whether any change in behaviour occurred.

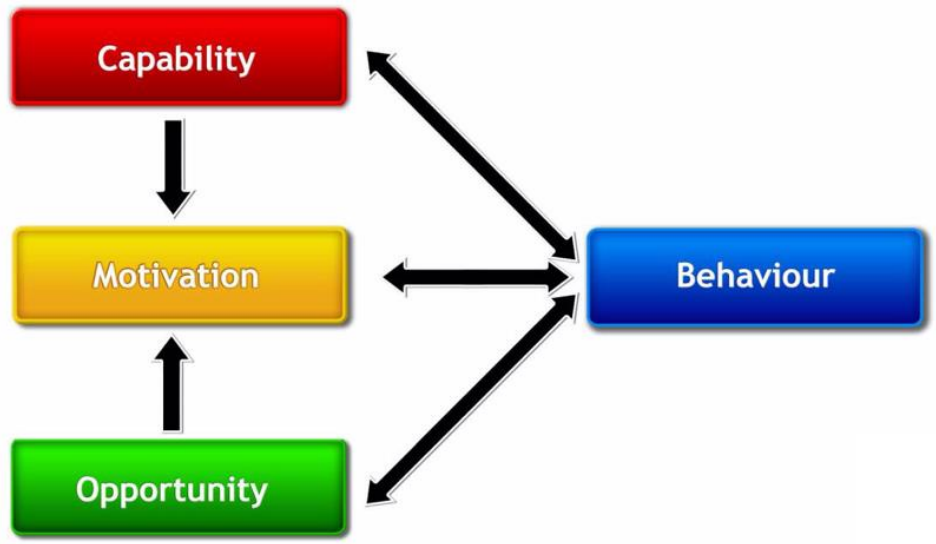


Figure 6. The COM-B framework for behaviour change (Michie et al., 2011).

5.6.1 Capability

All participants described getting their VLE engagement data and spending time to review their numbers. Where participants were below the cohort average, they felt that they should take action to improve their VLE data in the subsequent weeks. A few participants (Uma, Charlotte and Evie) described having the confidence and competence to change their engagement behaviour.

> Once I got the email I would definitely be like, "okay this is where I was at, why is that? Why didn't I do that?" And then I would literally plan my next week after, I would be like, "okay I need to do that, I need to do this". I felt like I had the tools and the knowledge to try and be more engaged and be more focussed. I feel for me personally it was definitely positive in terms of reflection, planning and acting on it as well.
>
> Uma IV2

> I think it really triggered me to think about how I had been like managing my time. I stopped and thought about what do I need to change? What could I do differently? For me it was changing the structure of my day, making a plan to get up early and go and sit in my study, because for me that was the time I felt most productive. I felt pretty certain that that would help me.
>
> Charlotte IV2

> I think over the years I've worked out the ways I learn best. In first and second year I didn't really think about how engaged I was. But this year I've realised I can concentrate more, I can

> write a lot more lists, I can spend more time going through my work, I can spend more time going through every part of blackboard and make sure I using all the resources available.
>
> Evie IV2

However, the majority of participants were unsure how or what to change, or lacked the self-belief that they could change their behaviours.

> Sometimes I do say to myself “oh I need to focus more” or “ you need to change this and that”, But I never work on it 'cause if I do change the way I'm studying or engaging with the material, maybe that way doesn't work either and then I’d be like, oh I missed out on some things I would have done in that time of period. So I guess, I do think about it, but I don't really know how to act on it.
>
> Adriana IV2

> There have been times where I’ve felt that I should do more, I felt like I need to change my study habits. And I was thinking is there a different way? But I didn’t really change it because I didn’t know how else to do it. If I had known a better way, or if somebody had given me advice on that, then yes I would have had the confidence to change.
>
> Maya IV2

These results demonstrate that participants’ self-belief, or lack of, is influential to being able to change their engagement behaviour. Most participants lacked the confidence and knowledge of how to study differently and be more engaged.

5.6.2 Motivation

For almost all participants the main driver for motivation to engage was keeping up with the cohort average. However, this varied between participants, dependent on whether they were below, the same or above the cohort average. Yousef and Zara, both previously described competitive mentalities (see individual attributes 4.2.3,) and they were highly motivated to always wanting to be above the cohort average.

> It's always good to know and see what the others are doing. If you see they are doing higher than you then you would want to up the game.
>
> Yousef IV2

> I like to know where am. I want to know whether I need to be doing more work. For me, I want to be above the average every single week and if I'm not, there's an issue.
>
> Zara IV2

For other participants, being below the cohort average led to extra stress or a defeatist attitude, they knew they were behind and struggled to find any motivations to change this.

> I saw the report and I'd done almost no hours compared to other students, it was quite a shock. It was really demotivating, knowing that all my other classmates are doing far more hours than me.
>
> Bruce IV2

> At times I was surprised when my values were very low, and below the average. It made me stress out, and I felt that I was not good enough.
>
> Adriana IV2

For most participants, seeing that their data was comparable to the cohort average, was a reassurance and motivated them to continue engaging in the same manner.

> It made me feel quite good, that I was on the right track because I found that my data was either the same or above other people's. So I was like I'm okay, just keeping doing the same thing and you're not going to fall behind.
>
> Krishan IV2

> For me, being able to compare yourself to others was a big insight, and most useful for my own reflection process, I think it is really useful as a I knew whether I was spending the right amount of time or not I.
>
> Harjot IV2

> I enjoyed seeing my progress. It helped me kind of stay on track. I feel it's good to have the monitoring to help you motivate you, and give you a little nudge when you need to do more.
>
> Evie IV2

Some participants described incentives, such as planning treats, and doing better in exams, as a key motivator for being more engaged.

> I think having an incentive helps. So I would set myself targets, I need to do this and this, and then I can take an afternoon off and like chill with like my flatmates. Like it's a balance between work and fun.
>
> Uma IV2

> I know that if engage more, keep up with my lectures, make good revision notes, then I will do better in my exams. I've seen in previous years, that the modules I've engaged less in I've done worse in those exams. So now I try and be engaged as much as I can, because I want to do well.
>
> Marie IV2

Benchmarking of participants' VLE engagement data compared to the cohort average was shown to be a significant motivator for participants to consider changing their engagement behaviour. However, this needs to be considered in a sensitive way, as for some participants whose VLE data was less than their peers this may be demoralising and stressful.

5.6.3 Opportunity

Most participants described that there was sufficient help and resources from the department or university to help them engage. This included support from their tutor, asking a lecturer for help, being directed to further reading and support from central university services, such as the librarian, study skills and maths support.

> We're always told about the library resources and the lady who helps with that. I feel like we have a lot of access to support, we have a lot of facilities. When the lecture finishes, you always get a queue of students waiting for the lecturer. I've always had support from all the lecturers.
>
> Jane IV2

> I got an email from my tutor saying "hey I've noticed that your attendance has been reduced quite a bit, do you want to meet about it", and I did meet him, and we talked about like what's going on and we make a little plan on how to increase my engagement. And we met like every week for a bit, then every two weeks, then it was just as and when after that. And it did help push me to do something, it helped increase my attendance. I think having someone to look out for you and hold you accountable, it was helpful.
>
> Krishan IV2

Almost all participants felt that peer support also helped them engage more. For example, having a groups of friends around you to encouraged you to study, to go to lectures or the library.

> I think it's easier to be engaged or to keep my engagement high when you have a network of people supporting you. I had some friends where I would ask them "hey can you make sure that I go to the library tomorrow", like can you text me tomorrow and ask me "hey have you gone to the library today?", and I can text them again saying "Yes, actually I have". That's something to hold me accountable again, a lot of the time I need that outward support.
>
> Georgia IV2

Despite feeling motivated and supported to change the engagement behaviours, most participants explained that time and workload were the biggest barrier to change.

> I would probably say just like the main thing is finding time to actually do that. When spring term came I just couldn't because we had so many assignments so I couldn't actually put in effort, like I could see that my data was sinking for some weeks but I just thought, well there is nothing I can do about it.
>
> Harjot IV2

> I did try to make plans and try to set goals. But it was kind of hard to achieve because in reality I just didn't have the extra time, there was so much work to do, I just had to do enough to keep up, I couldn't do anymore. So I wanted to change, but I couldn't actually achieve I wanted to do.
>
> Maya IV2

These findings demonstrate both key enablers and barriers to behaviour change. Participants felt well supported by their peers and university academic and pastoral systems. However, participants' workloads and lack of time was the most prominent barrier and negated the enablers.

5.6.4 Behaviour change

There were mixed responses from participants on whether the VLE engagement data had prompted or resulted in a change in their engagement behaviour. Uma, Evie and Charlotte talked positively about their capacity, motivation and opportunities to change, so consequently they all described a change in their engagement behaviours.

> 100%, it [the VLE data] was definitely positive in terms of reflection, planning and acting on it as well. Every time I got the email it would make me want to do it more, and my studying increased. And then, I'll see the results and that would push me a bit more to continue working hard.
>
> Uma IV2

> I would say that the [VLE] data did change my behaviour, especially like just being able to compare with everyone else. It's influenced my actions because I've been able to think about how I study and what I can improve on.
>
> Charlotte IV2

> Yes I would say so for sure. When I started getting my engagement data, I tried to stay with the average, or at least about the average. ... I think it helped me organising my time, put in more effort, write a weekly plan, and try and stick to.
>
> Evie IV2

For Adriana, Bruce, Maya and Harjot, they previously described lacking motivation, lacking time and/or lacking the ability to change. Therefore, they also reported no change in their engagement behaviour.

> I don't think it affected my engagement. It didn't really affect the way I study because I know in myself what I need to do. Most of the time it just depended on what work needed doing that week. It didn't really affect my engagement.
>
> Maya IV2

> For me, if was useful to reflect and see where I was, but I don't know if I took the steps to make a difference or not.
>
> Harjot IV2

> I wanted to change, but my work patterns and being tired all the time meant I couldn't. Maybe if my situation had been different I could have engaged more.
>
> Bruce IV2

> I didn't change my habits this year because of the monitoring, I just do engage regularly, it's normal for me. I just opened the email, looked at it, then continued as I would normally. I don't think that people will change their study behaviours just because of some data.
>
> Adriana IV2

This was a non-interventional study, so it may be expected that for most participants no engagement behaviour change was reported. However, for a few participants, the combined effect of capacity, motivation and opportunity did prompt them to change their study plans, be more focussed and engage more academically.

5.7 Chapter summary

This second results chapter has considered the acceptability and accuracy of attendance, VLE and learning analytics systems. Participants were generally in favour of universities collecting their digital footprints and using the data to support students in difficulty, to review teaching practices and make informed decisions about university resources. The VLE engagement data graphs were shown to give a representation of the participants' engagement journey over the two academic terms. However, participants felt the graphs and any engagement data must not be taken in isolation, and talking to participants gave a fuller picture of their engagement. Participants who described having the capability, motivation and opportunity to change were more likely to describe a change in their engagement behaviour as a result of receiving the regular VLE engagement data emails.

Chapter 6. Discussion

6.1 Chapter introduction

This chapter discusses the main findings of this study exploring pharmacy student engagement. Firstly, the chapter will discuss key influences on participants' engagement. Secondly this chapter will discuss the participants' perceptions of systems used to monitor student engagement, such as attendance monitoring, VLE data and full data analytics models. Finally, the impact of presenting participants with their VLE engagement data on their behaviour will be discussed alongside participants' motivations, capabilities and opportunities to be more engaged. The discussion will present how the findings have answered each research questions and how this relates to the wider literature.

6.2 Key influences on engagement and persistence for pharmacy students

The literature review presented studies which supported all dimensions of Tinto's model of dropout and their influence on student engagement. However, with each claiming to be a significant predictor of engagement and studies showing differing effects in different student populations, this research question aimed to establish which are the most influential factors for this case study of pharmacy students.

All dimensions of Tinto's model were described within the participants' accounts of engagement. Participants described their family background, pre-university education, personal attributes, career aspirations and academic and social contents that made them more or less engaged at university. Each of these factors will be discussed in turn.

Family background was found to influence participants' behaviour at various stages; deciding whether to go to university, what subject to study and their engagement at university. For most participants their family had a positive influence on their decision to go to university and students demonstrated a desire to engage and succeed to make their parents proud. This supports other studies of family influence on students' engagement and success at university (Benner et al., 2016, Eldegwy et al., 2022). Whilst some participants mentioned a family or cultural expectation to attend university, this was not seen in a detrimental way, but rather an expectation that had guided their life choices and they were content to fulfil. This contrasts with other studies that suggested that family pressure to attend university, or study a course they might not be interested in, is unfavourable for engagement and is more likely to lead to drop-out (Gollins, 2005, Pizzolitto, 2021). However, these other studies involved interviews with students who had withdrawn from their courses (Gollins, 2005) or were non-engaged (Pizzolitto, 2021). Compared to this study, where participants appeared to be regularly engaging or trying to engage with their studies.

For participants who were the first in their family to attend university (Bruce, Jane and Krishan), the family background appeared to be less influential to their own decision and motivation to study. However, once at university, Bruce and Krishan both described the crucial support they received from their families to re-engage, after they both had health difficulties. This supports the literature, that family support is key throughout a student's time at university to offer emotional support, and positively contributed to their university engagement and success (Sorey and Duggan, 2008). Family background is an unmodifiable factor influencing student engagement, and it can be argued whether universities have a responsibility to acknowledge and encourage family support for students. For example, it has been proposed that universities that proactively include families through visit weekends, newsletters, social media posts can lead to greater personal connectiveness and academic success throughout a student's time at university (Cox, 2019). However, interactions with parents and

family are typically outside the scope of academic systems and could be problematic where students may have strained or difficult relationships with their parents, carers or family. Additionally, for many students going to university is part of a process of gaining independence from their family and they may not welcome this intrusion (Lewis et al., 2015).

The findings support the documented struggle for students entering university from non-traditional educational backgrounds (Wharrad et al., 2003, Kahu et al., 2015). Three participants (Jane, Charlotte and Bruce) entered university via a BTEC or Access qualifications. They all expressed that they felt they were academically disadvantaged compared to other students who had entered via the traditional A-level route. These three participants described having to work harder to be at the same perceived academic level as other students. Consequently, they demonstrated a greater emphasis on academic engagement and career development, over social engagement. Tinto's model suggests that students must be both academically and socially integrated in order to persist, therefore this lack of social engagement for mature students may be of concern for their overall engagement and persistence. Other studies exploring barriers for mature students have found similar issues with lacking social integration for mature students (van Rhijn et al., 2016, O'Donnell and Tobbell, 2007).

Participants stated the most important factor influencing their engagement was their own self-determination and motivation towards their goal of becoming a pharmacist. This combines both the personal attributes and goal commitment elements of Tinto's model. This was most aptly demonstrated by Jane's long-held commitment to go to university and become a pharmacist, despite her cultural and family situation when she was 18. As set out by Bempechat and Shernoff (2012), participants displayed both performance goals linked to assignment completion and grades, and a strong commitment to mastery goals, through engagement with learning the skills needed to become a pharmacist. This aligns with studies where delivering vocational content that is sign-posted to

students' long-term goals has been shown to act as a regular reminder for students' of their vocational motivation and will continue to support engagement (Welch et al., 2017).

Chapter 2 discussed how student engagement can be thought of as a holistic interconnected web of social and academic experiences that influence their educational experience (Elliott and Healy, 2001). This was affirmed within the findings, with participants demonstrating a strong institutional commitment, a motivation to learn and an enjoyment of the social opportunities at university. However, students may interact with the same academic environmental and social settings but have very different outcomes due to personal attributes and motivations (Loh et al., 2021). For example, academic engagement was described subjectively dependent on whether the participants personally found the topic interesting and whether they found the lecturer and their teaching approach engaging. For some participants, assessments were viewed as either a measure or enforcers of engagement, with participants focusing time and efforts on these to achieve the best possible grades, at the expense of other educational activities and social events. There were mixed feelings about relationships between staff and students, supporting Billups (2008) proposition that it is the quality and not the quantity of faculty interactions that are key. It was concerning to hear that some participants chose not to disclose health information to their tutors, for fear that might lead to them having to suspend their studies. This fear was most prominent whilst talking about attendance monitoring and had led other students to cheat attendance systems to avoid potentially punitive non-engagement meetings. This concurs with Pozdeeva et al. (2021) and Campbell et al. (2007) recommendations that engagement monitoring systems must be utilised in a way that encourages honest and supportive discussions with staff members.

The findings of this study support Tinto's model that social engagement is as influential as academic integration on student engagement. Participants described the important influence of peers and

friendship groups on supporting them both pastorally and academically, such as dealing with stress, studying together and reminding each other of coursework deadlines. However, there appears to be a fine balance between study and play, with too much of either being detrimental to student's engagement and outcomes (Kennett et al., 2019). Participants described relationships with their peers, in particular benchmarking grades or studying behaviour with each other, which served as both a motivator to work harder and de-motivator as some participants felt they were not good enough. This was also mirrored in discussions around participants comparing themselves to the cohort average in the VLE engagement data. It may be assumed that Tinto's model describes one student's longitudinal journey through from pre-university to graduation. However, the importance of social interactions and peer benchmarking would suggest that multiple student journeys are all intermingling with each other.

Tinto's model was utilised to inform the interview question framework and model for deductive analysis. Therefore, the findings above, have thus far fully supported Tinto's multitude of student factors influencing student engagement and persistence at university. Through inductive coding, several other factors were identified as being influential and important for engagement, such as study location, stress and the COVID-19 pandemic.

The physical location of studying was mentioned by all participants. Most of the participants found that their study behaviour was more focussed in the library compared to working at home, and the library gave a useful distinction between work and home space. Historically, a library's main purpose was as the physical holding space for references texts. With the majority of literature now available online, libraries have had to adapt their purpose and use of space (Pomerantz and Marchionini, 2007). Libraries have increased study space and become hubs for IT and academic skills support services (Kuh and Gonyea, 2003). Similar to the findings in this study, other studies have shown that students value

libraries for their quiet space where they can study uninterrupted and concentrate for a long period time (Lin et al., 2010) and are motivated by a community of other students studying around them (de Jager, 2015).

Stress was a key factor discussed by participants in relation to academic workload, assessments, and fear of failure. Stress can often be thought of as continuum with limited amounts useful to apply pressure to engage, however excessive amounts or piling up of stress being responsible for poor mental health, disengagement and withdrawal (Gohm et al., 2005). Stressors reported by participants reflect those in the literature (Marshall et al., 2008, Gupchup et al., 2004, Votta and Benau, 2013). In particular, the intensity of the curriculum, heavy workloads, long study hours and assessments. Some researchers recommend that the university environment could be made less stressful and more nurturing, allowing students to have a higher self-efficacy (Schunk and Mullen, 2012). This might be achieved through better scheduling of classes and spacing out of assessments (Marshall et al., 2008) and promotion of support services available (Awé et al., 2016). Whilst, others state it is impossible to eliminate all stress, and that students should strive to become stress hardy and resilient, so they have effective techniques for managing stress and pressure at university and in future workplace (Brooks et al., 2012).

The impact of the COVID-19 pandemic was seen throughout participants' responses regarding both their academic and social engagement. Similarly to other studies, participants experienced difficulties engaging with online teaching (Sun, 2021) and felt disconnected with other students and the university environment due to lockdown and social distancing enforcements (Elmer et al., 2020). Other studies also reflect the positive aspects of COVID-19 discussed by participants , such as increased accessibility, flexibility and autonomy (Herwiana and Laili, 2022), and increased productivity due to reduced travel/commuting time (Kern and Tague, 2022). Tinto's model does not account for such unpredicted

events that can totally upturn a student's emotional, cognitive and behavioural engagement. Despite the challenges and restrictions presented by the COVID-19 pandemic, the participants demonstrated resilience and adapted in their own way to make the academic and social systems work for them.

6.3 Contribution to knowledge: pharmacy student engagement and Tinto's model

Overall, the findings have demonstrated the multi-factorial nature to pharmacy student engagement. Although Tinto's model served as a valuable framework to explore these factors. some authors have found that Tinto's model does not sufficiently describe the detail and personal meaning attributed to each factor, rather categorizing a student's experience into broad generic factors (Brunsden et al., 2000, McKeown, 1993). This thesis has added depth, description and new knowledge to each of these factors. For example, participants described the impact of various individual attributes (such as being an international student, being a mature student, their own mentality, and physical and mental health issues) on their academic and social integration and engagement. For pharmacy students in particular, their families influenced their decision to study a healthcare degree, and the pharmacy vocational element drove their goal commitment and engagement with clinical pharmacy topics and practical teaching approaches.

Within Tinto's model, academic integration is portrayed to be related to student grade performance and intellectual development. Whilst both of these factors were discussed with participants, new knowledge was gained on the impact of teaching approaches, assessments, study location, the COVID-19 pandemic, workload and stress on pharmacy student academic engagement.

Similarity for social integration, Tinto's model represents this through peer-group and faculty interactions. In this thesis, new knowledge was gained on friendships, balancing socialising with

academic commitments, living arrangements, extracurricular activities and the COVID-19 pandemic. These were shown to be both enablers and barriers to participants' social engagement, wellbeing, sense of belonging and academic engagement.

These new findings have demonstrated that Tinto's model is not a "capture all". As is the nature of model that was developed 50 years ago, it is inevitable that educational practices and society evolve. Models should be adaptable, iterative and malleable, depending on the evidence presented. Based upon this thesis' findings, an adapted version of Tinto's model is shown in figure 9.

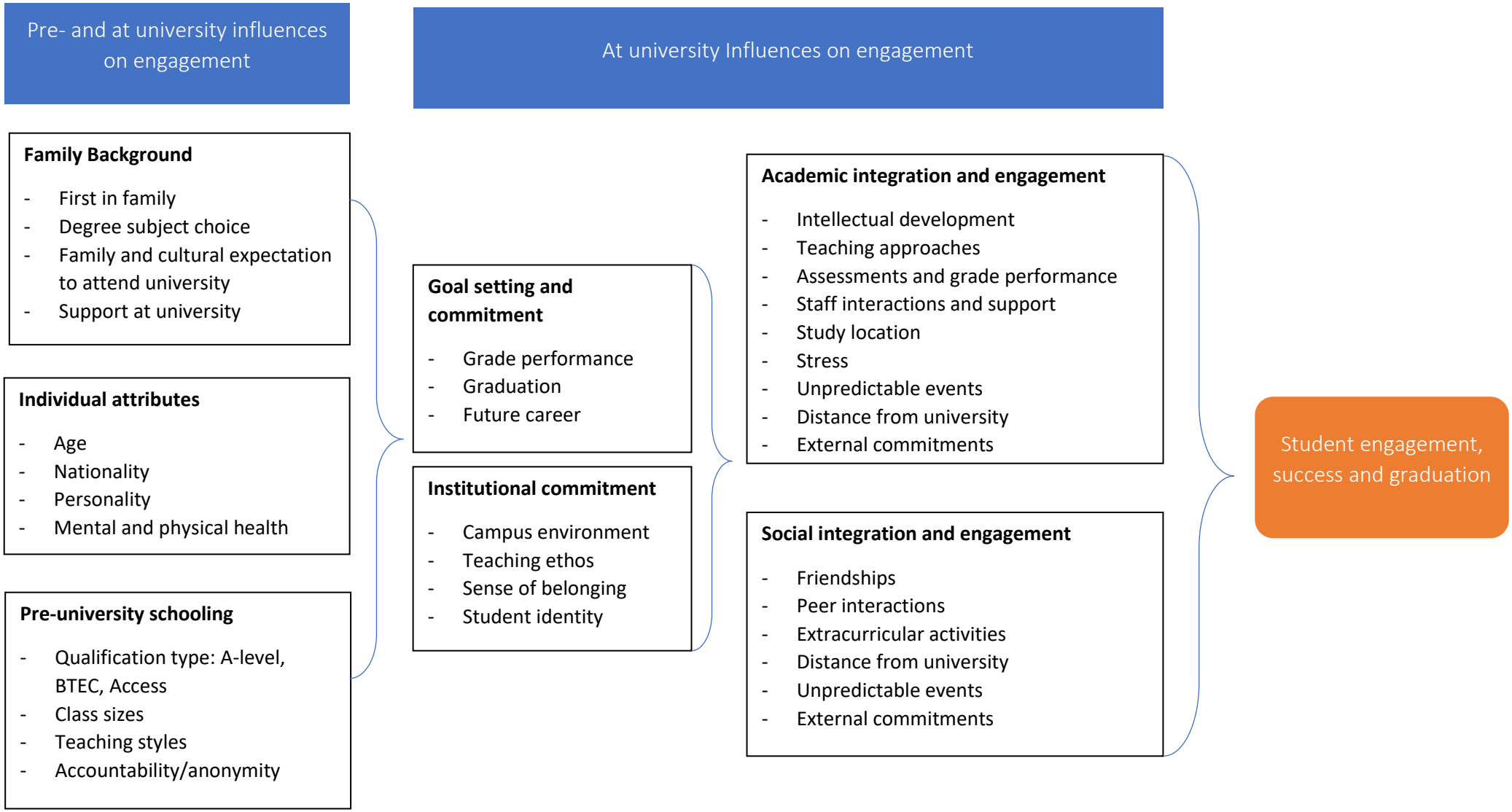


Figure 9. Adapted Tinto's model to demonstrate influences on pharmacy student engagement described within this thesis.

6.4: Pharmacy students' perceptions of the use of data to monitor their engagement

In line with the studies presented in the literature review (Payne, 2019, Gollins, 2005), most participants felt strongly that attendance monitoring was a paternalistic approach and did not appreciate their autonomy and differing study habits. Using attendance data as a punitive system to impose improvements in their engagement was described by participants to be outdated, ineffective and at worse detrimental. Some participants believed that the current system for attendance monitoring was too slow and reactive to identify a student in difficulty until it is too late. Other universities have shown success with fingerprint systems or face recognition, to record attendance in an automated system, with data readily accessible to students and staff via a dashboard (Benyo et al., 2012, Jaikumar et al., 2015, Ula et al., 2021, Kowsalya et al., 2019, Yahya and Anwar, 2013). These systems have been shown to be reliable, user friendly and demonstrated to improve punctuality and attendance (Bicard et al., 2012) and attainment (Newman-Ford et al., 2008). However, the collection and storage of student biometric data may raise legal data protection issues and appropriate consent and data security must be guaranteed.

This was the first-time students on this course had been presented directly with their engagement data. All participants could readily see the benefits of data analytics systems for themselves, and some participants mentioned the wider implications for academic staff and the university to use the data to improve educational and support processes. Almost all participants described an enjoyment, interest and reflection when getting their values, and wished to continue receive this data in the future. This supports the use of data analytics as actionable intelligence (Campbell et al., 2007) to allow earlier identification of students in difficulty, supporting students to improve engagement and retention, as demonstrated by data analytic systems used at other UK and international universities (Jokhan et al., 2019, Soffer and Cohen, 2019, Barnes et al., 2015, Arnold and Pistilli, 2012, Villano et al., 2018, Sclater et al., 2016).

As was found in the Nottingham Trent, Southampton Solent and Purdue University studies on data analytics (Sclater et al., 2016, Khan, 2017, Arnold and Pistilli, 2012), almost all participants were accepting of their VLE and other digital data being monitored and reported. Only one participant felt that data collected on activities undertaken away from the university campus, such as VLE use on home computers, felt more intrusive and less acceptable. This concurs with literature that students should be fully informed and reassured of the purpose of data collection, how it will be collected, who will have access and how it will be used, before giving their consent for their digital data to be monitored (Roberts et al., 2016, Arnold and Sclater, Shacklock, 2016).

6.5: Accuracy of VLE engagement data to portray academic engagement

All participants felt the VLE graphs gave a useful visual representation of their engagement throughout the academic year. All participants could identify the peaks and troughs in their data and could relate this to workload on each module, coursework submission, and their varying energy levels and engagement at the beginning compared to the end of each term. This mirrors the positive student feedback seen with the Nottingham Trent dashboard, where students valued seeing their daily and weekly engagement scores (Sclater et al., 2016). Some participants also discussed how the VLE graphs could be used by academic staff to know when there are declines in students' engagement with VLE such as towards the end of each term, and how staff could take more targeted approaches to encourage student engagement during those times.

The graphs showed some commonality between participants and their engagement journey, for example most followed a similar trajectory. However, as is the nature of engagement, it must be acknowledged that every student's engagement journey is unique. As suggested by Campbell et al.

(2007), academic staff must never make assumptions as to why a student's engagement data has increased or decreased, but must be open to consider the wealth of personal factors that influence a student's engagement. This was pertinent for Jane, Bruce and Krishan, where significant events had a negative effect on their ability to engage academically.

As discussed in Chapter 2, the accuracy of the learning analytics data governs its usefulness in predicting, detecting and acting upon student non-engagement (Villano et al., 2018, Saqr et al., 2017, Dron and Anderson, 2009). Most participants felt that VLE data was potentially more accurate than attendance data, although both had their flaws. For example, the data could only tell you whether they were physically present in a lecture and whether they had logged on the VLE. However, as shown in this thesis time spent in lectures or on the VLE is not always fully focused, interactive and participatory. Some participants also described differing studying habits, for example some downloading content from VLE, some repeatedly watching the screencasts on VLE.

Most participants agreed that a more comprehensive data analytics system with a wide range of engagement data measures may give a better overall picture of a student's engagement. However, some participants felt this could also be exponentially more inaccurate as there would be more points where data could be misrepresentative of actual student engagement and behaviour. This sits with the proposition by Chatti et al. (2014) that learning analytics is "data rich but information poor". Data analytics works on the assumption that a student's time spent on educational activities, such as lecture attendance, accessing teaching materials on VLE and attending the library, is all part of their constructive activity of learning. However, it could not show whether the student was focussed, engaged or otherwise distracted.

The majority of participants also felt that student intentional and unintentional actions, could lead to the data being inaccurate and misleading. For attendance monitoring this was felt to be more of a conscious decision such as tapping in your friend's card or registering your attendance then leaving the lecture. Whereas with the VLE, some participants thought that their data may be inflated due to inadvertently leaving the tab open or clicking on lots of links to find the information they needed.

Most participants felt that if engagement monitoring was only used for supportive measures, rather than punitive, there would be no need for students to cheat the system. Some participants postulated that when data analytics systems become standard practice, students may forget they were being monitored and there would be no need to "play the system". Other universities have minimised the impact of students cheating data analytics, through a system which detects and adjusts for unusual spikes in student behaviour, or through removing any incentive to cheat by removing any punitive measures for non-engagement (Shacklock, 2016).

As demonstrated within the first research question, it was participants' self-motivation that most positively influenced their engagement. These inner thoughts cannot possibly be measured by any digital data. This study has demonstrated the unique non-recordable study habits, thoughts and understanding, which are core parts of a student's engagement and learning experience. This leaves me to conclude that VLE data monitoring is a valuable tool to gain an overview of students of engagement and to identify students in difficulty. However, VLE and other digital data are limited, and cannot be used to fully understand or explain students' individual experiences and behaviour at university (Daniel, 2015, Elias, 2011, Siemens and Long, 2011).

6.6: Influence of engagement data on students' engagement behaviour

The key to learning analytics being influential on student behaviour, is thought to be wholly dependent on human factors (Buckingham Shum et al., 2019). This study demonstrated that participants are their own change agent and will self-determine whether they find the data useful and will self-regulate their willingness to modify their engagement. This is thought to be dependent on their autonomy, capacity and power to make changes and any modifiable or non-movable barriers (Elias, 2011). Utilising the COM-B model, participants demonstrated differing capacity, motivation and opportunities to take action to be more engaged.

Similar to the work by Zimmerman and Kitsantas (2005) on self-regulated behaviour, some participants showed capacity to be a limiting factor to their behaviour change. This included self-doubt, lack of awareness of how to change and uncertainly about alternative approaches of studying. This also mirrors Li et al. (2021), findings that uncertainty-avoidance influences a students' confidence, motivation and courage to make a change. Studies have shown providing guidance, giving examples of successful approaches, and creating a safe space where student can practise activities which develop students study skills, supports a student's capability to change (Castro et al., 2021, Sagar-Ouriaghli et al., 2020, Michie et al., 2014).

A key part of the motivation stage, is reflection of where you presently are and what you would like to achieve (Michie et al., 2011). All participants in this study described finding the VLE data useful to see how they were progressing compared to peers, and the majority of participants stated that having their engagement data did make them think and reflect on their engagement. For most participants the motivation to change was steeped in their belief that being more engaged would have a positive outcome for them. This supports other studies that show that motivation, effort and persistence is

strongly influenced by the likelihood of the expected positive outcome (McAteer et al., 2008, Mill et al., 2023). The literature review has already demonstrated the positive correlations between time spend on VLE and attainment and progression (Atherton et al., 2017, Saqr et al., 2017), which supports the participants' motivation to change their behaviour for a beneficial outcome.

For opportunities, all participants discussed both facilitators and barriers, however this was more skewed towards the barriers, with time and heavy workloads being the most limiting for participants. Other studies have also shown barriers to be access to information, availability of support services, stigma of asking for help, relationships with service providers, and negative past experiences (Sagar-Ouriaghli et al., 2020, Barker et al., 2016). In contrast to this, participants in this study did feel that they had a good level of support from tutors and central university services such as library advice. Barker et al. (2016) demonstrated that being part of a team or peer group, reinforced social opportunities to change behaviour. Most participants in this study talked positively about their peers and their support engaging academically. As involvement in this study was anonymous, participants weren't aware which of their peers were participating, so were not able to experience that group opportunity of behaviour change.

For a small proportion of the participants, being presented with their VLE data, did result in a self-reported behaviour change. These participants described being motivated to study more, planning future week's study schedules, catching up with lecture content on VLE, and reported then feeling pleased when they saw an improvement in their next set of VLE data. The biggest motivator for this behaviour change was the comparator to the cohort average, which drove participants to study more in order to match or exceed this value. This supports findings from other learning analytic models where student progress is mapped against others (Jokhan et al., 2019, Sclater et al., 2016).

For participants who already felt content with their study habits, the VLE data was a useful reminder but was not a significant motivator to change their behaviour. For other participants, although their motivation to improve or maintain their engagement was strong, they lacked time, belief, and experience to change their engagement behaviour. This mirrors the findings of Garip et al. (2020) and (Wong et al., 2020), where despite high motivation and intentions to make a change, capability and opportunity limited their behaviour change.

6.7 Contribution to knowledge: COM-B and learning analytics

This thesis is believed to be the first to explore learning analytics in a pharmacy student context. The findings add to the knowledge on student acceptability of having their engagement monitored. The long-standing impact of attendance monitoring being used as a disciplinary measure to enforce pharmacy student attendance, was reflected in participants' negative views towards attendance monitoring. It may be postulated that participants were more accepting and positive around VLE monitoring as they gave their consent for this to be monitored, the data was reported directly to them and there was no disciplinary consequence of this data being high or low. This thesis demonstrated the participants' desire to have a student facing dashboard, with the view that learning analytics is their data and they should be able to take ownership of it.

Additionally, this thesis is believed to be the first to utilise the COM-B behaviour change model to explore the impact of learning analytics on student engagement behaviour. The findings have added new knowledge on influences on pharmacy student capability, motivation and opportunity to change. Only a small number of participants described a change in their engagement behaviour, demonstrating that most participants did not have all three components of COM-B; the capability motivation and opportunity to change. This thesis has shown that an intervention is needed to support

each of these components. For example, offering academic skills support to students, helping students to set goals, and utilising peer support to instil confidence in students to change.

An adaption of the COM-B model is shown in figure 10. This demonstrates the input of learning analytics in instigating student reflection and planning of a behaviour change, the need for an intervention to support student capability, motivation and opportunity, and the output as a change in engagement behaviour. Figure 10 also illustrates student engagement as a cyclical process, which will change throughout an academic year.

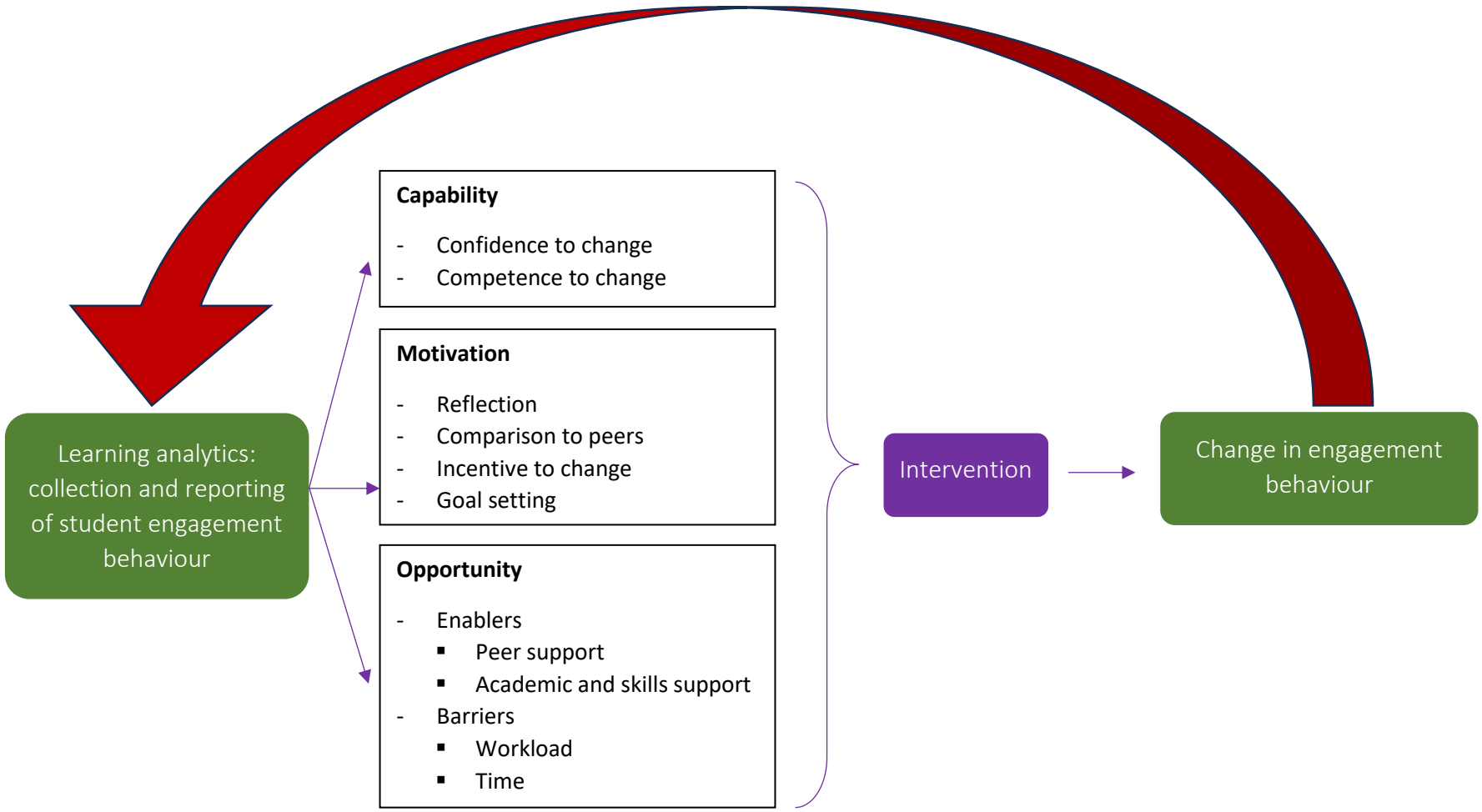


Figure 10. Adaption of COM-B to include the influence of learning analytics as an input and output

6.8: Chapter summary

This Chapter has discussed the key findings of this thesis. All aspects of Tinto's model were seen to be influences on participants' engagement, with goal commitment to becoming a pharmacist the most significant on student's continued engagement with the course. All participants were not in favour of attendance monitoring, with this system being seen as inaccurate, paternalist and used for punitive measures. All participants were supportive of VLE data being collected and being able to benchmark their engagement against the cohort average motivated some participants to reflect, plan and make changes to their engagement behaviour. The VLE engagement graphs gave a useful representation of participants' engagement journey, which can support students and tutors to have discussions about engagement. Most participants were open to the idea of a full learning analytics system; however, care must be taken to not only focus on student data, but to understand the holistic and interconnected personal, academic and social factors that influence a student's engagement.

Chapter 7: Conclusions and Implications for practice

7.1 Chapter introduction

This thesis set out to explore influences on pharmacy students' engagement and the potential impact of learning analytics on changing their engagement behaviour. This chapter will conclude this study's key findings and what they mean for the Pharmacy Department, University and wider research community. Recommendations will be made on supporting student engagement and the use of engagement data, which may be implemented at a local and national level to help understand and influence student engagement behaviour. Suggestions for future research will be given, which could supplement or extend this research's findings.

7.2 Conclusions and implications related to influences on student engagement

The main finding of this study regarding influences on engagement, was the importance of participants' career orientated motivations. This drove their commitment to be on the MPharm and to engage with the teaching and assessments, in order to graduate and become a pharmacist. Understanding student motivations and delivering clinical pharmacy content that is explicitly sign-posted to students' long-term goals will act as a regular reminder for students of their vocational motivation and will continue to support their engagement. Historically the MPharm degree was a purely scientific degree, which over time has evolved to be a balance between the science and clinical pharmacy practice (Jesson et al., 2006). Whilst some universities have achieved an integrated science and vocational practice curriculum (Husband et al., 2014), there is still room for improvement in some programmes, particularly those that are science-heavy in the first year of study (Guile and Ahamed, 2011). The MPharm degree at this university is currently being re-designed for re-accreditation with

the GPhC. The new programme has significantly more clinical teaching and experiential learning, which should positively reinforce students' career orientated motivations and engagement.

Social integration and a feeling of belonging at university was found to be fundamental to participants' emotional and holistic engagement. This study found that more could be done to encourage social integration for mature students. Other universities have been successful with anti-ageism mandates, student networks, peer support for mature students and advocating socially integrated classes which recognise the value of experience that mature students bring (van Rhijn et al., 2016, Ashar and Skenes, 1993). These recommendations for peer support networks and promotion of mature student integration academically and socially should be implemented at both a department and university level. For all students there should be opportunities to engage with peers as often as possible within teaching, and social events could be timetabled within normal university hours (9am-6pm), rather than during evenings and weekends, to encourage inclusivity and participation.

The COVID-19 pandemic was an unexpected and unpredictable event that significantly impacted the participants' engagement experience. Despite the challenges, participants highlighted many changes that were beneficial, such as lecture screen-casting and flexibility to manage their workload. Going forward, these positive changes should be continued and built-upon to support student accessibility, autonomy and flexibility. Other universities have shown that the COVID-19 pandemic forced innovation and they have continued to benefit from virtual teaching (Da Silva, 2020, DeVaney et al., 2020). With the return of students to campus, post the COVID-19 pandemic, the university has implemented a new lecture capture system. This allows students to have high quality recordings of the lectures and slides, which promotes student inclusivity and engagement. Demonstration videos which were created within the department during the pandemic, should continue to be made available to students to support their learning.

7.3 Conclusions and implications related to student engagement data

A key implication of this study's findings is that the current attendance monitoring approach is seen by participants to be an inaccurate representation of their engagement. The use of this data in a punitive way, such as calling students into stage one or two academic engagement meetings, encourages students to cheat the system, leading to unreliable data. Within the department the students and staff perceptions on the use of attendance monitoring must be shifted from punitive to supportive. This may include delivering introduction sessions to students on the purpose of engagement monitoring and the relationship between engagement and student success. Further guidance should be given to tutors regarding having supportive discussions with tutees about engagement. Tutors should spend more time initially getting to know their tutees, to establish any background factors that may influence their engagement at university. Where barriers are identified, support should be given. For example, through helping get a car parking permit for those who commute, facilitating timetable swaps for students with carer responsibilities, and signposting to support services within the university. Engagement is an iterative and continuous process, and students need regular reviews of their engagement and ongoing support. Therefore, a recommendation would be more frequent meetings with tutors to encourage more open discussions with their tutees about factors including their engagement.

The introduction of VLE engagement monitoring presented directly to participants alongside the cohort average was shown to be useful to prompt student reflection and benchmarking with peers. The department and university should consider engagement monitoring systems with student facing dashboards. Participants were also supportive of a full learning analytics system. Systems for monitoring engagement need to be reviewed, with consideration of a more comprehensive system of engagement monitoring. This would need to be considered alongside IT resources, cost and staff capacity to implement and manage such a system. Ideally, this would also be an automated system

with real-time reporting of engagement data for quicker identification and interventions for students in difficulty. Regular reporting to students and staff allows tracking of engagement and would facilitate tutor discussions mentioned above. Students can identify times when their engagement was lower than expected and following action may be able to see their improvement in engagement data.

This study found that the VLE engagement data alone did not change participants' behaviour, and that participants needed support to improve their capability, opportunity and motivation to change. Alongside the recommendation to increase tutor meetings, the department could consider setting up group "engagement support sessions" at least once per term. This session could provide students with the time and opportunity to pause and reflect on their engagement and discuss their engagement with other students. Peer-support was mentioned in a largely positive way in this study. Peer assisted learning (PAL) has been shown to be an effective approach in pharmacy education to support skill development, confidence and performance in assessments (Cole et al., 2018). PAL is thought to be mutually beneficial for the PAL leader, who develop leadership skills, personal and professional skills, self-awareness, and a deeper understanding of course material. (West et al., 2017). Therefore, the engagement support sessions could be delivered as PAL focusing on peer discussions around engagement behaviours and sharing techniques and motivations to improve or maintain engagement. Mentoring schemes exist within the university, and these should also be promoted more to students.

7.4 Conclusions: Staff and student commitment to engagement approaches

Referring back to the working definition of engagement in Chapter 1, engagement must be viewed as a two-way process. There needs to be a commitment from the university in terms of training academic tutors to offer consistent and regular academic and pastoral support, investing in robust engagement monitoring systems, and creating supportive and engaging teaching environments. There also needs

to be a commitment from students to be reflective, supportive of their peers, and invest their time and energy to being engaged with their studies and university life. Students should also be involved in any interventions made, for example on working groups for implementing engagement monitoring systems. This thesis has shown the importance of listening to students' accounts, and their perceptions of what is most influential, supportive and useful for their engagement.

7.5 Limitations of findings and proposals for future research

It is important within research, to consider the results together with factors that may influence their validity and generalisability. Research methods limitations were discussed within the methodology chapter and mitigations were made throughout the research process to ensure that the results were analysed, presented and discussed in an un-biased way. However, this section will consider factors which may influence the implication of these results, and how future studies could mitigate the limitations, and support the current findings.

Volunteer bias is a well-documented phenomenon, where the nature of people volunteering for studies, is typically those with higher social capital, innate confidence or strong opinions that they wish to be heard (Callahan et al., 2007, Tyldum, 2012). Care was taken to ensure all participating student voices were heard and that no one participant dominated the findings. For example, within chapters 4 and 5, each participant's voice has been represented between 12-15 times.

Upon reflection, my position as an insider researcher was beneficial to allow an immersion within the topic and a connection with the participants. During the interviews a comfortable and natural rapport was developed with the participants and I believe they gave open and honest responses. However, insider research could have posed key issues, for example the potential for bias, the

influence of a “power” relationship coercing student to participate, maintaining participants’ confidentiality and protecting the reputation of the institution; all of which and how they were avoided were discussed within Chapter 3. One mechanism to minimise bias was my researcher reflexivity and critical self-questioning of values and judgements at multiple timepoints throughout the study (Coe et al., 2021). Bias whilst coding was minimalised through the use of deductive codes derived from the literature, but also being fully open to new emergent codes. The laborious process of re-watching/listening to the recordings alongside the transcripts, aimed to maintain each participants’ perspective within the coding and analysis. Whilst presenting each theme and the participants’ examples to illustrate each theme, I continually self-checked that I was consistently, fairly, and as accurately as possible portraying each participant’s story.

Whilst a fairly diverse participant sample was achieved, with regards to gender, ethnicity, international students, mature students, BTEC students, and commuters. A different sample from the same student cohort may have given similar, differing and additional factors (Payne, 2019). Future studies could include comparison of students from this university with other Schools of Pharmacy, with differing entry requirements and student demographics. As stated in Chapter 1, the MPharm degree involves a substantial teaching load and professional expectation that students engage fully in their studies. Therefore, future research could explore engagement in pharmacy students compared to students on degrees with different teaching approaches or non-vocational degrees.

The VLE engagement data graphs showed variety in participants’ engagement journeys, with high and lows of engagement levels. As is the unique and constructivist nature of engagement, the participants’ engagement attitudes and behaviours discussed in this thesis cannot be assumed to represent the entire view of the students within the pharmacy department at this university. Future studies could be targeted at non-engaged or drop-out students, to understand their influences on

engagement and the impact on VLE data. A challenge may be that this non-engaged/drop-out groups of students may be difficult to recruit, engage and persist with this type of study.

Each interview captured participants' feelings at that particular time. It is important to recognise that the participants' thoughts on engagement and engagement behaviours are not static. Participants' views and emotions can be described as pebbles on a beach, which are in constant flux as they interact with human and non-human activity (Ellingson and Sotirin, 2020). Some participants reported one-off behaviour changes, for example an improvement in the VLE data the subsequent week. However, sustained and maintained engagement changes were not described by the participants. Further longitudinal studies, such as following up these students over the course of their entire degree, may give a fuller picture of each student and their engagement behaviour.

In contrast to the quantitative studies on learning analytics presented within Chapter 2, this study focussed on qualitative students' own accounts. The VLE engagement graphs were used to support discussions in the second interview and were not quantitively analysed to measure a change in participants' behaviour. Participants self-reported whether their engagement behaviour had changed as a result of being presented with their VLE data. Further research could be undertaken to quantitively measure changes in engagement, for example having a control group and intervention group, with the intervention group regularly reported this VLE engagement data. Future research may also explore the use of other digital data, such as attendance, VLE data and library data combined.

This was a non-interventional study, where the VLE engagement data was sent to participants every 2-3 weeks. Further studies could include an intervention, such as a discussion about their engagement, offering student engagement support sessions (as mentioned above). This could then be evaluated

through student interviews or quantitively, for example as improvements in engagement data, student attainment and progression at the end of an academic year.

7.6 Impact of research and implications for practice

This section will discuss the impact of this research at a personal level and the potential impact at a local, national, and international level.

The findings of this thesis have been shared within the department of pharmacy and university library and will soon be shared at a university teaching and learning showcase. Dissemination of the findings, in particular the influences on student engagement, will lead to actions to improve student engagement. For example, changes to the curriculum to increase clinical and experiential learning, setting up networks for mature students, introduction of peer-led sessions to support student engagement. From September 2023, the intention is to pilot the collection and reporting of VLE data to all pharmacy students at the study university. With future intentions to work with our university technology enhance learning team to be involved in the design of learning analytics across the university.

Within the pharmacy sector, these findings have added new qualitative knowledge on the influences on pharmacy students' engagement. As mentioned in chapters 2 and 3, the majority of engagement studies focus on year 1 university students. This thesis purposively targeted year 2, 3 and 4 pharmacy students, and therefore added new knowledge on this previously less-well studied population. Dissemination of these findings at national/international conferences and within peer-reviewed journal publications has the potential impact to influence practice at other schools of pharmacy. The UK MPharm has parallels to other pharmacy degrees internationally and key findings may be transferrable to these settings.

With the higher education sector, these findings have added new knowledge on learning analytics, in particular the exploration of the impact of learning analytics on student engagement behaviour. Interviewing students at the beginning and end of an academic year, and the use of VLE engagement graphs, allowed this study to add new knowledge on engagement journeys for students. Dissemination at educational conferences and publications, have the potential to influence practice at a range of other higher education institutions nationally and internationally. With the use of learning analytics ever-growing, these insights may be useful for those at the design and implementation stage.

Finally, when reflecting upon my doctorate journey, I was able to draw my own parallels to Tinto's model. My pre-doctorate education, of a master's degree, clinical diploma and post graduate certificate in academic practice, put me in good stead for the academic demands of the EdD taught element. Within my family, my mother studied part-time for a degree when I was child, and that is reflected in my own journey as a part-time researcher, part-time academic and full-time mum. Completion of the doctorate has been largely driving by my own self-disciplined and determined mentality. With the end goal of being a doctor posted on my office wall as a constant reminder. The decision to complete this research within the department in which I work was driven by my institutional commitment to improve student experience for our students. I fully engaged with the initial taught EdD element and developed my theoretical knowledge of educational theories, research paradigms, qualitative and quantitative research methods. I gained practical skills on reviewing literature, designing research and academic writing. Feedback and support from academic staff during the taught element and from my supervisors during this thesis have been so valuable to keep me engaged and on-track. A key reason for undertaking an educational doctorate was the peer support; a group of like-minded pedagogic researchers who have supported each other throughout

this process. This replication of Tinto's longitudinal model demonstrates two points: firstly my journey and growth as a researcher throughout this process. Secondly the applicability of Tinto's model not just to UK undergraduates (as shown in this thesis), but also to UK postgraduate student engagement. As a researcher I look forward to dissemination of this work and future work to build-upon this.

7.7 Final summary and reflections

This thesis presented the rich and unique lived experiences of engagement for 13 pharmacy students over an academic year. The findings have added to the literature to understand the influences on pharmacy student engagement and the use of learning analytics to represent student engagement. Approaches to support and encourage student engagement must be consistently embedded with university systems and student voice must be considered to tailor effective interventions. Learning analytics allows the conceptualisation of student engagement, and with appropriate guidance, opportunities and motivations, can lead to improved student engagement, outcomes and retention. Engagement is a multifactorial constructivist concept, and you must "*look at the whole picture*" in order to understand and influence student engagement behaviour.

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Appendices

Appendix one: Participant information sheet

PARTICIPANT INFORMATION SHEET

Project title: Exploring student engagement: influences and monitoring

I am undertaking my doctorate in Education (EdD) with the Institute of Education, at the University of Reading. You are being invited to take part in the above research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully.

What is the purpose of the study?

The purpose of this research study is to explore influences on pharmacy student engagement. The study will also look at the impact of engagement monitoring (such as attendance registers and use of Blackboard) on your engagement.

This study involves three sequential stages:

Stage one (October 2020): a one-to-one interview with myself to discuss your thoughts about engagement and what influences this for you.

Stage two (November 2020 to March 2021): you will receive fortnightly emails from myself with your blackboard engagement data (time spent and number of hits in Blackboard). There is no need for you to reply to these emails, they are for your own information. To protect your anonymity, this information will not be shared with your tutor or the Director of Teaching and Learning.

Stage three (end of March 2021): will involve a final interview with myself to discuss your experience of having your engagement data reported to you during Spring term.

Why have I been invited to participate?

You have been identified to take part as pharmacy students who have experience with attendance monitoring. We aim to recruit 10-15 students for this study. If more than 15 students volunteer to participate, 15 students will be chosen at random.

What will happen if I take part?

You will be invited to take part in TWO interviews (one in October 2020 and one in March 2021) lasting between 40-60 minutes each, based on your experiences of engagement. The interviews will take place either face to face on campus, with appropriate social distancing and health and safety arrangements, or via MS teams video call. The interview will be arranged at a mutually convenient date and time. With your agreement, the interview will be recorded and transcribed.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to keep and asked to sign a consent form. If you decide to take part, you are still free to withdraw at any time and without giving reason by contacting me via email on c.a.langran@reading.ac.uk.

Taking part in the study or deciding to withdraw will have nil consequence on your course assessment or progression.

These interviews with myself about your engagement, does not replace any discussions you may have with your academic tutor, year tutor or the Director of Teaching and Learning. If you have any concerns about your engagement or ability to study at any point during this project you should discuss this with your academic tutor or the university welfare team.

What are the benefits of taking part?

For you: participating in the interviews and fortnightly reporting of engagement data, will give you the chance to reflect on your engagement and may support you to make positive changes.

For the School of Pharmacy and University: your involvement will allow us to explore key issues related to student engagement and make recommendations for improved policy and practice.

What are the possible disadvantages of taking part?

In agreeing to take part in this study there will be a time commitment to consider, as the interviews are likely to each last between 40 and 60 minutes. While there will be a time commitment required from participants, it is felt that the benefits of involvement will outweigh the costs.

Will what I say be kept confidential?

The information given by students in the project will remain confidential and will only be seen by myself and by two EdD supervisors. All electronic data will be held securely in password protected files on a non-shared PC and all paper documentation will be held in locked cabinets in a locked office. Voice recording of the interviews will be deleted once transcription has taken place and been checked for accuracy. No real students' names will be used, and no individual students will be identifiable in any published report resulting from the project. All anonymised research data will be retained indefinitely whereas any identifying information such as consent forms will be disposed of securely after the research findings have been written up.

The organisation responsible for protection of your personal information is the University of Reading (the Data Controller). Queries regarding data protection and your rights should be directed to the University Data Protection Officer at imps@reading.ac.uk, or in writing to: Information Management & Policy Services, University of Reading, Whiteknights, P O Box 217, Reading, RG6 6AH.

The University of Reading collects, analyses, uses, shares and retains personal data for the purposes of research in the public interest. Under data protection law we are required to inform you that this

use of the personal data we may hold about you is on the lawful basis of being a public task in the public interest and where it is necessary for scientific or historical research purposes. If you withdraw from a research study, which processes your personal data, dependant on the stage of withdrawal, we may still rely on this lawful basis to continue using your data if your withdrawal would be of significant detriment to the research study aims. We will always have in place appropriate safeguards to protect your personal data.

If we have included any additional requests for use of your data, for example adding you to a registration list for the purposes of inviting you to take part in future studies, this will be done only with your consent where you have provided it to us and should you wish to be removed from the register at a later date, you should contact Catherine Langran or Professor Elizabeth McCrum e.m.mccrum@reading.ac.uk

You have certain rights under data protection law which are:

- Withdraw your consent, for example if you opted in to be added to a participant register
- Access your personal data or ask for a copy
- Rectify inaccuracies in personal data that we hold about you
- Be forgotten, that is your details to be removed from systems that we use to process your personal data
- Restrict uses of your data
- Object to uses of your data, for example retention after you have withdrawn from a study

Some restrictions apply to the above rights where data is collected and used for research purposes.

You can find out more about your rights on the website of the Information Commissioners Office (ICO) at https://ico.org.uk

You also have a right to complain the ICO if you are unhappy with how your data has been handled. Please contact the University Data Protection Officer in the first instance.

What will happen to the results of the research?

The data will be analysed and used in my EdD thesis. The results of the study may be presented at national and international conferences, and in written reports and articles. We can send you electronic copies of these publications if you wish.

Who has reviewed the study?

This application has been reviewed following procedures of the University of Reading Research Ethics Committee and has been given a favourable ethical opinion for conduct. The University has the appropriate insurances in place. Full details are available on request.

Name, position and contact address of Researcher	Name, position and contact address of Supervisor
EdD student name: Catherine Langran Contact details Email: c.a.langran@reading.ac.uk Tel: +44 (0)118 3787017	**Professor Elizabeth McCrum** *Pro-vice Chancellor (Education & Student Experience)* University of Reading Whiteknights Campus Whiteknights House Reading RG6 6UR UK Email: e.m.mccrum@reading.ac.uk Tel: +44 (0)118 378 6140

Appendix two: First interview questions

Questions & prompts	Topic/framework
Tell me about your family background: did you parents or siblings go to university? What influence did you parents have on your choice of university/subject? Tell me about your previous experience of studying before university - A-levels, BTEC, IB levels etc What were the key differences between school/college and university? How would you describe your character/personality?	Family background Pre-university experience Individual attributes
Why did you decide come to university? Why did you decide to study pharmacy? What are your short-term goals? What are you longer term goals? What motivates you at university?	Institutional and goal commitment
Can you describe a typically week at uni for you? - time spent in lectures/workshops, private study, library, - evenings and weekends: study, social, part-time job, family How engaged/focused are you when in class? - Lectures - Workshops/practicals - Online learning - preferred teaching approaches How intellectually stimulating/challenging do you find the course? - What parts do you enjoy/not enjoy? Can you tell me about working with other students on the course? - Comparisons to peers - influence of others - group-work - feeling part of community Can you tell me about your interactions with staff on the course? - Level of support, approachability, Can you tell me about the use of Blackboard? - How often do you access BB? - ease of use - other online resources/distractions	Academic engagement Intellectual development Peer interactions Faculty interactions Online engagement
How do your friends at university influence your engagement?	Social engagement

- Friend on the course - Flat mates Do you enjoy being on campus? Do you enjoy being a student? Do you undertake extra-curricular activities/clubs/societies at uni or locally? - How does this influence your engagement? Do you live in halls, nearby or commute? - How does this influence your engagement	Sense of belonging
Can you tell me about your experience of attendance monitoring? How well do you think attendance monitoring matches student engagement? - What can it/can't it tell you? How often do you attend/miss classes? What are the reasons for missing classes? What encourages your engagement at Uni? What are the barriers to your engagement at Uni? Have you ever had a discussion with your tutor or member of staff about attendance/ engagement? o How useful was the conversation? o Did this conversation influence your attendance? Have you ever reflected on your engagement and made efforts to be more engaged? Do you think the university should be monitoring engagement? How could student engagement be monitored?	Perceptions of engagement monitoring
Is there anything else related to engagement you would like to discuss?	

Appendix three: Second interview questions

Tell me about your experience of having your Blackboard engagement data reported to you through autumn and spring term? - How did it make you feel? - Did you find it acceptable or intrusive? - Did you ever have the feeling of being watched? - Did you find the data useful? - Did you discuss your numbers with family/friends? - Did you compare your numbers with another student on this study? How did that make you feel? - How did seeing cohort average influence how you felt about your numbers? - How much time did you spend thinking about it? - What can blackboard data tell us about students? - What can't the blackboard tell us about students? - Do you think the values were accurate?	Perception of VLE engagement monitoring
Let's discuss the VLE engagement graphs - Did the blackboard data reflect your engagement throughout autumn and spring term? - What happened in week xx to make your data go up/down? - What was your engagement like at the start, middle and end of each term? - What affected your engagement this year?	Accuracy and explanation of VLE engagement graphs
What was your experience of blended teaching this year? - Overall experience - Comparison autumn and spring term - Comparison to previous years - high and lows - Impact on focus, motivation, engagement How have you found the workload, coursework and deadlines – impact on engagement? How stressful have you found this year? - Related to COVID - Teaching approaches - Workload - Logistics/organisation How supported by staff have you felt this year? Have you been studying in the library at all or all in halls? What's the atmosphere been like in the library? On campus in Halls? – impact on engagement	Influences on engagement: teaching approaches Impact COVID-19

What was the impact of COVID-19 on your social engagement this year?	
Based upon being sent your VLE data - Did it you reflect on your engagement data? - Did you make a plan to change your engagement with blackboard? or how you studied? or how you behaved? - Do you feel you have the skills and competence to change your engagement behaviour? - How motivated were you to make a change? - What influenced your motivation? - What helped or could help you change your behaviour? - What were the barriers to changing your behaviour? - Overall do you feel you made a change in your engagement or study behaviour?	COM-B
Describe learning analytics systems to students, then ask: - What data do you think would be most useful: attendance, blackboard, library, coursework submission, tutor mtgs, - Anything not needed? - Anything else that could be included? - Balance between intrusive/acceptability - Should it be something students consent to each year, or can automatically be monitored by uni- would you consent? - Should students have an option to opt in/out of engagement notifications? - Would you continue the comparison to cohort average? - Trustworthiness – would students cheat the system? - What are the anticipated benefits for students? and drawbacks/disadvantages? - Do you think it would motivate or demotivate students? - How likely is this data to evoke a behaviour change in students? - What are the benefits for staff? - What are the benefits for the Uni?	Perceptions of learning analytics
Is there anything else related to engagement you would like to discuss?	

Appendix four: Email to students regarding VLE data

Dear Jane,

Please see below for you BB data for 14th-29th November

	Cohort average number hits on blackboard	Jane - total number of hits	Cohort average time spent on blackboard	Jane- total time spent on blackboard
PM2A	55.7	92	7.2 hrs	9.2 hrs
PM2B	52.5	132	5.3 hrs	12.6 hrs
PM2C2	86.1	165	8.9 hrs	18.9 hrs
PM2D	94.1	146	14.5 hrs	14.1 hrs

I hope you find this data useful/interesting

Take care, Catherine

Appendix five: Pharmacy student consent form

CONSENT FORM

Research Project: **Exploring student engagement: influences and monitoring**

Name, position and contact address of Researcher	**Name, position and contact address of Supervisor**
EdD student name: Catherine Langran Contact details Email: c.a.langran@reading.ac.uk Tel: +44 (0)118 3787017	**Professor Elizabeth McCrum** *Pro-vice Chancellor (Education & Student Experience)* University of Reading Whiteknights Campus Whiteknights House Reading RG6 6UR UK Email: e.m.mccrum@reading.ac.uk Tel: +44 (0)118 378 6140

This application has been reviewed by the University Research Ethics Committee and has been given a favourable ethical opinion for conduct.

Please initial box

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation involves two interviews (October 2020 and March 2021) ☐

3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason. ☐

3. I agree to take part in the above study.

	Please tick box	
	Yes	**No**
4. I agree to the interview being audio (in-person) or video (MS Teams) recorded.	☐	☐
5. I agree to my attendance data and use of blackboard being accessed by the researcher for the purpose of this study.	☐	☐
5. I agree to the use of anonymised quotes in publications.	☐	☐

Name of Participant	Date	Signature

Appendix six: Post interview guidance sheet

Pharmacy student post-interview guidance sheet

Many thanks for completing the interview exploring student engagement. During the interview you may have discussed factors that influence your engagement at university. This advice sheet directs you to support service available at the university.

Academic Tutor

In the first instance you may wish to make an appointment to see your tutor to discuss any concerns or issues you may have.

University Welfare Team

The Student Welfare team is here to help you with any personal difficulties you may experience during your time at the University.

The team is made up of professional welfare staff who are able to advise you on a wide range of personal and welfare issues that may impact your studies and day-to-day life, including:

- Settling in and adjusting to University life
- Crisis support
- Difficulties with flat/housemates
- Family or relationship issues
- Harassment and bullying
- Drug or alcohol issues
- If you are victim of violence
- Struggling to manage carer responsibilities
- Concerns about a friend
- If you don't know where to go for help

There are two ways you can access help from the Student Welfare team:

1. Drop- In – The team offers a drop-in service in the Carrington building, available Monday – Friday, 10:00 – 16:00, where you can come along and speak to someone in person.

2. Appointment – you can email the team at studentwelfare@reading.ac.uk and ask to arrange an appointment with one of the Welfare Officers.

Student Support Centres

The Support Centre in JJ Thomson building foyer is staffed by Student Support Coordinators who are able to advise you or point you in the right direction for a range of academic and non-academic issues, including:

- Module and programme advice
- Timetable queries
- Coursework and exams queries
- Extenuating circumstances

- Placements
- Transfers, suspensions and withdrawals
- Appeals and complaints

Student Services

Visit Student Services in Carrington building on Whiteknights campus, for help and support in the following main areas:

- Counselling and wellbeing
- Financial support and advice
- Careers advice
- Campus Jobs
- Disability support
- Immigration and international support

Study Advice

Study advice are a professional and friendly team, based with the Library on the Whiteknights campus.

They can help you to:

- develop more effective practices for studying at university
- have a clearer understanding of what tutors expect
- make studying less stressful
- develop your skills for study success

More information can be found on:

http://www.reading.ac.uk/library/study-advice/lib-study-advice.aspx

Life tools

Life Tools is a programme of free talks given by members of staff working in Student Services. The aim of the programme is to increase your knowledge of key topics and learn practical skills to help *you* take control of your personal development and strengthen your skills to achieve your academic potential and prepare for life beyond university.

There are talks on a variety of student-focused topics to help you:

- *to manage academic pressure*
- *increase concentration and boost productivity.*
- manage academic demands effectively
- improve your resilience when life becomes challenging
- enhance your personal wellbeing

To access online resources you can enrol for the Life Tools course on Blackboard. Click the 'Enrol' button and then follow the instructions to get started. Once you have enrolled on the course, you will also have access to weekly emails with details of upcoming talks, and information related to the topics being covered as well as advice on how to study effectively while maintaining your personal wellbeing.

Appendix seven: Ethics application

University of Reading

Institute of Education

Ethical Approval Form A (version May 2019)

Tick one: Staff project: _____ PhD ____ EdD✓

Name of applicant (s): Catherine Langran

Title of project: Exploring student engagement: influences and monitoring

Name of supervisor (for student projects): Elizabeth McCrum and Yota Dimitriadi

Please complete the form below including relevant sections overleaf.

	YES	NO
Have you prepared an Information Sheet for participants and/or their parents/carers that:		
a) explains the purpose(s) of the project	Yes	
b) explains how they have been selected as potential participants	Yes	
c) gives a full, fair and clear account of what will be asked of them and how the information that they provide will be used	Yes	
d) makes clear that participation in the project is voluntary	Yes	
e) explains the arrangements to allow participants to withdraw at any stage if they wish	Yes	
f) explains the arrangements to ensure the confidentiality of any material collected during the project, including secure arrangements for its storage, retention and disposal	Yes	
g) explains the arrangements for publishing the research results and, if confidentiality might be affected, for obtaining written consent for this	Yes	
h) explains the arrangements for providing participants with the research results if they wish to have them	Yes	
i) gives the name and designation of the member of staff with responsibility for the project together with contact details, including email . If any of the project investigators are students at the IoE, then this information must be included and their name provided	Yes	
k) explains, where applicable, the arrangements for expenses and other payments to be made to the participants		n/a
j) includes a standard statement indicating the process of ethical review at the University undergone by the project, as follows: 'This project has been reviewed following the procedures of the University Research Ethics Committee and has been given a favourable ethical opinion for conduct'.	Yes	

k)includes a standard statement regarding insurance: "The University has the appropriate insurances in place. Full details are available on request".	Yes	
Please answer the following questions		
1) Will you provide participants involved in your research with all the information necessary to ensure that they are fully informed and not in any way deceived or misled as to the purpose(s) and nature of the research? (Please use the subheadings used in the example information sheets on blackboard to ensure this).	Yes	
2) Will you seek written or other formal consent from all participants, if they are able to provide it, in addition to (1)?	Yes, written consent	
3) Is there any risk that participants may experience physical or psychological distress in taking part in your research?		No
4) Staff Only - have you taken the online training modules in data protection and information security (which can be found here: http://www.reading.ac.uk/internal/humanresources/PeopleDevelopment/newstaff/humres-MandatoryOnlineCourses.aspx Please note: students complete a Data Protection Declaration form and submit it with this application to the ethics committee.	Yes	
5) Have you read the Health and Safety booklet (available on Blackboard) and completed a Risk Assessment Form (included below with this ethics application)?	Yes	
6) Does your research comply with the University's Code of Good Practice in Research?	Yes	
7) If your research is taking place in a school, have you prepared an information sheet and consent form to gain the permission in writing of the head teacher or other relevant supervisory professional?	Yes Appendix 5 & 6	
8) Has the data collector obtained satisfactory DBS clearance?		n/a
9) If your research involves working with children under the age of 16 (or those whose special educational needs mean they are unable to give informed consent), have you prepared an information sheet and consent form for parents/carers to seek permission in writing, or to give parents/carers the opportunity to decline consent?		n/a
10) If your research involves processing sensitive personal data[1], or if it involves audio/video recordings, have you obtained the explicit consent of participants/parents?	Yes	
11) If you are using a data processor to subcontract any part of your research, have you got a written contract with that contractor which (a) specifies that the contractor is required to		n/a

[1] Sensitive personal data consists of information relating to the racial or ethnic origin of a data subject, their political opinions, religious beliefs, trade union membership, sexual life, physical or mental health or condition, or criminal offences or record.

act only on your instructions, and (b) provides for appropriate technical and organisational security measures to protect the data?		
12a) Does your research involve data collection outside the UK?		No
12b) If the answer to question 12a is "yes", does your research comply with the legal and ethical requirements for doing research in that country?		
13a) Does your research involve collecting data in a language other than English?		No
13b) If the answer to question 13a is "yes", please confirm that information sheets, consent forms, and research instruments, where appropriate, have been directly translated from the English versions submitted with this application.		
14a. Does the proposed research involve children under the age of 5?		No
14b. If the answer to question 14a is "yes": My Head of School (or authorised Head of Department) has given details of the proposed research to the University's insurance officer, and the research will not proceed until I have confirmation that insurance cover is in place.		
If you have answered YES to Question 3, please complete Section B below		

- Complete **either** Section A **or** Section B below with details of your research project.
- Complete a risk assessment.
- Sign the form in Section C.
- Append at the end of this form all relevant documents: information sheets, consent forms, tests, questionnaires, interview schedules, evidence that you have completed information security training (e.g. screen shot/copy of certificate).
- Email the completed form to the Institute's Ethics Committee for consideration.

Any missing information will result in the form being returned to you.

A: My research goes beyond the 'accepted custom and practice of teaching' but I consider that this project has **no** significant ethical implications. (Please tick the box.)	
Please state the total number of participants that will be involved in the project and give a breakdown of how many there are in each category e.g. teachers, parents, pupils etc. 10-15 undergraduate pharmacy undergraduate students will be recruited for this study.	
Give a brief description of the aims and the methods (participants, instruments and procedures) of the project in up to 200 words noting: 1. **Title**: Exploring student engagement: influences and monitoring 2. **Purpose:** To explore student engagement through student case-studies 3. **Methods:** Repeated semi-structured interviews with 10-15 undergraduate pharmacy students (October 2020 and March 2021). With consent, participant engagement data (time spent and number of hits in Blackboard) will be accessed by CL, from October 2020 to March 2021, and emailed to participants fortnightly.	

There are current safeguards within the department that student support co-ordinators flag students with <50% attendance to academic tutors and <25% attendance to the Director of Teaching and Learning. To protect participant confidentiality, this study will not make direct referrals to tutors or the DTL. However, if CL observes a dramatic decrease in a participant's engagement (for example no access to blackboard), CL will email the participant to explain there may be multiple reasons for changes in engagement, and if the student is concerned about their engagement or ability to study they should speak to their tutor or the university welfare team for support.

4. **Recruitment:** Via email, to the year 2, 3 and 4 group email address**.** If more than 15 students volunteer, then volunteers will be randomly selected. If less than 15 volunteers reply, then one follow up email will be sent.
5. Please see appendix 1 (**information sheet**), appendix 2 (**consent form**), appendix 3 (**interview questions**).
6. **Ethical considerations:** My position of power as a lecturer may influence student participation and behaviour. This is mitigated by exclusion of my tutees, and I have minimal teaching contact with year 2, 3 and 4 students. Students will be informed participation is voluntary and they may withdraw at any point with nil consequence on their assessment/progression. Maintaining participant confidentiality is key to my professional code of conduct as a Lecturer and a Pharmacist.
7. **Timeframe**: Data collection: October 2020-March 2021.

B: I consider that this project **may** have ethical implications that should be brought before the Institute's Ethics Committee.	No
Please state the total number of participants that will be involved in the project and give a breakdown of how many there are in each category e.g. teachers, parents, pupils etc.	
Give a brief description of the aims and the methods (participants, instruments and procedures) of the project in up to 200 words.	

RISK ASSESSMENT: Please complete the form below

Brief outline of Work/activity:	This study seeks to answer the following research questions: 1. What influences student engagement in higher education? 2. What is the role of measuring engagement in modifying student behaviour? These questions will be answered via a three-stage sequential study: **Stage one (October 2020)** involves baseline interviews with undergraduate pharmacy students about their learning behaviour, motivation, understanding of engagement, influences on their engagement and their previous experience of attendance monitoring.

	The **second stage (November 2020 - March 2021)** involves collating and emailing to the participants their fortnightly VLE use data The **third stage (end of March 2021)** involves a re-interview with the participants to explore their experience of engagement monitoring and any impact on their behaviour e.g. self-regulation, reflection, confidence/time/ability/capacity to change their behaviour.

Where will data be collected?	The department of Pharmacy, within one UK university. The interview will take place in a pre-booked meeting room (not my office) on the university campus, during usual working hours (Monday-Friday 9am to 6pm).

Significant hazards:	1. Coronavirus poses a risk to this study. 2. Protection of personal data 3. Potential for students to become upset when discussing personal factors related to their engagement

Who might be exposed to hazards?	The students and the researcher/interviewer

Existing control measures:	1. In line with the university's plan to resume a proportion of face-to-face teaching, the proposed method is to undertake face-to-face interviews. Catherine Langran and the student will wash their hands/use alcohol gel on entering and before leaving the meeting room. Catherine Langran and the student will cancel the interview if they have experienced any coronavirus symptoms in the 7 days before the interview and presence/absence of symptoms will also be verbally confirmed before the interview starts. Face masks will not be worn as this may interfere/muffle the voices; however, the student and Catherine Langran will sit at least 2 metres apart. If the student does not wish to undertake a face-to-face interview, then a MS Teams video call will be arranged for the interview. 2. The information given by participants in the project will remain confidential and will only be seen by myself and two project supervisors. All electronic data will be held securely in password protected files on a non-shared PC and all paper documentation will be held in locked cabinets in a locked office. Voice recording of the interviews will be deleted once transcription has taken place and been checked for accuracy. No real students' names will be used, and no individual students will be identifiable in any published report resulting from the project. All anonymised research data will be retained indefinitely whereas any

	identifying information such as consent forms will be disposed of securely after the research findings have been written up. 3. The interview questions focus on individual student's influences on their engagement. It is not the purpose of this research, however discussing influences on their engagement may unintentionally trigger students to think about personal issues which could be upsetting for them. Students can decline to answer a question, take a short break and stop the interview at any point. An interview debrief sheet (appendix 4) also acts as a safety net to signpost students to support services.

Are risks adequately controlled:	Yes

If NO, list additional controls and actions required:	Additional controls	Action by:

C: SIGNATURE OF APPLICANT:

Note: a signature is required. Typed names are not acceptable.

I have declared all relevant information regarding my proposed project and confirm that ethical good practice will be followed within the project.

Signed: Print Name CATHERINE LANGRAN Date 04/08/2020

STATEMENT OF ETHICAL APPROVAL FOR PROPOSALS SUBMITTED TO THE INSTITUTE ETHICS COMMITTEE

This project has been considered using agreed Institute procedures and is now approved.

Signed: Print Name: Karen Jones
(IoE Research Ethics Committee representative)*
Date 19/8/2020

(IoE Research Ethics Committee representative)*

* A decision to allow a project to proceed is not an expert assessment of its content or of the possible risks involved in the investigation, nor does it detract in any way from the ultimate responsibility which students/investigators must themselves have for these matters. Approval is granted on the basis of the information declared by the applicant.

Appendix eight: Head of Department information sheet

Head of Department Information Sheet

Research Project: Exploring student engagement: influences and monitoring

Project Team Members: Mrs Catherine Langran, Professor Elizabeth McCrum, Dr Yota Dimitriadi

Dear Dr. Bicknell,

We are contacting you to seek your permission for us to approach students within your Department to invite them to participate in a research project we are undertaking,

What is the project?
The purpose of this research project is to explore pharmacy undergraduate student perceptions and experiences of monitoring engagement within the context of a UK university. This project forms part of Catherine Langran's doctorate in Education (EdD), with the aim of informing practice and offer insights to the department and wider university.

This aim will be achieved through a three-stage sequential study:

Stage one (October 2020) will include one-to-one interviews between Catherine Langran and volunteer pharmacy students to discuss students' thoughts about engagement and what influences engagement for them.

Stage two (November 2020-March 2021) will involve Catherine Langran emailing volunteer pharmacy students every two weeks with their attendance data and use of blackboard data. There is no need for students to reply to these emails, they are for their own information.

Stage three (March 2021) will involve a final interview between Catherine Langran and the volunteer pharmacy students, to discuss the students' experiences of having their engagement data reported.

Who will take part?

With your permission, in October 2020, Catherine Langran will send an email to the year 2, 3 and 4 pharmacy undergraduate student group email address asking for volunteers. The participant information sheet will be attached to this email, outlining what their participation involves, how their data will be securely stored and used, and that participation is voluntary.

We aim to recruit 10-15 pharmacy undergraduate students to this project. If more than 15 students volunteer, then 15 volunteers will be randomly selected. If less than 15 volunteers reply, then one follow-up email will be sent to year 2, 3 and 4 students.

Students will not be purposively recruited or excluded based on their age, gender, ethnicity.

Year 1 students are excluded as they have not experienced a "normal" university year i.e. before social distancing adjustments and online/blended teaching. Catherine Langran's tutees will also be excluded from this project.

Does the Department have to take part?

It is entirely up to you whether you give your consent for your department to participate. You may also withdraw the Department's consent to participation at any time during the project, without any repercussions, by contacting Catherine Langran c.a.langran@reading.ac.uk

Do the students have to take part?

Student participation is entirely voluntary, and students can change their mind at any time without any repercussions.

It is stated in the information sheet that any discussions with Catherine Langran about their engagement, does not replace any discussions students may have with their tutor, the year tutor or the Director of Teaching and Learning.

Written consent will be obtained from students before commencing the interviews.

What are the benefits of taking part?

For the students: participating in the interviews and fortnightly reporting of engagement data, will give the students the chance to reflect on their engagement and may support them to make positive changes.

For the School of Pharmacy and University: this project will explore key issues related to student engagement which can be used to make recommendations for improved policy and practice.

What are the risks of taking part?

In line with the university's plan to resume a proportion of face-to-face teaching, the proposed method is to undertake face-to-face interviews. Catherine Langran and the student will wash their hands/use alcohol gel on entering and before leaving the meeting room. Catherine Langran and the student will cancel the interview if they have experienced any coronavirus symptoms in the 7 days before the interview and presence/absence of symptoms will also be verbally confirmed before the interview starts. Face masks will not be worn as this may interfere/muffle the voices; however, the student and Catherine Langran will sit at least 2 metres apart. If the student does not wish to undertake a face-to-face interview, then a MS Teams video call will be arranged for the interview. In agreeing to take part in this study there will be a time commitment to consider, as the interviews are likely to each last between 30 and 45 minutes. While there will be a time commitment required from participants, it is felt that the benefits of involvement will outweigh the costs.

What will happen to the data?

The information given by participants in the project will remain confidential and will only be seen by the research team listed at the start of this letter. All electronic data will be held securely in password protected files on a non-shared PC and all paper documentation will be held in locked cabinets in a locked office. Voice recording of the interviews will be deleted once transcription has taken place and been checked for accuracy. No real students' names will be used, and no individual students will be identifiable in any published report resulting from the project. All anonymised research data will be retained indefinitely whereas any identifying information such as consent

forms will be disposed of securely after the research findings have been written up. The results of the study may be presented at national and international conferences, and in written reports and articles. We can send you electronic copies of these publications if you wish.

Who has reviewed the study?
This project has been reviewed following the procedures of the University Research Ethics Committee and has been given a favourable ethical opinion for conduct. The University has the appropriate insurances in place. Full details are available on request.

What happens if something goes wrong?

In the unlikely case of concern or complaint, you can contact Professor Elizabeth McCrum, University of Reading; Tel: 0118 378 6140 email: e.m.mccrum@reading.ac.uk

If you wish to make a formal complaint to someone independent of the research team or if you are not satisfied with the response you have gained from the researchers in the first instance then please contact the Quality Assurance in Research Team qar@reading.ac.uk

Where can I get more information?

For more information, please contact Catherine Langran email: c.a.langran@reading.ac.uk

If you are happy for your Department take part, please complete and return to Catherine Langran the attached consent form.

Yours faithfully

Catherine Langran

Data protection

The organisation responsible for protection of your personal information is the University of Reading (the Data Controller). Queries regarding data protection and your rights should be directed to the University Data Protection Officer at imps@reading.ac.uk, or in writing to: Information Management & Policy Services, University of Reading, Whiteknights, P O Box 217, Reading, RG6 6AH.

The University of Reading collects, analyses, uses, shares and retains personal data for the purposes of research in the public interest. Under data protection law we are required to inform you that this use of the personal data we may hold about you is on the lawful basis of being a public task in the public interest and where it is necessary for scientific or historical research purposes. If you withdraw from a research study, which processes your personal data, dependant on the stage of withdrawal, we may still rely on this lawful basis to continue using your data if your withdrawal would be of significant detriment to the research study aims. We will always have in place appropriate safeguards to protect your personal data.

If we have included any additional requests for use of your data, for example adding you to a registration list for the purposes of inviting you to take part in future studies, this will be done only with your consent where you have provided it to us and should you wish to be removed from the register at a later date, you should contact Professor Suzanne Graham – s.j.graham@reading.ac.uk

You have certain rights under data protection law which are:

- Withdraw your consent, for example if you opted in to be added to a participant register
- Access your personal data or ask for a copy
- Rectify inaccuracies in personal data that we hold about you
- Be forgotten, that is your details to be removed from systems that we use to process your personal data
- Restrict uses of your data
- Object to uses of your data, for example retention after you have withdrawn from a study

Some restrictions apply to the above rights where data is collected and used for research purposes. You can find out more about your rights on the website of the Information Commissioners Office (ICO) at https://ico.org.uYou also have a right to complain the ICO if you are unhappy with how your data has been handled. Please contact the University Data Protection Officer in the first instance.

Appendix nine: Head of Department consent form

Consent form: Head of Department

Research Project: Exploring student engagement: influences and monitoring

Please complete and return this form to: Catherine Langran c.a.langran@reading.ac.uk

1.	I have read the information sheet about the project and received a copy of it	X
2.	I understand the purpose of the study and any questions have been answered	X
3.	I agree to the research team emailing students (via year group email lists) in this department asking for their participation	X
4.	I agree to students in my Department participating in the study, with their consent	X

Name: _____Kat Bicknell _____

Signed: _____

Date: _____16/09/2020_____

Appendix ten: Example of coding: NVivo 12 screenshot

Theme: Institutional commitment

Code: University Campus

<Files\\Charlotte Transcript - complete> - § 1 reference coded [0.67% Coverage]

Reference 1 - 0.67% Coverage

Yeah I do. I do enjoy it. Um, I like socially, how you can sit and have a coffee with people and especially the campus is really pretty. And yeah, I think I enjoy just being in a cafe or even in the library around other people.

<Files\\Evie transcript - complete> - § 1 reference coded [1.20% Coverage]

Reference 1 - 1.20% Coverage

I like being on campus, and that is one thing that I miss from the first two years is like being on campus 'cause I do enjoy kind of that purpose of going in everyday and having a bit of structure. And I mean the campus itself is nice, like it feel quite homely and friendly. So yeah that's why I would potentially make the time to go to the library just to have a bit more reason to feel a bit more in contact with the actual University.

<Files\\Georgia Transcript - complete> - § 1 reference coded [1.49% Coverage]

Reference 1 - 1.49% Coverage

I love being on campus. I really miss being on campus. It just feels very open and like I love that. One of the biggest things about University of xxx for me, like one of the biggest selling points was the campus, first I liked that it had a campus to begin with, like some unis just have buildings, like Portsmouth was my insurance and I really hated that it was just a pharmacy building and there was nothing else around it really except other like buildings that weren't really uni property. So actually having a campus and the student union, like going to the bagel man or like getting bubble tea. I love bubble tea.
And like having you know the Lake nearby and like fields and stuff and places to sit and the library is so nice and like different like study spaces. It feels like a nice atmosphere. It feel like, this is a uni lifestyle, like being on campus. And so I'd love to being on campus. I really miss it.

<Files\\Jane transcript - complete> - § 1 reference coded [0.28% Coverage]

Reference 1 - 0.28% Coverage

I like being on campus. I enjoy going in. It's quite a friendly place I think, and people will actually stop to chat and talk to you

<Files\\Krishan Transcript - complete> - § 1 reference coded [0.73% Coverage]

Reference 1 - 0.73% Coverage

I think it's a lovely campus, it's beautiful in the sense that it's got a lot of greenery and I enjoy that. If I want to go for a walk or go for a run, which I've done multiple times before, I can do so. There's a lot of places to place sport and my friends from xx itself, we always come to the uni to play football. So yeah, I think the campus itself is amazing and it's really big as well.

<Files\\Marie Transcript - complete> - § 2 references coded [0.85% Coverage]

Reference 1 - 0.25% Coverage

The campus is really be nice because it's very green and it reminds me for home

Reference 2 - 0.60% Coverage

it's nice being here. Like the campus is very well arranged. Most of the buildings are renovated and they are still being renovated and we have new buildings, like the health sciences building.

<Files\\Maya Transcript - complete> - § 1 reference coded [0.58% Coverage]

Reference 1 - 0.58% Coverage

I love being on campus, and just the whole university enviroment. Where everyone is students, and there are students of different ages, diffferent backrgouns, it makes me feel kind of like that place where I belong.

<Files\\Yousef Transcript - complete> - § 2 references coded [1.25% Coverage]

Reference 1 - 0.25% Coverage

I love the University campus. It's well, first of all, it's a beautiful campus, it's big, the people are nice and I just feel like, you know, this is the university experience

Reference 2 - 1.00% Coverage

I love being at uni all the time. Like last year, every Wednesday you would find me in Union or like you know in xx Bar. It's really fun. It's really engaging. I'd always, you know, have an excuse to go to uni, so let's go library or something. 'cause you know you're getting nice facilities. OK, the library two years ago was like a haunted
house, no one liked it. But then when the new one opened it was really relaxing. You could either go on 2nd or 4th floor, talk to your friends or you can go on the quiet zones and study. So it was really engaging. Really, really fun. You know, like it's a good uni experience being at the University of xx, the campus is amazing. It's a big bonus, I think.

<Files\\Zara Transcript - complete> - § 1 reference coded [0.81% Coverage]

Reference 1 - 0.81% Coverage

I like really enjoyed being on campus a lot more than just like in my house, it's like more people around, you get to like bump into people and say hi. And I just like the environment I feel is more focused, like if you go to the library, you go to study. Um, that's probably why I prefer it.