Navigating the use of data through management information systems in secondary schools in England: a case study approach.

Submitted by

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Abstract

Although most secondary schools have at least one management information system (MIS) that may be used to support data-informed decision-making and aid school improvement, there are relatively few studies on the use of these systems in schools and how they can support educators in achieving school improvement. Furthermore, no studies have explored how the updated DeLone and McLean Information System Success Model (2003) may be used to help explore and explain how management information systems are used in schools and the impacts of their use in schools. The purpose of this research was to explore how management information systems are currently used in secondary schools and to devise tailored training programmes to improve their use by different members of school staff.

The first stage of this study consisted of an initial questionnaire sent to 204 schools. During the second stage of the study semi-structured interviews with data managers and other staff members at three case study schools were used as the main research tool. The final stage of the study involved devising a training session with a case study school data manager followed by an observation of the training and a follow-up questionnaire and interviews after the training.

The results suggest that the use and user satisfaction of management information systems within secondary schools can be partly explained using the Delone and McLean Information System Success Model. However, the influence of the data manager and the data culture within each school are shown to be particularly influential on the extent to which MISs are successfully used and therefore must be incorporated into the model. Moreover, there is a mismatch between the intended and actual usage of data within schools and highlight the relevance of critical theory in understanding the implications of data use on the positioning of teachers. Critically, this enquiry signals the importance of internal training and explored the effectiveness of internal, data manager led management information systems training and the need for the data manager together with senior leaders to be cognisant of how data can be used to inform school improvement planning.

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Chapter 1: Introduction and Rationale

1.1 Introduction

An information system is any organised combination of people, hardware, software, communication networks, and data resources that collects, transforms, and disseminates information in an organisation (O'Brien, 2011). Increasingly, around the world, institutions and organisations are recognising the value of information and knowledge management (Abdul-Hamid, 2017). Since their introduction during the 1970s and 1980s the use of information systems within organisations to support managers at every level to make strategic decisions has increased (Breiter & Light, 2006). In educational settings, management information systems (MISs) are particularly crucial as they support data-informed decision-making and can contribute significantly to educational outcomes and school improvement efforts (Mandinach & Jackson, 2012). Across many schools, management information systems (MISs) or groups of computer applications used to store, organise, analyse and retrieve data (Visscher, 1991) have been implemented to help schools to manage data (Shah, 2014). In England, School Information Management System (SIMS) is the most widely used management information system in schools and has dominated the market since the early 1990s. SIMS is a modular integrated system designed to meet many aspects of school management such as attendance, assessment, reporting and finance.

In this Chapter, I provide a history of the use of management information systems and SIMS in schools in England to serve as a basis for understanding and appreciating the need for this research. I then discuss my rationale for selecting this research topic, outline the research questions and the significance of this research. Finally, I outline the structure of this thesis.

1.2 Background to the study

In England, the Education Reform Act in 1988 and the devolution of financial and managerial responsibility from central government to schools resulted in the growth of data as a policy

instrument within schools (Lascoumes & Le Galès, 2007). Policy developments such as statutory

testing at the end of each Key Stage and the inspection of schools through a common inspection

framework, together with a focus on standards and quality assurance have supported the increased

significance of data within schools and the education system (Perelman, 2014). Schools are

accountable for their own performance and are therefore required to collect and publish

performance data to justify public expenditure (Perelman, 2014). Furthermore, schools must use

data to support and drive diagnostic and improvement agendas through continuous self-monitoring

(Ozga, 2009). Therefore, today schools collect, generate and store vast amounts of different types of

data (Nagy & Henderson, 2016).

Management information systems can play a crucial role in transforming data into knowledge (Mills,

McDowelle & Rouse, 2011). This effective use of data is an essential aspect of the school

improvement process and the ability to use data effectively is a vital tool for leaders within schools

(Schildkamp, 2019). Management information systems have the potential to improve data use in

schools by allowing for multiple use of the same data, potentially leading to quicker and more

effective decisions. For example, Zain, Atan and Idrus (2004) studied the use of MISs within schools

in Malaysia and found that staff had better accessibility to information, more efficient

administration and a higher utilisation of school resources. Although MISs can support educators in

achieving school improvement (Shah, 2014), their presence alone is not sufficient in turning data

into actionable knowledge (Wayman, 2005) and therefore an examination of their use is required.

Culture affects every aspect of schools (Deal & Peterson, 2009), including how data are perceived

and used (Firestone & Gonzalez, 2007). The concept of data culture in schools is critical in shaping

the way educational institutions use and respond to data. While teachers and leaders have always

used data in their practice, increased accountability has prompted the formalisation of data-driven

decision-making processes in schools (Mandinach & Gummer, 2016). Data cannot autonomously

drive decisions (Datnow & Park, 2014), but educators can engage with data through a cyclical

process of inquiry, analysis, and interpretation to inform their decisions and actions. This interpretive process is influenced by the way the users of data make sense of data as well as the organisational, social and political contexts in which these interactions take place (Coburn & Turner, 2011; Datnow & Hubbard, 2016). The existing systems predominantly rely on using data for accountability. Mandinach and Gummer (2016) highlight the disconnection between these systems and the practical needs of educators.

The purpose of data use significantly shapes the data culture within schools, delineating between data use for improvement and data use for compliance. Firestone and Gonzalez (2007) distinguish that data use for improvement is more prevalent in organisational learning cultures, while data use for compliance is characteristic of accountability cultures. In schools where data use is valued for its potential to support students and enhance overall school performance, data conversations are student-focused and improvement-driven. Here, the focus is on understanding student needs and exploring pedagogical strategies that resonate with diverse learners, fostering more equity-focused data decisions (Gannon-Slater et al., 2017).

On the other hand, some schools emphasise data use primarily for compliance purposes, aiming to ensure favourable outcomes in accountability reports. Discussions in such contexts often centre on raising test scores, aligning instruction with standardised assessments, and meeting accountability standards. Compliance-driven data use can lead to issues, such as targeted interventions for specific groups of students just below accountability thresholds, potentially creating inequitable resource allocation and learning opportunities (Booher-Jennings, 2005; Datnow & Park, 2014). This approach, teaching to a select group for improved overall school data, is criticised for distorting the professionalism of teaching (Nichols & Berliner, 2007).

1.3 Rationale for Research

Although secondary schools in England are required to purchase and use MISs (Department for Education, 2014), there are relatively few studies focused on how these systems are actually used within schools (Passey, 2002; Visscher, Wild, Smith & Newton 2003; Bisaso & Visscher, 2004). Despite SIMS being used in over 19,000 schools in (SIMS, 2023), the only research on SIMS is Visscher et al.'s (2003) study on the use of SIMS in secondary schools. Their research evaluated the implementation, use and effects of SIMS in English secondary schools using two questionnaires: one for the SIMS manager and the office clerk, and one for the principal. The questionnaires were sent to a random selection of one thousand secondary schools known to be using SIMS. They found that 10 years after SIMS was implemented, schools were not using all twenty integrated modules contained within the information systems as much as they could and identified a lack of effective training as one of the main barriers to effective SIMS use. SIMS users had not received enough training but more importantly, Visscher et al. (2003) concluded that different strategies for user training need to be tested to find out what types of training would be suitable for different SIMS users.

Traditionally, within information systems research, a positivistic approach has been favoured, focusing on using the scientific method to produce generalised theories. However, this research is guided by an interpretive and critical research paradigm. This paradigm seeks to understand the subjective experiences of MIS users in their natural contexts and highlights the influence of organisational and cultural factors on system adoption and use. These ontological and epistemological underpinnings shaped the choice of methodology, ensuring a focus on both meaning-making and practical applicability.

This approach is particularly appropriate for studying MIS use in schools, as it allows for a detailed exploration of how different stakeholders interact with systems like SIMS and how broader contextual factors, such as leadership and data culture, influence these interactions. Such a

framework also facilitates the development of actionable insights, bridging theoretical understanding with practical applications.

While Visscher et al.'s large-scale quantitative study provides an evaluation of the use of SIMS in 2003, there has been no more recent research on this management information system in the context of secondary schools in England. While there is substantial discussion about the broader use of digital technologies and data-driven decision-making in schools, specific studies focused solely on the impact of MISs in schools are less prevalent possibly because MISs are often considered a subset of the broader category of digital technologies used in education, rather than a distinct area of research. For example, in the Department for Education's 2018 report, 'Realising the potential of technology in education: A strategy for education providers and the technology industry,' management information systems are mentioned only briefly as a component of Educational Technology (EdTech). This example highlights how MISs are often embedded within broader discussions of educational technology, thus contributing to the scarcity of focused research on their specific impacts.

This apparent lack of research on the use of SIMS in secondary schools may be because researchers have chosen to focus on broader trends in education technology and management information systems rather than focusing specifically on a particular management information system. For example, Shah (2014) through a comprehensive review of literature and empirical evidence-based range of educational institutions from primary schools to universities explored the broader impact of management information systems on school administration and management, emphasising positive outcomes such as improved accessibility to information, enhanced administrative efficiency and enhanced use of resources. Moreover, although some researchers have chosen to focus on one specific information system, especially when the management information system is used throughout a country, such as the Nigeria Education Management Information Systems (Ogunode, Omolewa, Mofoluwake & Olajumoke, 2024), researchers may be reticent to concentrate on one

specific management information system like SIMS due to concerns about the broader applicability of their research findings. Furthermore, since 2003, SIMS has evolved into a more sophisticated management information system with more advanced functionality. The study of a more complex system may pose greater challenges for researchers. The need for a nuanced comprehension of the systems components and functionalities and the scarcity of researchers with specialised in a particular MIS may have limited the number of experts capable of conducting research on SIMS. In addition, the findings from studies on more complex systems may have even more limited applicability.

Although there is research on individual management information systems in other countries and settings, the body of literature in this area is also limited. For example, a study on the Nigerian Education Management Information Systems (Ogunode et al., 2024) provides valuable insights into the national implementation and its impacts on educational management. However, similar in-depth studies focusing on individual MIS implementations within specific educational contexts are rare. Additionally, research by Prasojo et al. (2019) on the use of MISs in Indonesian schools highlights the benefits and challenges of these systems in improving school administration, yet it underscores the need for more localised studies to understand the unique impacts of different MISs. This scarcity of focused studies may reflect broader challenges in the field, including resource constraints, the complexity of MIS technologies, and the varying educational contexts in which these systems are used.

Although the quantitative approach used by Visscher et al. (2003) provides an overview on the implementation of SIMS in English secondary schools, it is difficult to gain in-depth insights into the use of SIMS using only a questionnaire. A quantitative approach relying on questionnaires enables the researcher to collect data that is both measurable and easily comparable. However, participants are only able to respond to the questions asked and therefore there are limited opportunities to uncover the stories participants want to tell. In addition, the questionnaires were only sent to the

SIMS manager, the office clerk and the principal at each school and therefore no teachers or teaching support staff were included in the study. Although this omission is not explained in the study and a rationale for the selection of the chosen participants is not provided, there is an implication that the use of SIMS by teachers is less important compared with the members of staff the researchers selected to be included in the research. The choice of participants in Visscher et al.'s (2003) study may show that SIMS is used to collect data for reporting purposes rather than by teachers to support teaching and learning. Today in schools, teachers are required to use SIMS or a similar information system on a daily basis even if it is just to register students and therefore the use of SIMS by teachers cannot be omitted. Furthermore, data use has been promoted as a panacea for instructional improvement (Datnow & Hubbard, 2016) and therefore how teachers use data within SIMS to inform instruction should be considered.

The lack of qualitative research on the use of SIMS in secondary schools highlights the need for studies that provide richer, more detailed insights into how these systems are used in practice. Qualitative approaches can offer a deeper understanding of the experiences and perceptions of teachers and data managers regarding the use of SIMS, revealing the nuances of how MISs are integrated into daily practice, the challenges faced by users, and the contextual factors that influence their effectiveness. While the existing literature provides some insights into the use of MISs in educational contexts, there is a clear need for more focused and in-depth research specifically on the use of SIMS in secondary schools in England.

1.4 Personal and Professional Context

I have chosen this research topic because of my professional experience in working with information systems and my desire to discover how school information systems are used in schools, what impacts this use and how MISs could be used better. My involvement working with information systems started when I became a data manager at a relatively small independent school in England. I was the first data manager at the school and upon arrival, I quickly realised the post was an

automatic response to an inspection report and government requirements (Earl & Katz, 2002).

Many schools now employ professional data managers to help them become and remain data

intelligent (Mackinlay, 2014) and the new profession of data managers or data analysts within

schools is expected to grow (Halford, Pope & Weal, 2013). Over the past decade, I have witnessed

an expansion in both the number of data managers in schools but also in the responsibilities and

significance of the role. Personally, I transitioned from being the inaugural data manager in a school

to eventually leading a team of data officers before assuming a position within the senior leadership

team, in a role that had not existed before, with responsibility for data and systems. Although data

managers within schools can play a pivotal role in transforming data into useful and accurate

information (Mandinach, 2012), this emerging profession has no formal structure and therefore

each data manager will behave differently based on their personal autobiography, professional

identity (Mackinlay, 2014) and the expectation of the school. As this position as a data manager was

my first role in education, I did not know what was expected of me and as the role was developed as

a response to an external inspection, the school leaders were not sure what work I should be doing

either. Some senior staff were apprehensive about using data and did not see the need for it.

Furthermore, they did not like an 'outsider' querying levels of progress as the students were already

high achieving against national criteria. While I was working at this school, I found it a challenge to

fill my time and therefore began to research what other data managers were doing elsewhere. I

used online manuals to teach myself how to use different modules and features of SIMS and began

to understand the capabilities of SIMS. In addition, I was beginning to understand how SIMS could

be used by teachers and school leaders to support data use and therefore the need for the role of

data manager in schools but found that the role of the data manager was not understood by senior

leaders or teachers.

My second role as data manager was at a larger, mixed faith-based Academy. As soon as I started as

the data manager at this school I was trusted to manage and share data in the best interests of

students and staff. Teachers and senior leaders saw a real need for a data manager to help support

teaching and learning through the effective management of the school information system. I was given the freedom to develop my role from a data manager to a member of the senior leadership team with responsibility for data and systems. This transition was a natural process as I emerged as the person within the organisation who understood best how to use SIMS and other data systems to collect, store and analyse data (Shamir & Eilam, 2005).

As part of my role as the data manager, I found myself informally training different members of staff to use SIMS to support their role. This training included new data managers at other schools and a wide range of staff at my school including teachers, administrative staff, and senior leaders. Throughout this work, I realised that colleagues viewed SIMS completely differently to me because they did not understand the basic capabilities of it and therefore sometimes became frustrated when they had to use it. Therefore, I decided to evaluate users' attitudes to and experiences of SIMS at this school as part of my Master's research. I found that although most users felt positively towards SIMS, they had received very little effective training and therefore did not know the full capabilities of SIMS. Furthermore, they did not know how to access training even when they wanted to learn more about SIMS. Following these findings, I implemented several changes to try and improve SIMS use. These included providing training sessions focused on motivating users (Visscher, 1991), building confidence, and encouraging users to learn as much as possible from their colleagues (Fullan, Miles & Anderson, 1988). Although I identified training as an important factor influencing SIMS use, I did not evaluate how effective the training I implemented was. Furthermore, the research was only conducted in one school where I was responsible for the use of data. Therefore, I wanted to conduct larger scale research and focus on how training for different types of users can support the use of SIMS in secondary schools.

My professional experiences as a data manager and senior leader, alongside my later transition to teaching, significantly shaped my choice of methodology and research focus. These roles offered me firsthand insights into the technical, cultural, and practical challenges of MIS implementation in

schools. My understanding of SIMS as both a user and trainer highlighted the diverse perspectives of different stakeholders, from data managers to teachers and senior leaders. These experiences underpinned my decision to adopt a case study approach, enabling me to explore the contextual nuances of MIS use in depth.

Furthermore, my dual perspective as both a technical expert and an educator has informed my research design. For example, I observed that teachers' frustrations with SIMS often stemmed from a lack of effective training or understanding of its capabilities. These observations motivated me to investigate the role of targeted, stakeholder-specific training in improving the productive use of MIS in schools.

1.5 The impact of circumstances on this research project

This study was originally designed as an action research project and therefore one of its purposes was to solve a problem in my practice as a senior leader and data manager at a secondary school (Coghlan & Brannick, 2014). However, during the research phase of this project, I decided to leave my role as Assistant Principal: Data and Systems after reflecting on the use of data in schools. I strongly support the use of data to inform decision-making and I aspire for the full use of SIMS in secondary schools to transform data into actionable knowledge to support school improvement. I am particularly interested in the role of data managers and senior leaders in creating a data democracy through the use of data and SIMS. I knew that data could be used to inform decision-making and support school improvement. However, after reflecting on my situation I began to recognise that the data culture at the school where I was working focused on accountability rather than continuous improvement. Although at the beginning of my time at this school I was encouraged to develop my role as data manager and therefore the use of data within the school, a change in school leadership led to a shift in how data were used in the school. In addition, I understood how teachers could theoretically use data but felt uncomfortable engaging in teaching and learning conversations to support them because I was not a trained teacher. Therefore, I made

the decision to leave my role and applied to complete a Post Graduate Certificate in Education, partly so that I could understand on a practical level how teachers can use data to support teaching and learning and view data use from another perspective. However, I was unable to start the course until I had completed the data collection stage of this research. As I completed the data collection stage, I continued to work at the school in a consultancy role, training members of staff on the use of SIMS to support data management and to support a member of the senior leadership team to develop the school timetable. This experience gave me another perspective on the use of SIMS as I was able to formally train SIMS users and helped me to further understand the importance of training for SIMS users. Over the past two years I have completed a PGCE and my first year as an early career teacher. This experience has given me insights into how SIMS and data are used in schools from the perspective of a teacher rather than a data manager. My professional progression, from data manager to teacher, has equipped me with unique insights into the multifaceted use of MISs in schools. This perspective allows me to appreciate both the technical and practical challenges of using data systems in education.

1.6 Positionality

My understanding of SIMS and the use of data in schools as both a data manager, senior leader and trainer made me an 'insider' to the participants, especially the data manager participants. Insider research is undertaken by members of the same group as that being studied who share one or a number of characteristics (Loxley & Seery, 2008). Insider research is worthwhile as it enables the researcher to ground the study in the everyday lived experience of participants and forces researchers to confront their assumptions and perceptions enabling them to learn and reflect by engaging with what and who they are curious about (Smyth & Holian, 2008). I know that the data manager participants viewed me as an insider because of the way they spoke to me about their use of SIMS. For example, when one data manager was describing some of the uses of SIMS, they used phrases such as 'you and I know that' and 'to the likes of you and I'. As an insider I was able to gain

more knowledge about the case study schools as participants felt comfortable physically showing me how they used SIMS and therefore I was able to observe their use of SIMS during some of the interviews. My inside knowledge of SIMS allowed me to establish a positive research relationship quickly with participants at the case study schools (Le Gallais, 2008) which in turn may have made the participants more likely to feel that they could be more open and honest in their responses (Fleming, 2018). Furthermore, my deep understanding of SIMS meant that I could quickly understand the features of SIMS participants were discussing with me. As a SIMS trainer, I have had new data managers explain to me that trying to learn how to use SIMS is like learning a new language as there are many terms that are specific to this system. For example, within *Assessment Manager* [1], spreadsheets are called Marksheets, and columns are called Aspects. Without this 'insider' knowledge of SIMS, I would not have been able to gain in-depth and complex insights into the use and opinion of SIMS (Brannick & Coghlan, 2007).

Although it may be argued that insider researchers are able to elicit more open and honest responses from participants, an opposing view suggests that participants feel pressure to not let the interviewer down and therefore might be inclined towards giving answers they feel might please the interviewer (Fleming, 2018). However, despite being an insider in the sense that I understand how SIMS can be used and the use of data in schools, the participants at the case study schools may not have seen me as a full insider as compared to a staff member of the school. For example, schools use different terminology to describe different types of data such as target grades or predicted grades and therefore these had to be explained to me. These instances made me feel like 'an insider who is an outsider' (Sikes, 2008:144). Therefore, to help gain the trust of all of those involved in this research, I showed respect to all participants by ensuring confidentiality and reminding them of their right to withdraw at any time during the study.

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[1] *Assessment Manager is a tool that allows schools to record, track, analyse, and report on student assessment data to support educational outcomes and progress monitoring.*

1.7 Research questions and aims

The aims of this study encompass a dual focus on understanding the use of management information systems, particularly SIMS, in secondary schools in England, and developing internal training programmes aimed at supporting and enhancing the effective use of SIMS within these schools.

Therefore, the two main aims of this study are:

1. To understand better the use of management information systems in secondary schools in England.

2. To devise internal training programmes to understand how to support the use of MISs in secondary schools.

The first aim of this research study was to gather a multi-stakeholder perspective to gain a better understanding of the use of SIMS within secondary schools in England and to identify what is required to facilitate its use. The second aim focuses on the formulation of internal training programmes with the goal to devise targeted training initiatives that can support school staff to optimise their use of SIMS within the secondary school context. This research aims to bridge the gap between the current use of SIMS and the potential benefits it can offer individual schools.

 In order to achieve these research aims; the following research questions were identified to guide the research:

1. How is SIMS used? This question explores the practical applications and functionalities of SIMS within secondary schools, seeking to understand the current landscape of its use.

2. What are user opinions of SIMS? This question aims to capture the perceptions, feedback and opinions of users regarding SIMS, providing insights unto user experiences and potential areas for improvement.

3. How is training related to the use of SIMS? This question explores the existing connections between training initiatives and the use of SIMS, identifying any correlations or gaps in the current training practices.

4. How effective do users report the internal training to be in developing their productive use of SIMS? This final question assesses the efficacy of new internal training programmes developed through this research, evaluating their impact on users' proficiency and overall improvement in SIMS use within secondary schools.

To support the aims of this study, a case study approach was chosen as the most suitable research design. Case studies enable an in-depth exploration of the complex interactions between technology, organisational practices, and cultural factors in schools. This methodology aligns with the research questions, allowing for a rich, multi-stakeholder perspective on the use of SIMS. By examining three case study schools, this study captures both the diversity and commonality of experiences, providing insights into how SIMS is used across different educational contexts.

In conclusion, this study aims to comprehensively explore and enhance the use of SIMS in secondary schools in England, with a dual focus on understanding its current applications and devising effective internal training programmes.

1.8 Research design and methodology

Traditionally, within information systems research a positivistic approach has been favoured where researchers use the scientific method to produced generalised theories. For example, Venkatesh, Morris, Davis and Davis (2003) used empirical data from four organisations to integrate various technology acceptance models to formulate the Unified Theory of Acceptance and Use of Technology. However, the methodological approach of this study has been driven by the research questions and my ontological and epistemological beliefs and values (Burton & Bartlett, 2004; Greene, Azevedo & Torney-Purta, 2008).

This study employs a sequential mixed methods approach, combining quantitative breadth with qualitative depth. The first stage involved a questionnaire distributed to staff at 204 schools, capturing broad patterns of SIMS use. The second stage focused on three case study schools, where semi-structured interviews, focus groups, and observations allowed for a more detailed understanding of contextual influences on system use.

The case study design is particularly suited to this research as it provides the flexibility to integrate multiple data collection methods and capture the lived experiences of participants. By employing this approach, I was able to explore not only the technical use of SIMS but also the broader organisational and cultural factors influencing its implementation and success.

The interpretive paradigm is concerned with meaning making and seeking to understand the subjective world of human experience. Social systems are complex, and knowledge can be obtained through understanding perceptions of a particular situation through detailed involvement in the natural context (Kivunja & Kuyini, 2017). Consequently, interpretive research designs can enhance in-depth understanding of the lived experiences of MISs by participants (Walsham, 1993). Therefore, to gain a richer more in-depth picture of the use of SIMS, a multiple case study design of three cases was developed. For the second stage of the research, I used three schools as cases to explore in more detail how SIMS is used and at one school, I developed a training session with the data manager. One of the strengths of a case study approach is that it allows the researcher to use a variety of research methods to generate data (Simons, 2014). Semi-structured interviews, focus groups, observation and questionnaires were used. In addition, I reflected on my thoughts, feelings and actions in a research journal. Through reflection I was able to acknowledge my assumptions and values and the influence they might have had on the findings.

The quantitative questionnaire results were analysed using descriptive statistics to explore and present the data. Manual coding was conducted for both interview transcriptions and observation fieldnotes. A constant comparative approach where the data were constantly compared and

contrasted within each category and also across categories in order to identify emerging themes was adopted to analyse and interpret data. Themes derived from the coding were designed to lead to inferences about the use of SIMS and training. A more detailed discussion of the research design and the rationale for the choice of methodology and methods is presented in Chapter 3.

1.9 Significance of this research and contribution to knowledge

The main purpose of this study is to contribute to the theory and practice of management information systems in schools by better understanding how they are used by different users within a school and how training can support SIMS use. Therefore, this research investigated what SIMS was used for, how, why, and when it was used or not used and by whom. The first stage of the research involved distributing an online questionnaire to selected staff members at 204 secondary schools in England and the second stage involved interviewing and observing school personnel in three secondary schools to provide insights into how SIMS was used and the data culture at each school.

The use of MISs in schools is a previously under researched topic and although SIMS has been used within schools for decades, there is very little research on the use of school information systems in England. There are no similar studies that I have found; therefore, the findings are uniquely positioned to provide empirical evidence and yield new knowledge about how SIMS is used in schools and how training can support its use. In addition, the findings reveal factors that affect the use of SIMS in secondary schools. In qualitative research, logical inference takes precedence over statistical inference, as the emphasis shifts from numerical measurements to understanding the intricate dynamics of human experiences within social and cultural contexts (Kaplan & Maxwell, 1994). Hence, the outcomes of this study can reasonably extrapolate insights into the utilisation of SIMS and the role of training in analogous educational contexts within the same system in England. Therefore, this research can provide a contribution to support other schools in using training to support SIMS use.

It is hoped that the findings of this study may provide school leaders and teachers with a stimulus for reflection and discussion on the use of SIMS and data thereby encouraging collaboration and promoting professional training. Therefore, this study has implications not only for the students and staff at the research schools but also the education community as a whole for whom data-informed decision-making plays a key role in school improvement. Moreover, the findings of this research can contribute to policy development by offering evidence-based recommendations for integrating and enhancing MIS training programmes within schools. Therefore, this study has the potential to inform both practice and policy, supporting the broader educational goals of data-informed decision-making.

Another key contribution to the knowledge of this thesis is the pioneering application of the DeLone and McLean Information System Success Model in the secondary school context. Although the model has been applied to e-learning platforms used in universities (for example Çelik & Ayaz, 2021; Alotaibi & Alshahrani, 2022) and virtual learning environments (for example Halonen, Thomander & Laukkanen, 2010), as far as I am aware, such use of the model has not been undertaken in previous studies within secondary schools. Therefore, this novel application represents an innovative approach.

Finally, at a personal level, I was motivated to undertake this research to advance my knowledge and understanding on the use of SIMS and of the debates about the theory and practice of the use of data in education. The process of completing this research was transformational (McNiff, 2016) and helped me to better understand the complexities of using SIMS in schools. This new knowledge has explicitly enhanced my role as a data manager, senior leader and will undoubtedly influence my practice as a future teacher and further support me in becoming a better-informed practitioner within my field (Zuber-Skerritt, 1996; Coghlan, 2003). However, it is important that any research conducted will make a difference and the benefits are collective rather than individual. Therefore, the findings from this case study approach will benefit all users of SIMS as it will identify factors

influencing the overall use of SIMS and will subsequently provide recommendations arising from the study in relation to training and the promotion of a suitable data culture in secondary schools.

1.10 Thesis outline

This thesis presents the results of a study evaluating the use of SIMS in secondary schools and the extent to which future use could be improved to support data use and school improvement and is organised into six chapters. Following this introductory chapter, in Chapter 2 I present the literature on the use of data and MISs in education. This chapter includes a wide-ranging overview of the educational context surrounding the use of data and MISs in schools. In addition, a review of the theories and models used to understand information system success is presented. The chapter ends with the identification of the research gaps, which led to the formulation of the research questions in this study.

Chapter 3 presents the methodological basis of the study, including its epistemological context and an in-depth explanation of case study research. In addition, I consider my position and the issues of reflexivity and power in conducting the research. I will set out how the participants and case study schools were selected, issues of access and ethical considerations. Through this chapter, I justify the sequential mixed methods approach and the data collection methods: surveys, interviews, focus groups and observations, are examined.

Chapter 4 provides a description of the findings from the data which emerged from the questionnaires and interviews, focus group and observation. I present the analysis of the data and the themes and subthemes that emerged through the research.

Chapter 5 is a critical discussion of the themes and compares my findings with the theories and models discussed in the literature review and my own experiences.

The final chapter consists of a summary of the study, an outline of the main conclusions and reflections, the limitations of this research and suggestions for further research. Furthermore, this chapter considers how this study could be used to support school improvement and therefore the policy and practice implications. This chapter is particularly relevant and important to me as I want to share the knowledge I have gained throughout this study.

Chapter 2: Literature Review

2.1 Introduction

This chapter undertakes a review of the literature pertaining to the use of data and management information systems (MISs) in the educational domain. By examining historical developments, current practices, and theoretical frameworks, this review aims to provide a comprehensive understanding of how data and MISs are used in schools. Placing data culture at the forefront as a critical theoretical framework, this chapter highlights its central role in shaping MIS adoption, use, and success. Data culture, the shared norms, values, and practices surrounding data use within an organisation, provides a lens through which the complexities of MIS implementation and its potential for supporting data-informed decision-making are explored.

The literature review is structured to explore the evolution of data use in schools, define and examine information systems, particularly within educational settings, and analyse the impacts of MISs on a range of school practices. Additionally, this chapter addresses the models used to study information system success and the role of data cultures and data managers in enhancing data use in schools. By integrating these elements, this review highlights the interplay between organisational practices, technological tools, and culture dynamics, emphasising the critical importance of fostering a positive data culture to maximise the benefits of MISs. This integration ensures that the review not only examines the potential of MISs but also identifies where my research fits within the existing literature.

To develop this literature review, I identified a range of search terms related to the core topics including 'SIMS', 'management information systems in education', 'school data use', and 'DeLone and McLean Information System Success Model'. I explored a mix of academic sources from databases like JSTOR and ERIC, supplemented with grey literature, such as government reports, to provide broader context and practical insights. This approach ensures that both technical and

cultural dimensions of MIS use are addressed. I prioritised more recent literature where available to ensure the review reflected current practices and developments in the field. I focused on sources that discussed the educational implications of data systems in schools and provided relevant theoretical perspectives. My selection sought to balance academic research and real-world applications, offering a comprehensive overview of both theoretical and practical considerations for the use of management information systems in schools.

2.2 The use of data in schools: a cultural perspective

Since the late nineteenth century, data have emerged as a prominent social, political, and cultural force, profoundly shaping decision-making across institutions. While the collection of measurements, observations, and statistics has a long history, the digital revolution has dramatically transformed the processes of recording, storing, manipulating, and distributing data, particularly through the use of computers. In education, this shift has embedded data at the heart of school management, driving both accountability measures and improvement initiatives. The cultural turn towards data reliance in schools reflects broader societal trends that emphasise quantifiable evidence as a basis for decision-making.

In England, the Education Reform Act of 1988 and the devolution of financial and managerial responsibility to schools marked a significant moment in embedding data as a policy instrument (Lascoumes & Le Galès, 2007). Between 1988 and 1992, the introduction of statutory testing for primary pupils, public reporting of test results, and a standardised inspection framework formalised a culture of accountability reliant on measurable outcomes. This trend intensified in 1999 with the establishment of the Unique Pupil Number (UPN), linking critical data points—such as gender, ethnicity, first language, indicators of poverty, and special educational needs—to individual pupils. These data, collated into the National Pupil Dataset, allowed for longitudinal analysis, enabling policymakers and educators to monitor and predict pupil progress at scale.

Beyond these national initiatives, schools engage in their own extensive data practices. They collect and analyse performance data to monitor pupil achievement against benchmarks, as well as pastoral data to support daily operations like attendance and behaviour management. While these school-level practices are not directly regulated, the expectation for schools to self-monitor and self-evaluate reinforces the pervasiveness of data culture in education (Kaliszewski, Fieldsend & McAleavy, 2017). Schools are now described as 'data-rich' environments, producing vast volumes of information ranging from government-mandated collections to bespoke, localised metrics tailored to internal priorities (Selwyn, 2015).

The way this data is utilised, and its effectiveness, depends significantly on the **data culture** within individual schools. Data culture, defined as the shared norms, values, and practices surrounding the collection, interpretation, and application of data, shapes how data are perceived and acted upon by educators. A positive data culture, characterised by trust, collaboration, and transparency, can transform data from a compliance tool into a mechanism for meaningful school improvement. In such cultures, data use is inquiry-driven, and educators feel empowered to use data to inform instructional practices, identify areas for improvement, and innovate collaboratively.

Conversely, a data culture dominated by external accountability pressures often reduces data to a mechanism of compliance. In these environments, the focus is on meeting performance indicators, such as standardised test scores, rather than using data as a basis for reflective practice or instructional enhancement. Educators in these settings may experience data as punitive, with information systems used to monitor and evaluate their performance rather than to support their development (Datnow & Park, 2018). This restrictive approach can stifle creativity, limit the exploration of new pedagogical strategies, and lead to a sense of disempowerment among staff.

The dual purposes of data use for compliance and for improvement are not inherently contradictory but require careful balancing within the school's data culture. While external accountability pressures are unlikely to disappear, the most effective schools integrate these demands into a

broader vision of inquiry and improvement. A positive data culture ensures that data practices align with the school's strategic goals and educational ethos, fostering a sense of ownership and shared responsibility among all stakeholders.

The effectiveness of data practices also hinges on the extent to which educators are trained to interpret and act on the information available to them. Without appropriate professional development, schools risk becoming 'data rich but knowledge poor' (Wayman, 2005), overwhelmed by an excess of raw data that lacks actionable insights. The ability to translate data into meaningful knowledge is not merely a technical skill but a cultural competence, shaped by the values and priorities of the organisation. For instance, a school that values collaboration and reflective inquiry is more likely to invest in professional learning communities and data coaching, empowering teachers to engage with data meaningfully (Mandinach & Gummer, 2016).

Furthermore, schools with a well-developed data culture leverage management information system (MISs) as tools to enhance these practices. MISs, such as SIMS, are instrumental in transforming raw data into actionable insights by providing accessible platforms for data storage, analysis, and visualisation. However, their success depends on the cultural context of their use. In schools with a collaborative and inquiry-driven data culture, MISs serve as enablers of innovation and shared problem-solving. In contrast, in schools where data culture is dominated by compliance, MISs may be underutilised or even resented as mechanisms of surveillance.

To truly harness the potential of data, fostering a positive data culture is essential. This involves creating an environment where data is seen as a tool for empowerment rather than a source of pressure. Leadership plays a crucial role in articulating a clear vision for data use that aligns with the school's broader mission and values. By prioritising trust, transparency, and capacity-building, schools can develop a data culture that not only meets accountability demands but also drives genuine improvement in teaching and learning.

In summary, while the prominence of data in schools reflects broader societal shifts towards evidence-based decision-making, its utility depends on the cultural context within which it is embedded. A positive data culture transforms data from a compliance mechanism into a tool for inquiry, collaboration, and continuous improvement. Without this cultural foundation, the potential of data use in schools may remain unrealised, underscoring the need to place data culture at the heart of educational data practices.

2.3 Information Systems

Although the term 'information system' is used regularly, there is no clear, agreed upon definition of what is meant by it (Visscher, 1996a; Shah, 2014). In a broad sense the concept may refer to all the activities related to collecting, distributing and processing all kinds of data within an organisation. For example, O'Brien and Marakas (2010:4) use a broad definition and describe an information system as 'any organised combination of people, hardware, software, communications networks, data resources, and policies and procedures that stores, retrieves, transforms, and disseminates information in an organisation'. Other definitions focus on the ability of information systems to use past, present, and projected information related to the organisation to support planning and assist decision makers to make operational, tactical and strategic decisions in an accurate and timely manner (Watson, Carroll & Mann, 1991; Shah, 2014). Whereas Visscher (1992) states that an information system is based on one or more computers, enabling the user to record, process, retrieve, output, and distribute data. Therefore, usually an information system will consist of a database with various computer applications that allows the user to store, analyse, retrieve and distribute data.

In addition, within different disciplines, an assortment of terms may be used to describe information systems (Wayman, Stringfield & Yakimowski, 2004). For example, within education, management information systems may also be referred to as school information systems (for example Visscher, 1996a), computerised information systems (for example Bisaso & Visscher, 2004) or education

management information systems (for example Saad & Daud, 2020). This diversity in terminology reflects the varied functions and contexts in which these systems are employed.

Management information systems were originally developed and used in the corporate world to support the process of transforming data into useful information and ultimately actionable knowledge to support decision-making as shown in Figure 2.1 (Breiter & Light, 2006). Therefore, the most successful information systems are designed to match the specific needs of an organisation to ensure the flow of data to support planning, control and operations (Pearlson, Saunders & Galletta, 2024). By providing suitable, timely reports, information systems can assist decision makers at every level to make data-informed decisions (Shah, 2014).
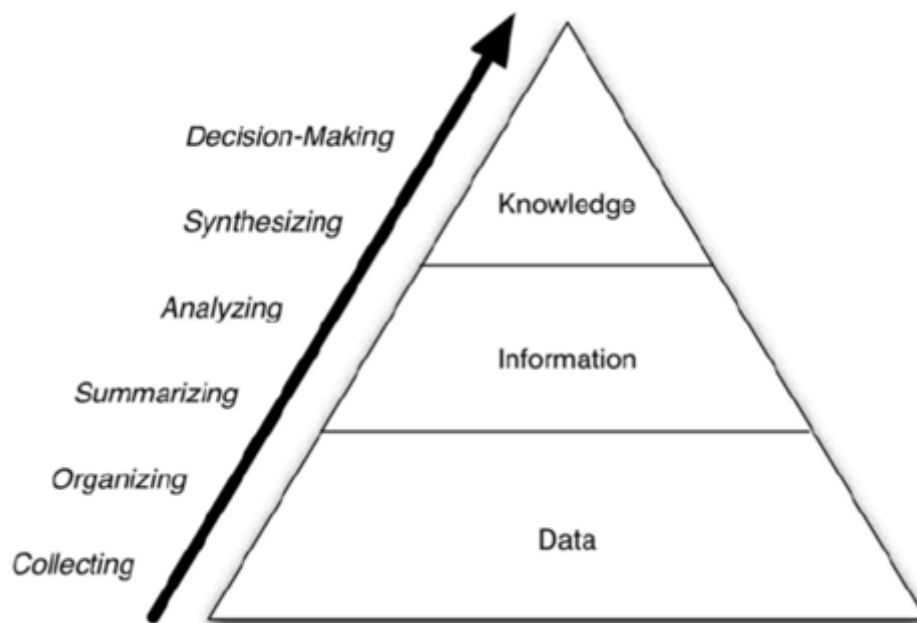
Figure 2.1: Transforming data into knowledge (Breiter & Light, 2006:210).

2.3.1 School information systems and SIMS

During the initial stages of development in schools, information systems were mainly used by administrative staff to store student and personnel data (Carnoy, 2004). During the 1980s several loose, non-integrated applications were developed to store different types of data. However, these initial systems were developed with a focus on data entry and collation rather than upon data

transfer or analysis and therefore limited the possibilities as the relationships among data could not be analysed (Visscher, 1996b). Following the Education Reform Act in 1988, government funding was made available to Local Education Authorities to promote the use of computers in school administration and management. Therefore, many schools implemented new integrated information systems (Visscher, Wild, Smith & Newton, 2003).

Within England there are a variety of MISs available for schools to use and schools are able to choose to use any management information system or a combination of systems (Department for Education, 2014). Some school management information systems provide specialist support in particular areas, such as the analysis of attendance or item level question response. Whereas other products provide comprehensive support and aim to provide the full range of monitoring and tracking reports that schools perceive they need. The most commonly used MIS within secondary schools in England is Capita's School Information Management Information System (SIMS). SIMS has dominated the market since it was developed (Wild, Smith & Walker, 2001) and according to data collected in the January 2022 school census is currently used as the primary MIS by approximately 81% of secondary schools in England. SIMS was developed by a group of teachers in Bedfordshire's Local Education Authority in the early 1980s (Bird, 1991). SIMS is a modular, integrated system specifically designed to store, analyse and disseminate data related to many aspects of school management such as attendance, assessment, behaviour, communication, reporting, finance, resource and staff allocation (Shah, 2014). A brief explanation of each SIMS module is provided in Appendix A.

Because SIMS is an integrated system this means that once entered, core data are available to other modules. However, although SIMS has modules for many aspects of school management, only some of them are included in the core suite and additional modules have to be purchased separately. Visscher et al. (2003) found that the use of different modules varied between schools. Schools may choose to use some modules and not others or purchase and use individual modules from several

different MISs. The Department for Education (2014) acknowledges that schools may use multiple

MISs as they may be best served by purchasing different modules from different suppliers.

However, all of the different systems should be interoperable and share common data.

Furthermore, the Department for Education guidance encourages schools to consider the cost and

value for money of management information systems. These costs include the initial licence,

transfer fees, maintenance fees, support fees and consultancy fees. Therefore, it may be more cost

effective to use modules or elements from one supplier rather than purchasing separate elements.

The provision and guidance on systems seems appropriate in ensuring that all schools have access

and proficiency. However, the potential drawbacks of allowing discretion in system selection may

introduce dysfunction into the process, raising questions about who holds responsibility for these

decisions and whether they are the most qualified or knowledgeable individuals to make these

choices.

My experience as a data manager has provided firsthand insight into the dysfunction that can arise

when multiple MIS products are used simultaneously due to fragmented decision-making

responsibilities within schools. In several different schools, I have observed that different

stakeholders, such as administrative staff, academic departments and senior leadership, select and

purchase various MIS products independently resulting in multiple systems performing similar

functions, leading to unnecessary expenditure and inefficiencies. For example, I have seen schools

invest in separate systems for attendance tracking, behaviour management, and assessment

analysis, despite there being comprehensive solutions available that could consolidate these

functions within a single platform like SIMS.

This fragmentation not only increases costs due to multiple licences, support fees, and training

expenses but also complicates the data management process. Users must learn to navigate

different interfaces which can be time consuming and confusing. Moreover, the lack of

interoperability between systems can lead to data silos, where information is duplicated or

inconsistently recorded across platforms, potentially wasting time and increasing the risk of errors. Furthermore, the responsibility for managing these disparate systems often falls on different individuals who may not have the technical expertise or overarching view required to ensure that the systems work harmoniously, leading to inconsistent data practices and a lack of coherence, as no single person has a comprehensive understanding of the school's data infrastructure.

2.3.2 Impacts of management information systems

Access to information

Despite the widespread use of MISs within schools there is a lack of research focusing on their use (Visscher et al., 2003; Shah, 2014). This lack of research may represent that the importance of using data and relying on management information systems to collect and store increasing amounts of data is 'taken for granted' as an essential component of education (Murray, 2013) and therefore research is not required to critically understand how these systems are used.

However, some studies have shown how the use of MISs in schools can have a positive impact. MISs can allow for better accessibility to information (Shah, 2014) and integrated systems allow for multiple use of the same data (Strickley, 2004). The single entry of data into an integrated system saves time and prevents errors which may have occurred as a result of repeated data entry (Visscher, 2001). Management information systems provide benefits in managing, storing and maintaining information therefore, the use of MISs within schools should result in more efficient administration and a possible reduction in workload (PricewaterhouseCoopers, 2004). For example, a study investigating the impact of changes in ICT on management practices in smart schools in Malaysia indicated that use of MISs helped to increase access to information therefore leading to more efficient, effective schools with regard to administration and school resources (Zain, Atan & Idrus, 2004). In addition, Granville, Russell and Bell (2005) found that staff at schools in Scotland believed that the use of ICT had made administrative work easier because information was more

accessible and could be shared more efficiently. Furthermore, as school information systems evolved and became web-based systems, parents and students were able to access academic information via the Internet (McIntire, 2004). More recently, the introduction of Parent and Student apps have allowed schools to provide information in real time.

However, the increasing reliance on SIMS and other management information systems poses potential problems, particularly concerning the security of these systems. If SIMS were to be hacked and sensitive student and staff data were compromised, then it could lead to severe consequences such as exposing individuals to identity theft and privacy violations. Furthermore, the loss of academic and administrative data may disrupt normal school operations and potentially erode the trust of both SIMS users and parents and students. To address these challenges, schools must invest in cybersecurity measures, such as storing data in the cloud (Department for Science, Innovation & Technology, 2023), to safeguard sensitive information and maintain the integrity of their management information systems.

The existing literature underscores the significant benefits that MISs offer in enhancing access to informing with educational settings. Studies by Shah (2014) and Strickley (2004) highlight how integrated systems facilitate better information accessibility and reduce administrative burdens through single data entry points, thus preventing errors and saving time. The positive impacts on administrative efficiency, as evidenced by studies in Malaysia (Zain, Atan & Idrus, 2004) and Scotland (Granville, Russell & Bell, 2005), further demonstrate the global relevance and effectiveness of MISs in educational contexts. However, the scarcity of focused research on MIS usage suggests a gap in understanding the practical implications and challenges faced by schools in implementing these systems. This gap indicates a need for more detailed studies to critically evaluate how MISs are integrated into school practices and how they can be used for maximum benefit. Addressing this gap will provide valuable insights into the best practices for MIS use.

Workload

The use of management information systems can make a significant impact on the workload of teachers (Department for Education, 2015) by helping to reduce workload and increase productivity (Selwood & Pilkington, 2005). Centralised systems to store and share data can make administrative tasks, such as preparing reports, easier and improve communication within and between schools (Condie & Munro, 2007). For example, Khademi (2020) found that the headteacher's workload was much lighter using an EMIS because they found it easier to track and monitor all aspects of the school. However, studies on the implementation of management information systems in schools has not shown a universal reduction in workload for all staff members. For example, Visscher and Bloemen (1999) evaluated the use of computer assisted management information systems in the Netherlands and found that although system administrators and clerks were positive about the impact of the SIS on workload as the amount of monotonous clerical work had decreased, 40% of users believed the implementation of the SIS had a negative impact on workload. Furthermore, although Visscher et al. (2003) identified a reduction in workload as a perceived positive effect amongst users following the introduction of SIMS at schools in England only 30% of participants believed the implementation of SIMS had reduced workload and approximately a quarter felt that the use of SIMS had increased their workload and stress. Visscher et al. (2003) argue that these differences between respondents may be explained by the quality and extent of training they have received. A study of teachers' workload found that ICT did support a reduction in workload for some teachers, especially for confident users (PricewaterhouseCoopers, 2004).

Another perspective on the impact of management information systems in schools involves the broader context of government policies and their influence on teacher workload. The heightened emphasis on data-driven decision-making and reporting, often mandated by the Department for Education, has contributed to an increased administrative burden for educators. The accountability culture imposed by educational policies has changed the nature of teaching, making administrative

tasks integral to the profession (Ball, 2003). Therefore, the implementation of systems like SIMS can be viewed as a response to, rather than a cause of, the adjusted workload. While management information systems can support teachers and school leaders in managing the additional administrative load, the additional workload stems from broader policy decisions rather than being an inherent aspect of pedagogical practice.

The impact of MISs in workload is multifaceted, with studies indicating both positive and negative effects. This discrepancy highlights the crucial role of training quality and the broader context of government policies in shaping the effectiveness of MIS implementation. It suggests a need for comprehensive training programmes and a re-evaluation of policy frameworks to ensure that MISs truly alleviate rather than exacerbate teacher workloads.

Communication and collaboration

The use of MISs in schools may allow for greater flexibility and communication both within schools and between schools or other stakeholders as MISs allow greater access to data (Castells, 1996). Teachers involved in data inquiry have been found to be more willing and able to collaborate (Symonds, 2003). For example, a study on developing data mentors in schools in a midwestern district in the United States found that by increasing the use of data, interdepartmental collaboration increased because schools were able to see the 'total picture' rather than being limited to accessing information from their own department (Nichols & Singer, 2000: 36).

MISs can allow for more frequent, intensive, and informative interactions between parents/carers and teachers. For example, Telem and Pinto (2006) found that the introduction of SMIS, a school management information system, resulted in noticeable changes in interrelations between parents and school and parents and their children with parents' involvement in learning, behaviour and attendance issues becoming more intensive, more frequent and more focused. Furthermore, MISs allow many different users to access important information such as emails and phone numbers for

parents rather than these being stored by one person (Enomoto & Conley, 2007). More recently, MISs have implemented new modules to improve communication between teachers and parents/carers. For example, schools can use additional SIMS products such as InTouch or the SIMS Apps to improve communication by providing real-time notifications or emails either to individuals or large groups of parents/carers. In addition, school information systems can be partnered with text-messaging technology to automate the provision of information to parents. For example, Bergman and Chan (2017) used this technology to send parents automated text message alerts about their child's attendance, assignments and grades across 22 middle and high schools in West Virginia and found significant positive effects on grades and attendance.

While the aforementioned studies offer valuable insights into the use of school management information systems, it is important to acknowledge their age and consequent limitations within the rapidly changing landscape of educational technology. The findings from these dated studies may not fully reflect the current state and capabilities of modern MISs, nor the contemporary challenges faced by schools.

This study aims to address this gap by examining the contemporary use of SIMS in secondary schools in England, providing up-to-date and relevant insights into the evolving role of management information systems in educational contexts. By focusing on the current functionalities, user experiences, and impacts of SIMS, this research will contribute to a more nuanced understanding of how MISs are used in today's educational contexts. Additionally, by investigating the role of training in enhancing the use of management information systems, this study aims to provide practical recommendations for schools to enhance the use of SIMS, ultimately supporting better data-informed decision-making and improving educational outcomes.

2.4 Data use and school improvement

Schildkamp and Datnow (2022) identify four ways in which data can be used in schools; conceptual, instrumental, symbolic, and strategic. Conceptual data use describes using data to change educators' thinking whereas instrumental data use involves actually making changes either in the classroom or the school. Symbolic data use is when data use is perceived to be important, but data are not used in any meaningful way (Farley-Ripple, May, Karpyn, Tilley & McDonough, 2018). Finally, strategic data use describes when data are manipulated to attain specific power or personal goals.

Schools tend to use data to support and drive diagnostic and improvement agendas through continuous self-monitoring (Ozga, 2009). MISs have the potential to allow leaders at all levels (Bober, 2001) to carefully use data to monitor all aspects of school management, therefore highlighting possible aspects requiring attention (Visscher & Wild, 1997; Pegler, 1992) and allowing quick and effective decisions (Christopher, 2003). This process allows schools to take ownership of their future (Earl & Katz, 2002), within the prevailing culture of performativity and accountability, by increasing communication and knowledge throughout the school. Sahlberg (2023) critiques the Global Education Reform Movement (GERM) which promotes standardisation, competition and test-based accountability. He argues that these market driven reforms can lead to unintended consequences, such as narrowing the curriculum and increasing inequality. This perspective is relevant when considering the impact of MISs like SIMS, which are often used to support these very reforms by facilitating extensive data collection and analysis to meeting accountability demands. As such, understanding the broader educational and policy context, is crucial for evaluating the implications of data use in schools.

A large-scale research project conducted in England on the impact of SIMS, the chosen MIS at the research school, indicated that most participants (60%) believed that SIMS assisted users to evaluate school performance and therefore improved this process (Visscher et al., 2003). MISs allow for schools to use data to develop alternative solutions for sophisticated problems across the whole

school (Pegler, 1992; Visscher & Wild, 1997) such as complex allocation problems like timetabling (Ejimofor & Okonkwo, 2022). For example, because SIMS allows multiple use of the same data within different modules the process of making examination entries can be streamlined using the data within Course Manager and the school timetable. Furthermore, school managers are able to use data from different sources to formulate strategic plans and therefore distribute resources effectively (Telem & Buvitski, 1995; Telem, 1999). For example, in 2017 a new interventions tool was introduced in SIMS. This tool allows users to analyse the outcomes of different interventions together with a cost comparison of the interventions. In the context of the ongoing financial strains and resource constraints faced by schools (Sibieta, 2020), the strategic use of tools embedded in SIMS becomes a useful tool in supporting schools in navigating these constraints while still enhancing the educational experience for students.

Multiple sources of data can support individual teachers to align appropriate instructional strategies with the needs of individual students by translating data into action (Mandinach, 2012). Therefore, teacher expectations of previously low performing students may be raised through the use of data across a school (Armstrong & Anthes, 2001; Massell, 2001) and therefore improve school outcomes (Bober, 2001) and instil confidence in individual students. For example, Finn (2015) found that the use of aspirational targets can inspire confidence in students and become self-actualising.

However, data use is not always positive and some problematic data use practices such as publicly displaying assessment results (Neuman, 2016) and an increased focus by teachers on 'bubble-kids' (Booher-Jennings, 2005) or students who are close to the threshold of passing a test can further marginalise low performing students (Datnow & Park, 2018).

While the internal use of data has been a positive element within the story of the improvement of schools in England, the current data systems give greater priority to the requirements of external scrutiny and pressure rather than internal self-improvement (Kalizaewski, Fieldsend & McAleavy, 2017). This emphasis raises concerns about the balance between external accountability and

fostering a culture of continuous internal improvement. As data systems prioritise external demands, there is a risk that the genuine needs for self-reflection and enhancement within schools may take a backseat, potentially hindering the holistic development of educational institutions.

The potential of data use in driving school improvement is significant, with MISs offering tools for both diagnostic and strategic applications. Research by Bober (2001), Visscher and Wild (1997) and Christopher (2003) demonstrate that data use through MISs can facilitate rapid decision-making and strategic planning, leading to improved school performance and resource allocation. However, the dual nature of data use presents challenges. While data can empower schools to self-monitor and improve, as highlighted by Earl and Katz (2002), the pressure of external accountability can overshadow self-improvement efforts (Kalizaewski, Fieldsend & McAleavy, 2017). This dichotomy underscores the need for balanced data practices that support both external accountability and internal development. Further research is necessary to explore how schools can navigate these pressures and optimise the use of data for comprehensive improvement.

2.5 Management information systems and effective use

Although these studies indicate that MISs have the potential to make a positive impact within schools and other organisations, some studies have indicated that they are rarely used effectively. For example, studies have found that within management information systems many features of systems are not used at all (Wayman & Stringfield, 2003; Passey, 2008) and they are primarily used for clerical purposes (Bosker, Branderhorst & Visscher, 2007) as many barriers exist preventing their use (Shah, 2014).

Information system implementation within organisations, including schools, is costly (Legris, Ingham & Collerette, 2003). These costs include direct costs such as annual license fees, support and external or internal training and indirect costs such as time. Furthermore, although data practices can become increasingly routinised and therefore save time in schools (Mandinach, 2012), a lack of

time has been identified as a potential barrier to the use of MISs in schools (Shah, 2014). In my own experience as a data manager, I found that some data practices were routinised and could therefore save time. For example, using SIMS to take registers or to make examination entries. However, management information system users need the time to attend training and to practice using the system to gain familiarity and gain confidence (Zhao & Frank, 2003; Chitolie-Joseph, 2011). Other potential barriers to MIS use include technical factors such as server, network and internet problems, a lack of adequate training or support, software factors such as the interface or flexibility of the software and organisational features such as a vision for the use of the MIS (Chitolie-Joseph, 2011). These barriers highlight the need for comprehensive training programmes and robust support systems to optimise the benefits of MIS in schools.

Ibrahim, Susanto, Haghi and Setiana (2020) used questionnaires and interviews to gain insights into the effectiveness of a newly implemented management information system, an Integrated National Education Information System (iNEIS), in public schools in Brunei. Teachers viewed the new system as an additional burden with 93.7% claiming that the system did not help them at all. The reasons for this included no clear justification of the benefits of the system and a lack of shared vision for the system, inadequate training prior to implementation, a complicated interface, instability of the system and the internet connection and a lack of support from the iNEIS team and helpdesk. In addition, teachers reported having to complete 'double jobs' where they had to use iNEIS in addition to producing hard copy reports. Therefore, the implementation of iNEIS led to an increase in workload without any apparent educational advantages or discernible learning benefits.

Although MISs have the power and availability to support educators in achieving school improvement (Shah, 2014) their presence alone is not sufficient in turning data into actionable information (Wayman, 2005) because computer systems cannot improve organisational performance if they are not used (Davis, 1989). Data alone is without meaning and will only become knowledge when it is effectively studied to inform practice (Ackoff, 1989; Petrides & Guiney, 2002;

Breiter & Light, 2006). Management information systems can play a key role in transforming data into knowledge. However, MISs may complicate decisions for managers by providing too much information (Ackoff, 1989). Therefore, school managers may find themselves lost in 'data overload' (Breiter & Light, 2006) as schools become 'data rich' but also 'knowledge poor' (Wayman, 2005) as information systems may appear to demand a large amount of effort from schools with regard to inputting and updating data but offer little use of the resulting information (Klein, 1986). In navigating this dynamic, a delicate balance must be struck to ensure that management information systems serve as useful tools in fostering informed decision-making within schools.

2.6 Models

There are many approaches to studying the use of information systems by users (Martono, Nurkhin, Mukhibad, Anisykurlillah & Wolor, 2020) and many competing models have been formulated to evaluate information system usage and therefore success (Manchanda & Mukerjee, 2014). These models include Davis's Technology Acceptance Model and DeLone and McLean's Information System Success Model. Both of these models are widely recognised and frequently used within the field of information systems due to their theoretical foundations and practical applicability to a wide range of information systems within different contexts.

2.6.1 Technology acceptance model

The technology acceptance model (TAM) was proposed by Davis (1985) and had been developed from the theory of reasoned action (Fishbein & Ajzen, 1975). The model assumes that an individual's acceptance of an information system and therefore their use is determined by two major variables: perceived usefulness and perceived ease of use. However, the original model does not include essential determinants of decisions and actions or external variables such as system experience, level of education and age (Bagozzi, 2007). Therefore, the TAM was modified a number of researchers to include other variables. For example, the first modified version of the TAM

acknowledges that the belief of the person towards a system may be influenced by other factors that are referred to as external variables (Davis, Bagozzi & Warshaw, 1989). The final version of the TAM formed by Davis and Venkatesh (1996) shows that perceived usefulness and perceived ease of use have a direct influence on behaviour intention and therefore usage behaviour. The TAM has been widely tested in real-world IT implementation settings using the four main types of systems (communication, general purpose, office and specialised). For example, Alharbi and Drew (2014) used the TAM to measure the behavioural intention to use a learning management system at public universities in Saudi Arabia. Although there is no explicit reference to the TAM in the study, Bisaso, Kereteletsure, Selwood and Visscher (2008) found that the use of computer information systems in schools in Uganda and Botswana was dependent on the quality of the information the CIS provided which is related to the perceived usefulness and the amount of training users had received which influences the perceived ease of use.

Although the TAM is a useful theoretical model to help explain user behaviour in information systems implementation, TAM has only been successful in predicting about 40% of a system's use (Legris et al., 2003). Therefore, Legris et al. (2003) argue that because the results of empirical research using the TAM are not totally consistent or clear, then significant factors must be missing from the model. Sun and Zhang (2006) argue that the TAM must include organisational and technological factors because contexts and situational differences can play an important role in user acceptance (Taylor & Todd, 1995; Szajna, 1996). My own experience of using SIMS reflects the importance of contexts and situational differences. As a novice user trying to understand SIMS in a school where data use was limited, I struggled to comprehend how it could be used to support teaching and learning and therefore my initial perception was that SIMS offered limited practical value. Whereas when I became more proficient in using SIMS, in a school where teachers were expected to use data to support teaching and learning, my perception of the usefulness of SIMS changed.

Furthermore, although the TAM is a model that can be applied and used to understand the acceptance and use of any type of technology, other models have been developed specifically in relation to information systems to include elements of the TAM and other elements.

2.6.2 DeLone and McLean Information System Success Model

The DeLone and McLean Information System Success Model was originally developed in 1992 by using 180 conceptual and empirical studies to draw together the many aspects of information systems success into a descriptive model using a new comprehensive taxonomy (DeLone & McLean, 1992). Ten years after the publication of the original model, DeLone and McLean analysed over 150 articles referencing the original model and proposed an updated IS success model based on the contributions from other researchers. The updated model includes the addition of service quality to reflect the importance of service and support in successful information systems and intention to use to measure user attitude as an alternative to use. Individual impact and organisational impact have been collapsed into one construct: net benefits. The evolution of the DeLone and McLean Information System Success Model based on many projects reflects a dynamic engagement with the field and an openness to refining models in response to the ever-changing landscape of information systems research. Importantly, the evolution of the DeLone and McLean Information System Success Model highlights that models are subject to modification based on evidence, reinforcing the model's adaptability and relevance in a continuously changing field of research.
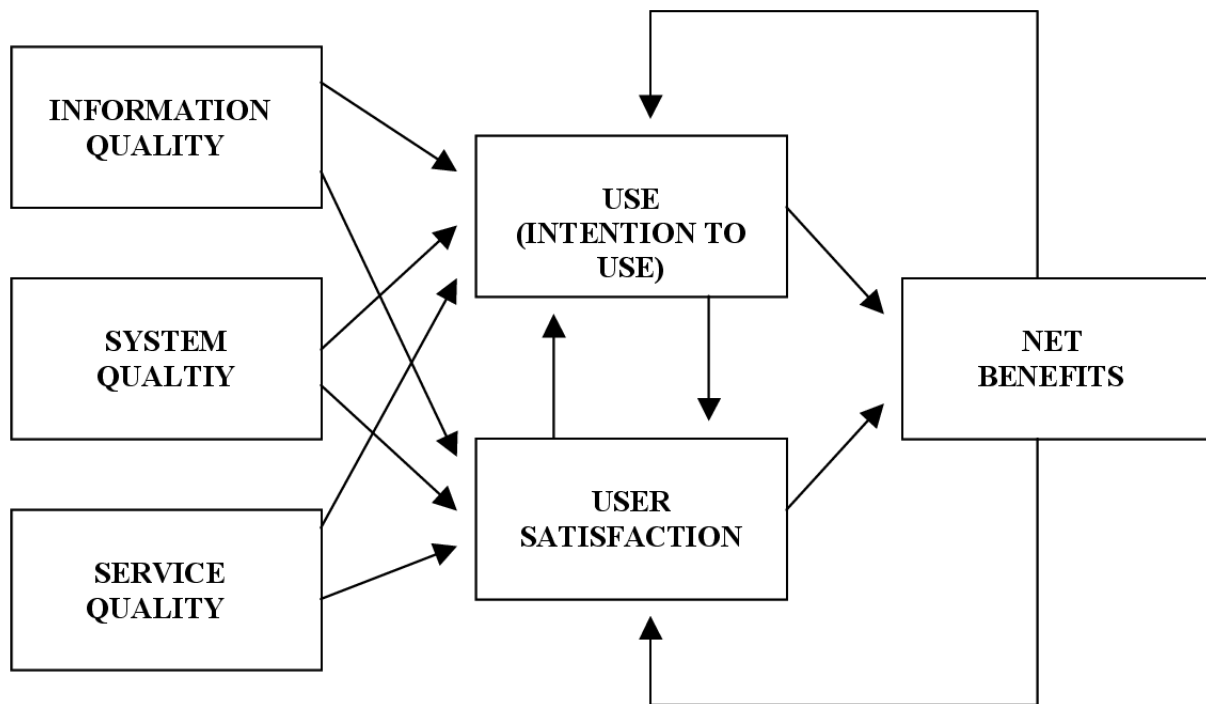
Figure 2.2: Updated DeLone and McLean Information System Success Model (2003).

The DeLone and McLean Information System Success Model, shown in Figure 2.2 is the most widely used model to evaluate information system success (Rabaa'i, 2009). The popularity of the DeLone and McLean Information System Success Model can be attributed to a variety of factors, including its comprehensive nature, adaptability, user-centric focus, versatility across contexts, empirical support and longstanding recognition in the field of information systems research (Elazzaoui & Lamari, 2022). The model consists of six interrelated dimensions of information system success. These dimensions comprise three independent factors; system quality, information quality and service quality and three dependent factors: use / intention to use, user satisfaction and net benefits. The arrows demonstrate associations between the dimensions.

System quality

The dimension system quality refers to the desirable characteristics of an information system and measures of this element typically focus on usability aspects and performance characteristics. Although perceived ease of use has been used as a measure of system quality in studies on

information systems success (Seddon, 1997), many additional measures have been used to capture system quality as a whole (Urbach & Müller, 2012). These measures include access, convenience, ease of learning, navigation, reliability, and system features.

A key barrier to the use of MISs within schools is the user-interface. Some studies have indicated that users may find it difficult to access, manipulate and interpret student data (Wayman, 2005). For example, users of a newly implemented MIS in a Californian school reported that accessing student data was considerably more challenging and less predictable than anticipated (Enomoto & Conley, 2007). When I first started using SIMS, I found the user-interface outdated and difficult to access. However, as a data manager, I needed to use SIMS and became more proficient in using it. As I used SIMS more, my perception of the quality of SIMS as an information system increased as I placed more emphasis on other measures of system quality, such as reliability and system features, rather than the user-interface. My experience of using SIMS shows that if the initial barrier of a poor user-interface can be overcome, users may gradually adapt and become more proficient with the system resulting in an increase in their perception of system quality. Over time, as familiarity increases, the perceived drawbacks of the user interface may become less prominent to the system's overall functionality and reliability. My experience highlights the importance of providing adequate training and support to SIMS users to alleviate user-interface concerns and allow them to navigate and use the system.

Information quality

Information quality refers to the output of an information system and the quality and usefulness of the information a user can generate using it. Measures of information quality include accuracy, availability, completeness, format, relevance, understandability and usability (Urbach & Müller, 2012).

The use of data to inform decisions within schools has the potential to support continuous improvement however, the relevant data must be made available in an accessible format (Breiter & Light, 2006). MISs and other data handling facilities can support the use of data and help prevent schools becoming lost in data overload (Nagy & Henderson, 2016). However, without a strategic approach to data, too much data or the wrong type of data stored in a complicated format may result in schools becoming lost in data overload (Lachat, 2001; Schmoker, 2003; Celio & Harvey, 2005).

Service quality and training

Information systems organisations produce an information product and also provide support for end users. The original DeLone and McLean information system success model (1993) did not include a measure of service quality and therefore some researchers have argued that information system effectiveness will be mismeasured (Pitt, Watson & Kavan, 1995; Kettinger & Lee, 1995; Wilkin & Hewitt, 1999). Although some researchers such as Seddon (1997) do not think that service quality is an important measure, service quality was added by Delone and McLean when the model was updated and extended in 2002. Service quality includes aspects of the hardware and software of the information system such as how up to date it is and its dependability. In addition, service quality relates to aspects of support provided by information system employees such as reliability, responsiveness, and empathy. In relation to SIMS, service quality reflects both the ad hoc support provided via the Capita support line and training courses provided by Capita. Within schools, end users may also receive internal training from colleagues (Visscher & Bloemen, 1999). For example, as data manager I regularly provided training for colleagues on SIMS. This training included providing formal training sessions for groups of teachers and support staff and ad hoc training for individuals as needed. Although this type of internal training is not provided by the service provider, Capita, it will still influence the use of SIMS in a similar way to the formal external training and support usually included in the measure 'service quality'. High quality user training can influence

system use because it can clarify how SIMS can support user's duties and provide the skills and expertise for further SIMS use.

Visscher (1995) presented user training as a key factor influencing the implementation and use of computer information systems in schools across seven different countries. This finding is supported by other empirical studies. For example, the amount of internal and external training was found to influence SIMS use in secondary schools in England (Visscher et al., 2003). They found that many respondents were unhappy with the amount and the nature of the training they had received, and the extent of external training offered a strong explanation of the differences between participants in their extent of SIMS use (Visscher et al., 2003). One of the most important aspects of the benefits of user training identified by Visscher et al. (2003) is that training can help users to identify problem solving strategies that they can follow if 'SIMS does not do what they want it to do' (Visscher et al., 2003: 365). I found that when I first started using SIMS as a data manager, SIMS often did not do what I wanted it to and was not an intuitive information system to use. However, as I gained more experience using SIMS and understood more about how different modules work together, using SIMS began to feel more intuitive and so it felt as though SIMS began to do what I wanted it to do. However, I may have experienced this because as I began to understand the limits of SIMS capability, my intentions aligned with its capability.

 This changing experience of using SIMS prompted me to reflect on the training I received. When I first started using SIMS, I received limited training and the training that I did receive was focused on completing specific tasks such as preparing student reports rather than providing an overview of how SIMS can be used.

Although, training has been identified as an important factor influencing the use of data and MISs, schoolteachers and school leaders rarely receive systematic training in data-driven practices (Mandinach, Gummer and Muller, 2011). Kelly, Downey and Rietdijk (2010) found that most teachers had not received any data related training in the last five years. This finding may be

because access to good training is limited (Means, Padilla & Gallagher, 2010) and most schools do not provide the suitable sustained training required to analyse and interpret data (Protheroe, 2001) or because teachers and school leaders did not want to attend training (Mette & Bengtson, 2015) or are not able to attend training due to a lack of time or resources (Shah, 2014). Furthermore, relatively little is known about the best way to train school managers in information systems usage (Visscher & Branderhorst, 2000). However, wider and better MIS usage can be promoted by carefully designed user training based on an analysis of the needs of individual users or groups (Fulmer, 1995; Visscher et al., 2003; Bisaso & Visscher, 2004). Other studies have also indicated how training can have a positive effect on attitudes towards a school management information system (for example Staman, Visscher & Luyten, 2014; Wei, Piaw, Kannan & Moulod, 2016). For example, Bosker, Branderhorst and Visscher (2007) studied the impact of a deliberately designed training course for school principals on their attitudes towards the use of MISs in schools. They found that their training course resulted in a positive impact on the principals' knowledge of MISs and attitude towards MISs. However, these attitudes were less positive months after completing the training. Although an explanation of this finding is not provided, a lack of ongoing support or a lack of opportunity to apply the acquired knowledge and embed new practices may have resulted in a less positive attitude towards the MIS (Shah, 2014). These studies highlight the importance of training in relation to MIS use for school leaders. Although it could be suggested that MIS use by teachers could be supported with training, there is currently no research on how training can support teacher use of MISs. Therefore, this research focuses on this aspect of SIMS use.

Intention to use / use

System use is a complex, multidimensional variable and should capture the richness of use as a system phenomenon by including the nature of use, appropriateness of use, extent of use, attitudes towards use and intention to re-use rather than simply measure the frequency or amount of use (DeLone & McLean, 2003). Simply measuring the amount of time, a system is used cannot properly

capture the relationship between usage and the net benefits, although declining usage may indicate that the anticipated benefits are not being realised. While researchers have argued for the importance of evaluating success from the user's perspective (Bostrom & Heinen, 1977; DeLone & McLean, 2003) practice has failed to follow this advice (Petter, DeLone & McLean, 2012).

In the context of this research the perspectives of system users are critical. Understanding how data managers, teachers and other school staff use these systems and their attitudes towards them will provide valuable insights in meeting the aim of this study. To explore system use and user perspectives in this study a combination of quantitative data from surveys with qualitative data from interviews allows for a comprehensive understanding of how SIMS is used in schools and the factors influencing its use. This research aims to bridge the gap between theoretical recommendations and practical implementation by focusing on the user experience of MIS in schools. By evaluating success from the user's perspective, this study highlights the multidimensional nature of MISs and identifies key factors that influence the use of SIMS.

User satisfaction

The DeLone and McLean Information System Success Model (2003) shows that use / intention to use is associated with user satisfaction. Although use must precede user satisfaction in a process sense, a positive experience with use will lead to greater user satisfaction. Qualitative case studies have indicated that user satisfaction is associated with information quality (Scheepers, Scheepers & Ngwenyama, 2006), perceived usefulness (Leclercq, 2007), higher quality training and support (Coombs, Doherty & Loan-Clarke, 2001). Within education management information systems research Saad and Daud (2020) found that ease of use was a critical factor influencing user satisfaction in data information teachers to accept an online education management information system in secondary schools in Malaysia. Although Saad and Daud (2020) only surveyed data information teachers and therefore did not compare with other teacher users within the same

organisations some groups of users might have higher user satisfaction compared to other users (Elbanna, 2007; Cerpa & Verner, 2009).

Net benefits

Net benefits reflect the balance of positive and negative impacts and can be measured at the individual level or organisational level (DeLone & McLean, 2003). Within information systems research net benefits means enhanced decision-making and improved productivity.

Use of the DeLone and McLean Information System Success Model

While several relationships found in the DeLone and Mclean Information System Success Model have been sporadically supported in empirical research the complete model has not been consistently applied. A critical meta-review of 53 studies using the DeLone and Mclean Information System Success Model published between 1992 and 2019 identified variation in the application of the model (Jeyaraj, 2020). This variation may be attributed in part to differences in research contexts. This analysis underscores the importance of context-specific adaptations and highlights the need for a more in-depth understanding of how the model can be applied to various settings, such as secondary schools using SIMS. By incorporating these insights, this research aims to contribute to a more comprehensive understanding of MIS success and its practical implications for enhancing data-driven decision-making in schools.

Most previous research on the DeLone and Mclean Information System Success Model has evaluated the model or a single dimension of the model using statistical analysis (Petter et al., 2008). However, more recent research has demonstrated that the model can be used as a descriptive tool to explore the success of information systems. For example, Hassan, Rahmatullah and Mohamad Nordin (2014) used the model to evaluate the implementation of a virtual learning environment in one school in Malaysia. I have adopted a similar approach and used the model as a descriptive tool

to evaluate the use of SIMS in secondary schools. Therefore, my research does not question the measures but instead uses the model as a framework for description and evaluation.

2.7 Data culture

Within organisations, cultural resistance at various levels including national, organisational and group can influence the successful implementation and effective use of information technology and MISs (Damodaran & Olphert, 2000; Leidner & Kayworth, 2006). There are a myriad of definitions, conceptualisations, and dimensions used to describe the concept of culture (Straub, Loch, Evaristo, Karahanna & Srite, 2002). It is through the examination of participants' experiences that we can recognise the culture aspects, such as patterns of beliefs, values, assumptions, and norms, of data use in schools. Examining participants' experiences, values and beliefs related to data use provide us a vehicle to better understand school data cultures (Lasater, Albiladi, Davis & Bengston, 2020).

A positive learning environment within a school includes attitudes, values, goals, norms of behaviour and practices, accompanied by an explicit vision for data use by leadership, emphasising the importance and power that data can bring to the decision-making process (Hamilton, Halverson, Jackson Mandinach, Supovitz, Wayman, Pickens, Martin & Steele, 2009). Salpeter (2004) asserts that the most important element of an effective data-driven programme is not the data, the analytical tools, or even the curriculum framework; it is the school culture in which the data inquiry takes place. This underscores the significance of fostering a supportive and open culture towards data use in schools.

Research has distinguished between data cultures focused on continuous improvement or organisational learning focused on improving teaching and learning over the long term versus those focused on accountability (Diamond & Cooper, 2007; Firestone & González, 2007; Ikemoto & Marsh 2007; Datnow & Park, 2018). Kelly et al. (2010) presented two contrasting approaches to the management of data: data dictatorship and data democracy. Although these classifications

represent two theoretical extremes, actual school data cultures are more complex and fluid than this binary implies.

Datnow et al. (2007) and Datnow and Park (2018) explored how data cultures within schools can significantly impact the effectiveness of data use. A data culture that promotes continuous improvement and values data-informed decision-making is likely to see better outcomes in teaching and learning. This involve creating an environment where data are used not only for accountability but also for identifying areas for instructional improvement and fostering a collaborative approach to addressing educational challenges. To achieve this, school leadership must articulate a clear vision for data use and cultivate a culture that values transparency, collaboration, and ongoing professional development. A positive data culture encourages collaborative inquiry, reflective practice, and a shared commitment to using data to drive decision-making. However, the imposition of data use without considering the existing school culture can lead to resistance and superficial compliance.

Critical theory provides a framework for understanding the dynamics of power relations and ideologies that influence data use practices in schools. It prompts critical questioning of whose interests are served by data initiatives and considers how data practices can either reinforce of challenge existing inequities within the education system (Giroux, 1983). By incorporating insights from critical theory, a deeper understanding of the complexities of school data cultures can be achieved, contributing to the creation of more equitable data use practices. This approach involves not only providing the necessary tools and training but also fostering a culture that values and supports thoughtful, reflective engagement with data (Datnow & Hubbard, 2016). Critical theory can help highlight the hidden curriculum embedded within data practices, revealing how these practices may perpetuate existing power structures and inequities (Apple, 2012). For example, data use that focuses solely on accountability measures can marginalise students who do not perform well on standardised tests, thereby reinforcing systemic biases (Au, 2011). Engaging educators in

critical reflection about the purposes and impacts of data use can lead to more thoughtful and equitable practices (Datnow & Park, 2018). Furthermore, creating a data culture grounded in critical theory involves promoting collaborative inquiry and shared decision-making processes (Coburn & Turner, 2011). This means not only equipping educators with the skills to analyse data but also fostering an environment where they can question and discuss the implications of data use openly (Datnow & Hubbard, 2016). By prioritising transparency, inclusivity, and continuous professional development, schools can develop data use practices that support equity and improve educational outcomes for all students (Mandinach & Gummer, 2016).

2.7.1 Data vision

The perceived usefulness of MISs within schools relates to the perceived usefulness of data for informing instructional decisions and continuous improvement (Salpeter, 2004; Breiter & Light, 2006). Therefore, use of MISs that support data use will be affected by barriers to data use. One barrier to data use in schools is an absence of a data vision (Means, Padilla & Gallagher, 2010). A data vision should show why data are used and provide explicit expectations for data use (Lasater, Albiladi, Davis & Bengston, 2020). For example, a data vision could be that all staff and students will use data to support the individual learning needs of students (Hamilton et al., 2009). A vision must be articulated clearly and aligned across the whole school. Therefore, it is important that school leaders are sufficiently empowered, prepared, trained and knowledgeable in the use of data in order to promote a suitable data vision.

2.7.2 Data dictatorship versus data democracy

One of the direct results of a data vision is the creation of a data culture. Therefore, the type of data culture that is fostered will depend on the data vision within a school (Datnow, Park & Wohlstetter, 2007). A vision that only accepts the use of data for accountability purposes is likely to lead to restricted data use within schools as the culture will be driven by fear rather than inquiry (Lachat &

Smith, 2005). As part of this vision, only some members of staff who hold positions of authority will have access to data to make informed decisions. This type of data use within schools has been described by Kelly et al. (2010) as a data dictatorship. Kelly et al. (2010) presented two contrasting approaches to the management of data: data dictatorship and data democracy. Although these classifications represent two theoretical extremes, actual school data cultures are more complex and fluid than this binary implies.

A data dictatorship is led by data gatekeepers who control and prevent the use of data by teachers and other members of staff as shown in Table 2.1. Kelly et al.'s (2010) study on the use of data in English secondary schools found that only 5% of schools reported that student performance data was analysed by classroom teachers and that teachers in pastoral teams had very little involvement in data analysis. A study on the use of data in two secondary schools in Australia found that some practices of data use in the schools reflected the 'data dictatorship' described by Kelly et al. (2010). Most members of staff did not have access to unprocessed data and therefore the analysis of data was conducted by a few members of senior staff (Selwyn, Henderson and Chao, 2015). Therefore, teachers believed that data were being used 'on them' to reinforce hierarchies and power relations. However, the data culture at each of these schools did not wholly reflect the notion of a data dictatorship because the 'gatekeepers', believed they were data advocates and potential facilitators of data use across the school.

Data dictatorship	Data democracy
Led by 'data gatekeepers'	Led by 'data advocates'
Deficit view of colleagues	Developmental view of colleagues
Data manager = data expert	Data manager = data facilitator
Need to control	Need to support
Teachers get what they are given	Teachers given appropriate access

Pre-digested data bytes	Undigested data sets
Prevented from exploring further	Encouraged to explore further
Colleagues de-skilled	Colleagues upskilled
Stilted self-evaluation	Wide ranging self-evaluation

Table 2.1: Contrasting approaches to the management of data in schools (Kelly et al., 2010:39)

This framework has allowed me to reflect on my experience as a data manager in a secondary school. In Kelly et al. (2010) the 'data manager' role is described as typically being undertaken by a Deputy or an Assistant Head. However, over the past decade, the role of data manager has emerged as a distinct role typically undertaken by a member of support staff (Atherton, 2016). This change is reflected at each of the case study schools as the data managers are support staff who are not members of the SLT, although there are members of SLT who have a responsibility for data at each of the case study schools.

Following an interpretive analysis of teachers and school leaders' experiences of using data from 10 schools in one Arkansas school district, Lasater et al. (2020) proposed a similar framework of data culture called the data culture continuum framework (Figure 2.3). Their framework posits that schools create data cultures which exist on a continuum between positive data cultures and negative data cultures. This study aims to contribute to the existing literature by filling the gap in understanding how the use of MISs in schools can support the evolution of data cultures from restrictive to empowering environments. By exploring these dynamics, this research can provide insights into creating more effective and equitable data practices within schools, ultimately supporting better educational outcomes and fostering a more inclusive approach to data use.

DATA FACTORS

Negative Data Cultures

Negative Factors:
Distrust and isolation
Data use for compliance
No expectations or teacher agency
Displacement of data ownership
Lack of leader competency
Data as evaluative weapon

Positive Factors:
Trust and collaboration
Data use for improvement
Leader expectations/teacher agency
Shared ownership of data
Leader competency
Data as supportive tool

Positive Data Cultures

Figure 2.3: Data culture continuum framework: positive and negative factors (Lasaster et al., 2020).

Positive data cultures

Wohlstetter, Datnow and Park's (2008) study of school systems indicated that there are many successful approaches to data use in schools. However, there are common features that support the effective use of data reflecting a positive data culture. The use of data has been shown to be strongly influenced by the leadership of the principal (Massell, 2001). Therefore, to promote data use, school leaders should model good practice through communications with members of staff, students and other stakeholders and provide resources such as common planning time or data coaches to support the use of data (Mandinach, 2012). For example, Armstrong and Anthes (2001) showed that strong leadership and a supportive culture were characteristics of schools that were most involved in data use. Furthermore, schools that are the most proficient at closing the achievement gap between different groups of students, a key factor in school improvement (Massell, 2001), are more likely to have school leaders who encourage, or lead data-driven enquiry (Symonds, 2003). For instance, schools with principals who actively engage with data and facilitate data discussions are more likely to see improved student outcomes (Mandinach & Gummer, 2016).

In a positive data culture or a data democracy, the purpose of data use is to support student, teacher and school improvement. For example, schools that use data democratically involve teachers in data analysis processes, encouraging them to identify trends and develop instructional strategies based on their findings (Ikemoto & Marsh, 2007). Furthermore, a supportive culture of data use or a data democracy is characterised by data facilitators rather than data gatekeepers and promotes the use of undigested data sets by teachers who are upskilled and encouraged to explore further (Kelly et al., 2010). Scherman, Howie and Archer (2013) highlight the importance of data paths, which define who is included and excluded in data discussions, further emphasising the need for inclusive data practices.

By creating a positive data culture of trust and collaboration between staff, teachers will be more willing to accept responsibility for their data and share ownership of the data with other teachers and leaders. For example, schools that establish professional learning communities focused on data often see higher levels of teacher engagement and a more collaborative approach to addressing educational environments (Vescio, Ross & Adams, 2008). In these environments, teachers feel empowered to use data to inform their teaching practices and contribute to school-wide improvement efforts.

Therefore, the most productive use of data within schools is characterised by multiple teams working collaboratively to interpret and use data to support continuous student improvement (Lachat & Smith, 2005; Anderson, Leithwood & Strauss, 2010). Collaboration between teachers helps them to learn from each other and allows for the exchange of ideas and strategies (Schildkamp, Poortman & Handelzalts, 2016). For instance, Ikemoto and Marsh (2007) found that schools with established data teams that meet regularly to discuss data and instructional strategies tend to have better student performance outcomes. Additionally, regular data meetings where teachers and administrators collaborate can lead to more informed decision-making and a stronger focus on student achievement (Wayman, Cho & Johnston, 2007).

Negative data cultures

Negative data cultures are characterised by a focus on data use for accountability and compliance. Although these data cultures have been characterised as 'negative' by Lasater et al. (2020), data use for accountability is encouraged through the implementation of performance measures, like Progress 8 and Attainment 8 (Department for Education, 2024), focused on a narrow range of assessment data used to hold secondary schools accountable. Performance measures are used in school performance tables and Ofsted Inspections influencing school rankings and reputation. The educational context within which schools are positioned will undoubtedly affect how data are viewed used and therefore this focus on data use for accountability and compliance may be accepted as the norm within a system heavily influenced by policy directives. The omnipresence of these accountability measures, integrated into school performance tables and Ofsted inspections, establishes a culture where the utility of data becomes synonymous with compliance and adherence to predetermined benchmarks. Consequently, educators may perceive data primarily as a tool for meeting external expectations rather than a resource for nuanced understanding, responsive teaching, and continuous improvement. This emphasis on accountability in data use, while aligning with policy objectives, may inadvertently overshadow the broader educational goals of fostering critical thinking, creativity, and a holistic development of students. As a result, the acceptance of data use for accountability within this context may be a reflection of systemic pressures rather than a genuine commitment to the comprehensive betterment of educational practices.

Within the critical pedagogical framework (Giroux, 2011) the pervasive focus on data use for accountability and compliance in educational policies reveals troubling implications for the very purpose of education. Giroux emphasises that education should cultivate engaged citizens capable of critical thinking and social transformation. The imposition of standardised performance measures such as Progress 8 and Attainment 8, prioritising accountability, resonates with Giroux's concerns about the marketisation and impact of neoliberal influences in education. From a critical pedagogy

perspective, the relentless pursuit of quantifiable outcomes at the expense of a holistic educational experience contradicts the foundational principles of transformative learning. An emphasis on accountability within school data cultures may contribute to culture of conformity, inhibiting educators from fostering a rich, diverse and critical learning environment. Consequently, the acceptance of data use for accountability within this context may not merely be a response to systemic pressures but a reflection of a broader ideological shift in education that potentially compromises its emancipatory and transformative potential.

Lasater et al. (2020) posit that leaders towards the negative end of the data culture continuum may demand data use from teachers without providing them with the support to effectively use it. An accountability focused data culture may lead teachers to focus on the technical dimensions of teaching. An investigation into data use at two elementary schools found that teachers at grade level meetings were more concerned with completing the data form and following protocols rather than using the data to have meaningful discussions about instructional improvement (Gannon-Slater, Londe, Crenshaw, Evans, Greene & Schwandt, 2017). In addition, Horn, Kane and Wilson (2015) found that when the principal of a school is focused on accountability, teacher workgroups used data as a monitoring activity and used mathematics assessment data to characterise students according to achievement levels. Whereas a teacher workgroup at another school used the same data to frame a discussion on instructional improvement and to deeply investigate the source of student mistakes. The consequences of such a culture include increased teacher frustration, as they may feel overwhelmed by administrative tasks that do not contribute to their primary goal of improving student learning. Moreover, this approach can lead to missed opportunities for identifying and addressing students' individual learning needs, ultimately affecting outcomes negatively. From my experience as a data manager, I have observed firsthand the detrimental effects of an accountability focused data culture. In one school where the emphasis was heavily on data compliance, teachers were often stressed about meeting data submission deadlines and less engaged in collaborative discussions about using data to inform their teaching strategies. This

environment created a sense of disempowerment among teachers, as they felt their professional judgment and insights were undervalued in favour of rigid adherence to data protocols.

In schools where teachers fear reprisal, they may be reluctant to use data even when adequate training and time have been provided as effective data use is driven by inquiry rather than fear (Lachat & Smith, 2005). Teachers and leaders in negative data cultures are more likely to view data as a tool to punish them (Lasater et al., 2019) which may lead to problematic data practices in schools such as focusing efforts on certain groups of borderline or 'on the bubble' (Datnow & Park, 2018) students (Booher-Jennings, 2005; Gillborn & Youdell, 1999), narrowing the curriculum (Hutchings, 2015) or publicly displaying student or class test scores (Finn, 2015; Neuman, 2016). Gannon-Slater et al. (2017) found that teachers at a school with an accountability focused data culture were focused on the technical dimensions of teaching and concerned with 'what works' to increase certain test scores. Goertz, Olah and Riggan (2010:76) study on the use of data from a benchmark assessment in mathematics at schools in Philadelphia shows that even when the aim of the district was continuous improvement, teachers felt pressured by principals 'if you don't do well, you get talked to'. This example highlights the importance of school context and the role of the school leader. Furthermore, a study by Herman and Gribbons (2001) found that teachers in higher performing schools found data use empowering whereas, teachers in lower performing schools felt devalued and disenfranchised by data use again highlighting the importance of the school context. This phenomenon was also observed by Diamond and Cooper (2007), who studied data use in urban schools. They found that in schools where data were used punitively, teachers felt threatened and were more likely to engage in practices aimed at avoiding negative consequences rather than genuinely improving student outcomes.

These examples highlight how the context and approach to data use within a school can significantly impact teachers' perceptions and practices. Schools that foster a supportive, inquiry-based data culture are more likely to see data used effectively to drive genuine instructional improvements,

whereas schools with punitive data cultures risk fostering fear and superficial compliance among teachers.

2.7.3 Role of the data manager

Researchers have highlighted the importance of data teams or a data coach in schools to promote the use of data to drive or inform decision-making through the use of MISs (Lachat & Smith, 2005) and the presence of data teams in schools is a key element of a positive data culture or a data democracy. However, Breiter and Light (2006) following a brief review of management information system research and a specific educational case study in New York City identified schools often lack the professional staff for data processing and data distribution (Breiter & Light, 2006). Therefore, schools have begun to employ data managers (Mackinlay, 2014). This relatively new role in schools has no formal structure and therefore each data manager or school computer administrator (Haughey, 2006; Telem 1997) will have a different role depending on their personal and professional identity and the structure of the school (Mackinlay, 2014). For example, some schools have expanded the role of examinations officer to include data management whereas other data managers have a teaching background. In addition, within secondary schools there is usually a senior leader who has a responsibility for the use of data within the school. I started my professional career as a Data Manager at a small, independent secondary school and was an Assistant Principal: Data and Systems at a larger academy.

I started my professional career as a data manager at a secondary school that used SIMS as their principal MIS. As a data manager, my role was to manage the system. However, I believed that SIMS was not being used to its full potential within the school because colleagues did not know its full capabilities. Through my Master's research I was able to develop my role and attempted to improve the use of SIMS through widespread internal training. By providing colleagues with the skills to use SIMS, I witnessed changes to the data culture within the school and an increase in the use of SIMS. During this time, I became a member of the Senior Leadership Team which is unusual

as a non-teaching data manager. Of the 204 schools included in this study, no data manager is listed as a member of the senior leadership team or equivalent on the website. I have also provided SIMS training and advice for data managers and senior leaders at other schools. My experience as a data manager highlights how the role of data managers as experts requiring professional knowledge and skills in data management and a range of systems (Williamson, 2018) is still emerging as the work that schools are required to do around data continues to evolve.

2.8 Data epistemologies

Although researchers within the field of information science have attempted to define the term 'data' and therefore determine the properties data have, there is no singular definition of the term (Furner, 2016). In the broadest sense, data are the result of abstracting the world into representational forms such as characters or symbols that can be used to created information and knowledge (Kitchin, 2014). From this empiricist epistemological viewpoint, data reflect an objective reality (Gitelman, 2013) and therefore data are the starting point of what can be known and therefore implies that data themselves are neutral and objective tools that are free of human bias (Kitchin, 2014).

However, the emerging field of 'critical data studies' addresses the challenges posed by data and acknowledges the importance of understanding that data are not neutral (Williamson, Bayne & Shay, 2020). In order to produce or generate data, people must decide what to measure and how to measure it. Data are constructions about the world that have been collected for certain purposes and therefore do not represent reality independent from human thought (Jasanoff, 2017). Humans must decide what data to collect and how to analyse it. In addition, any management information system used in the collection of analysis of data must be designed or programmed. Therefore, data are always actively produced, framed, and sampled (Gillespie, 2014). Data are not simply natural and essential elements that are abstracted from the world in neutral and objective ways to be accepted at face value, they always have to be generated (Manovich, 2001). Consequently, the idea

that data can be impartial or 'raw' is an oxymoron (Bowker & Gitelman, 2013); data always bear the imprint of their producers (Kitchin, 2014). Data produce incomplete and highly partial representations of reality because they frequently remove complexities, context, meaning and causal factors (Lupton, 2014). Furthermore, because data are generally generated to achieve certain objectives, data are also framed by the wider culture where they are produced (Kitchin, 2014).

2.9 Datafication of education

Datafication, or the quantification of human behaviour to enable real time tracking and monitoring (Mayer-Schönberger & Cuklier 2013), has become a new paradigm in science and society (Van Dijck, 2014). Although education has been subject to historical forms of datafication (Lawn, 2013), the quantification, measurement, comparison, and evaluation of the performance of schools, staff and students has increased continuously and intensified throughout the last decade (Jarke & Breiter, 2019). Demands of measurable accountability, international large-scale assessments such as PISA, comparative ranking and the proliferation of indicators throughout schooling are inherent aspects of 'governing by numbers' (Grek, 2009; Piattoeva & Boden, 2020).

Data-based accountability governs education (Ozga, 2011) on a macro, meso and micro level (Altrichter, 2010). Since the publication of PISA results in the 1990s, public pressure on changing education policy enforced by international non-governmental organisations, such as OECD, has been observed (Martens, Nagel, Windzio & Weymann, 2010). Although the political perspective of the use of data in schools has been studied intensively, research on the underlying ICT infrastructures, management processes and data practices within schools has been less prominent (Breiter, 2016).

Therefore, it is important to investigate not only the broader political and policy implications of datafication in education but also the practical and operational aspects of how data are managed and used within schools by examining the role of MISs in supporting data practices. By focusing on the intersection of data practices and MISs within schools, this research aims to fill the gap in the

existing literature and provide a comprehensive understanding of the datafication process in educational settings.

A narrow meaning of the term data has been used in schools where only that which can be enumerated counts, meaning that data could only be numbers and not more nuanced qualitative concepts (Pratt, 2016). Therefore, aspects of teaching and learning that cannot easily be measured or quantified are often rendered invisible, marginal, and devalued whereas data that are collected and analysed achieve visibility value and importance. This narrow definition of data promotes a narrow focus on standardised test scores as the only form of data and on raising standardised test scores as a primary goal for data use in education (Penuel & Shepard, 2016).

While the potential benefits of data use in education are widely acknowledged, there are significant problems associated with its implementation and practice. First, we cannot simply promote data use and expect positive outcomes (Datnow & Park, 2018). The assumption that the mere presence of data will lead to better educational outcomes is overly simplistic and fails to consider the complexities involved in educational contexts. Educators play a critical role in shaping how and why data are used, what counts as data, and what people are aiming for when they advocate the use of data in schools (Coburn & Turner, 2011). The interpretation and application of data are deeply influenced by educators' beliefs, knowledge and experiences. For instance, the emphasis on quantitative data often leads to the neglect of qualitative aspects of education, such as student engagement, creativity, and critical thinking, which are equally important for holistic education but are challenging to measure and often ignored in data-driven decision-making processes. Moreover, data do not drive decisions by themselves (Dowd, 2005). Data are merely tools that provide information, and their utility depends on how they are interpreted and used by individuals. The effectiveness of data-driven decision-making hinges on the ability of educators and school leaders to critically analyse data, contextualise it within their specific educational environment, and apply it in ways that support meaningful improvements. Without a nuanced understanding of data and its

limitations, there is a risk of misinterpretation and misapplication, leading to decisions that may not effectively address the underlying issues.

Williamson (2019) argued that within the education technology sector the apparent objectivity of data has been adopted and accepted based on the assumption that teachers are too subjectively biased and therefore may not necessarily be trusted whereas data and algorithms offer apparent objectivity and impartiality. Datafication is framed in terms of mechanical objectivity, certainty, and impartiality in contrast with humans who are subjective and biased (Williamson & Piattoeva, 2019). However, more recently the apparent objectivity regarding the use of data and algorithms has been publicly questioned. When GCSE and A Level examinations were cancelled in England in the summer of 2020 following the closure of schools in response COVID-19 pandemic, Ofqual announced that students would be assigned grades based on teachers submitting grades and rankings for students and a standardisation process using an algorithm. However, the government was forced to abandon this system when 36% of grades assessed by teachers in England were downgraded by the algorithm led to demonstrations outside the Department for Education (Kippin & Cairney, 2022). In the following summer when examinations did not go ahead for the second year, Gavin Williamson, the education secretary, said that 'this year we are going to put our trust in teachers rather than algorithms' showing a shift in how teachers and algorithms were positioned by the government over this particular issue.

2.10 Summary

This literature review has provided a comprehensive examination of the use of data and MISs in secondary schools, with a particular focus on SIMS, the most widely used MIS in secondary schools in England. The review highlights the historical development, current applications, and theoretical underpinnings of MISs, alongside the significant benefits and challenges associated with their use. Despite the considerable potential of MISs to support data-informed decision-making and drive

school improvement, several gaps in the literature have been identified, warranting further exploration and research.

One notable gap is the limited research focused specifically on SIMS, despite its widespread use in over 19,000 schools in England. While broader discussions on educational technology and data-driven decision-making are abundant, studies that focus on the use and user experiences of SIMS remain scarce. The seminal work by Visscher et al. (2003) is now outdated, and there has been a lack of more recent studies that reflect the advancements and evolving functionalities of SIMS. This gap is significant because it means that current practices and challenges may not be adequately addressed, limiting the ability of schools to fully leverage the benefits of SIMS. Furthermore, much of the existing research on management information systems in schools has tended to adopt a quantitative approach (for example Zain et al., 2004; Çelik & Ayaz, 2022), which, while useful for providing an overview, does not offer the rich, detailed insights that qualitative methods can provide. There is a significant gap in qualitative studies that explore the lived experiences and perceptions of various stakeholders, including teachers, administrative staff, and data managers. Understanding these perspectives is crucial for identifying the practical challenges and barriers to effective MIS use in schools, thereby informing more targeted solutions. Additionally, the review has underscored the importance of training and support in the use of MISs. Despite evidence suggesting that inadequate training is a major barrier, there is limited research on what constitutes effective training for different user groups within schools. This highlights the need for studies that not only identify training needs but also evaluate the effectiveness of different approaches, ensuring that training programmes are well suited to the diverse needs of school staff.

To address these gaps, this study will draw on several theoretical frameworks. The DeLone and McLean Information System Success Model (2003) provides a robust framework for evaluating the successes of information systems across multiple dimensions, including system quality, information quality, service quality, use, user satisfaction, and net benefits. This model's comprehensive nature

and adaptability make it particularly suitable for assessing the use of SIMS in the context of secondary schools. In addition to this model, the concept of data culture within schools will be examined using relevant frameworks that differentiate between data use for improvement versus compliance. Understanding the data culture is essential for comprehending how organisational and social contexts influence the use of MISs.

Based on the gaps and theoretical frameworks identified, the data collection phase of this study will focus on several key themes guided by the research questions:

1. How is SIMS used?

2. What are user opinions of SIMS and how it is used?

3. How is training related to the use of SIMS?

4. How effective do users report the internal training to be in developing their productive use of SIMS?

First, it will explore the current use of SIMS in secondary schools, including which features and modules are utilised, and how frequently and in what contexts they are employed. This will provide a detailed picture of SIMS usage patterns. Second, the study will investigate user satisfaction with SIMS, capturing the opinions and feedback of different stakeholders. This will include an examination of perceived challenges, usability issues, and the impact of SIMS on workload and administrative efficiency. Third, the research will assess the training and professional development available for SIMS users. It will evaluate the quality and effectiveness of existing training programs and identify best practices for developing internal training initiatives tailored to different user groups. Last, the study will evaluate the impact of SIMS on school improvement efforts. It will examine how SIMS contributes to data-informed decision-making and identify factors that influence its success in supporting educational outcomes. By addressing these themes, this study aims to provide a nuanced and comprehensive understanding of the use of SIMS in secondary schools in England. The findings will inform the development of targeted training programs and support

mechanisms to enhance the effective use of MISs, ultimately contributing to improved educational

practices and outcomes. This research will bridge the gap between the current use of SIMS and its

potential benefits, offering valuable insights for policymakers, school leaders, and educators.

Chapter 3: Methodology

3.1 Introduction

This chapter establishes the epistemological position adopted throughout this research and provides an outline of the decisions made in the research design. These decisions have been influenced by the research questions and my ontological and epistemological beliefs and values. The advantages and limitations of the choices made throughout the research are discussed. Ethical and practical considerations are also explored, including the methods for data collection and data analysis. By clearly outlining these methodological foundations, this chapter aims to provide a transparent and rigorous framework for understanding the research findings and their implications.

The main objective of this research is to gain a comprehensive understanding of the use of SIMS within secondary schools in England and to develop targeted internal training programmes to enhance its use. In selecting the methodology for this research, I have been guided by a combination of interpretive, critical realist and pragmatic paradigms, which are concerned with meaning-making and understanding the subjective world of human experience. This approach aligns with my belief that knowledge is constructed though interactions within specific contexts, and that understanding the perceptions and experiences of participants is important for generating meaningful insights.

The methodological approach chosen for this study includes a sequential mixed methods design, implemented in two stages. The first stage involved a quantitative approach, distributing questionnaires (Appendix B) to staff members at 204 secondary schools to gather broad insights into the use of SIMS. The second stage employed a qualitative approach, utilising semi-structured interviews, focus groups, and observations within three case study schools to explore in greater depth the nuance of SIMS usage and the impact of training. By integrating these methods, this study seeks to provide a well-rounded understanding of the use of SIMS in secondary schools.

3.2 Ontological and epistemological assumptions

The approach I have taken to this research has been shaped by my beliefs about knowledge and the relationship between knowledge and the empirical world (Chua, 1986; Grix, 2010; Furlong & Marsh, 2010). Due to the entrenched acceptance of positivist approaches in information systems research, many information systems researchers do not justify their epistemological stance (Walsham, 1995a; Chappell, 2013; Marchildon & Hadaya, 2023). However, research must be conducted in a disciplined, balanced and critical manner (Thomas, 2017). Therefore, I must explore my ontological and epistemological beliefs and ensure that they are closely aligned to the methods used throughout this research to collect and analyse data (Bracken, 2010). While positivist approaches are traditionally dominant in information systems research, my approach is grounded in interpretivism, critical realism, and critical theory, which together inform a comprehensive analysis of SIMS use in schools.

Interpretivism is central to my research position. I view knowledge as constructed through social interactions within specific contexts. This aligns with my goal of exploring how SIMS is used in secondary schools in England and how targeted internal training can support use. Through an interpretive lens, I acknowledge that reality is constructed from individual and shared human experiences. This approach allows me to delve into the subjective world of SIMS users, focusing on their lived experiences and the meanings they attach to their interactions with the system. This interpretive approach facilitates a comprehensive understanding of the contextual factors influencing SIMS use, beyond merely statistical measures.

Critical realism further enriches my approach by recognising both observable and underlying structures that shape SIMS use. Critical realisms assumes that an objective reality exists but is mediated by social structures and contextual influences. This framework enables me to examine not only the individual experiences of SIMS users but also the systemic factors, such as school policies and data governance practices, that impact these experiences. By combining critical realism with

interpretivism, this study explores both personal and structural dimensions of SIMS use, providing a balanced view that supports practical recommendations for system improvements.

Critical theory offers a lens to critique and address power dynamics within school data systems. Through this perspective, I examine how data access, permissions, and control in SIMS ma reinforce or challenge existing hierarchies within schools. This critical approach is essential to understanding how management information systems like SIMS may affect roles, authority and decision making in educational settings. The emphasis on critical theory aligns well with a case study methodology allowing me to investigate in depth how SIMS functions in practice and how training can address potential inequities in data access and use.

These ontological and epistemological positions inform my choice of a case study design which provides a holistic framework for examining SIMS use within real-world school settings. Case study research allows for an intensive, context-sensitive analysis, suited to interpretivism and critical realism. By exploring SIMS across multiple school cases, this study seeks to uncover both individual experiences and broader systemic influences, generating findings that can inform more equitable and effective MIS training practices in educational contexts.

3.2.1 Historical positive dominance

Historically most behavioural and organisational information systems research has purported to be objective, value free positivistic research (Orlikowski & Baroudi, 1991). Positivist research is based on the belief that there is a single, objective reality independent of humans (Cohen, Manion & Morrison, 2017) that can be measured and explained using generalisable laws (Maksimovic & Evtimov, 2023). Therefore, the use of statistical analyses or controlled experiments to test hypotheses and make generalisable inferences from a sample to a larger population has dominated information systems research for the past three decades (Chen & Hirschheim, 2004; Straub, Gefen & Recker, 2022).

However, a positivistic approach to information systems research fails to acknowledge the fundamental differences between natural science and social science (Siponen & Klaavuniemi, 2021). For my study, this means acknowledging that social systems such as schools, are inherently complex (Hawkins & James, 2018) and are influenced by many unidentifiable and unquantifiable variables. This complexity necessitates an approach that can capture the rich, contextual factors influencing the use of information systems like SIMS. Furthermore, social, historical and political factors influence the use of information systems within organisations and therefore the context in which they are implemented and used should not be neglected (Recker, 2021). In addition, unlike the results of other types of scientific research, the findings of social science research have the unique ability to transform social reality (Giddens, 1987).

In the context of my research, adopting a positivistic approach would limit the ability to fully understand the multifaceted nature of SIMS usage within schools. By reducing social systems to variables for hypothesis testing and disregarding contextual factors such a positivistic approach provides only a partial view of information systems phenomena (Marchildon & Hadaya, 2023). Therefore, my enquiry is better served by incorporating an analysis of the specific contexts (Elsahn, Callagher, Husted, Korber & Siedlok, 2020) in which SIMS is used. This contextual understanding is critical for revealing how social, cultural, and political factors influence the effectiveness of SIMS in supporting data use in schools.

3.2.2 Interpretive research perspective

Since the end of the 20th century, interpretivism has emerged as an alternative paradigm to positivism within information systems research and more information systems researchers have adopted this approach by assessing information systems through human interpretations and social interactions (Walsham, 1995b; Straub, Gefen & Recker, 2022). Interpretive research is based upon the ontological belief that reality is an intersubjective construction of individual and shared human experience (Waring, 2012). These ontological and epistemological stances allow interpretive

researchers to adopt a variety of different interpretive approaches within information systems research (Cecez-Kecmanovic, Davison, Fernandez, Finnegan, Pan & Sarker, 2020). For my study, this perspective is invaluable as it allows for an in-depth exploration of how SIMS is used within secondary schools, capturing the nuanced and contextual factors that influence its effectiveness. This approach provides rich insights into the lived experiences of SIMS users, which is essential for developing target training programmes and supporting the use of SIMS in schools.

3.2.3 Critical research perspective

Although an interpretivist approach acknowledges that social reality is complex and cannot be reduced to variables, it can still present an incomplete account of social interaction because the political and ideological contexts of the research may have been neglected (Guba & Lincoln, 1994). Knowledge is grounded in social and historical practices and is therefore influenced by communities of practice who define the notion of valid knowledge (Cohen et al., 2017). Critical researchers believe that social reality should be interpreted and critiqued in order to redress inequality, change organisations and promote individual freedoms (Chua, 1986).

The commercialisation of education and the emergence of a culture of audit and excessive accountability since the introduction of the Education Reform Act in 1988 has accompanied the increasing use of management information systems in England (Campbell, McNamara & Gilroy, 2003; Selwyn, 2015). Therefore, information systems within schools should be understood within this social and historical context through a critical perspective (Coburn & Turner, 2011; Halford, Pope & Weal, 2013).

Information systems have the power to produce new information and knowledge at all levels and therefore may be used to enhance democracy and help support organisational improvement (Zuboff, 1988). However, because access to data through a management information system relies on technological and organisations structures (Coburn & Turner, 2011), management information

systems can also be used to control and restrict users within an organisation. Each user of a management information system will have certain permissions, and these will vary depending on their role within the organisation. Therefore, some data will be available to them, and other data will be restricted. In addition, even if their permissions allow them access to certain data, they will require the adequate skills to use the information systems to access these data. If access to data and information relies upon permissions and skills then hierarchies and power relations can be reinforced through the use of management information systems (Lupton, 2014). Permissions are typically controlled by senior management, the data manager or IT administrators, who decide the level of access each user has based on their role and responsibilities within the school. This centralised control can create a power dynamic where certain individuals or groups have greater access to critical information, potentially leading to imbalances of knowledge and decision-making authority. Moreover, the power differential inherent in these systems can perpetuate existing inequalities within educational institutions (Foucault, 1980). Those in positions of power can use their access to information to maintain control and influence over others, thereby limiting opportunities for more equitable decision-making processes. Therefore, it is crucial to examine how these systems are implemented and used to ensure that they do not exacerbate existing power imbalances.

I believe that an explanation or interpretation of social systems is not enough. Instead, the context in which information systems are used must be understood and critiqued in order to reveal inherent contradictions or conflicts, redress inequality and change situations or organisations (Monson, 2023).

3.2.4 Critical Realism and Pragmatism

Although Burrell and Morgan (1979) argued that individual researchers must commit to a single paradigm because paradigms are based on mutually exclusive and contradictory assumption, several arguments against this view have been presented (Gioia & Pitre, 1990; Orlikowski & Robey, 1991;

Smaling, 1994). Reality is too complex to be understood and explained by theories and therefore limiting research to a single perspective would limit the view of reality and the relationships between humans, information systems and reality (Guba, 1990; Smaling, 1994; Goles & Hirschheim, 2000). Critical realists argue that an independent reality exists, but knowledge is socially produced and therefore depends on researchers within certain contexts (Archer, Bhaskar, Collier, Lawson & Norrie, 1998). This approach embraces a middle ground between positivism and interpretivism and has therefore become one of the most prominent emerging theoretical frameworks within information systems research as it encompasses aspects of both natural and social science (Mingers, 2004; Venkatesh, Brown & Bala 2013). Critical realism assumes a stratified ontology where structures may or may not be observable within an open and complex reality that is subject to external conditions, depending on the context with objects of research that are likely to change (Zachariadis, Scott & Barrett, 2013).

Another similar approach is pragmatism which argues that both singular and multiple realities exist. Instead of trying to determine the most accurate representation of reality, pragmatism aims to find solutions to practical problems in the practical world (Denscombe, 2009a). If reality is both objective and socially constructed (Johnson & Onwuegbuzie, 2004; Venkatesh, Brown & Bala, 2013), then a pragmatic, pluralist approach is necessary to fully assess the full richness of reality and access different aspects of a situation (Mingers, 2001).

In the context of my research, adopting a critical realist and pragmatic approach allows for a more comprehensive exploration of how SIMS is used within secondary schools in England. This perspective acknowledges that while an objective reality exists, the ways in which SIMS is utilised and understood are influenced by the social contexts and interactions within each school. By combining elements of both positivism and interpretivism, critical realism provides a balanced framework for examining the structural factors and human experiences that shape the use of SIMS. This approach is particularly relevant for understanding the dynamic and evolving nature of

information systems in educational settings. It allows the research to account for the observable

outcomes of SIMS usage, while also delving into the underlying social mechanisms and contextual

factors that influence these outcomes. By doing so, the research can identify both the strengths and

limitations of SIMS, offering insights into how it can be optimised to better support educational

objectives. Pragmatically, this approach supports the development of practical, context sensitive

recommendations for enhancing SIMS use. It acknowledges that the effectiveness of SIMS is not

only a matter of its technical capabilities but also of how it is integrated into the daily practice and

cultures of schools. This new understanding is important for designing targeted training

programmes that are responsive to the specific needs and realities of different educational contexts.

Pragmatism and critical realism may be considered types of mixed methods research (Benbasat &

Weber, 1996; Landry & Banville, 1992; Benz, Ridenour & Newman, 2008) where the researcher has

multiple worldviews (Venkatesh et al., 2013). This approach can offer a richer, deeper

understanding of information systems by using complementary methods to provide breadth and

depth (Johnson, Onwuegbuzie & Turner, 2007) and therefore a holistic view of phenomena (Teddlie

& Tashakkori, 2009). Within information systems research this practice-based approach has

emerged as one of the most prominent theoretical frameworks (Mingers, 2004; Venkatesh et al.,

2013) and I therefore believe that this approach is the most appropriate for this study as it

acknowledges the full complexity of reality. This research was conducted in stages, and I have used

a pragmatic approach to ensure the most effective methods were employed to provide useful

answers at each stage (Hevner & Chatterjee, 2010). Therefore, the methodological approach to this

research has been driven by the research questions in addition to my ontological and

epistemological beliefs and values (Burton & Bartlett, 2004; Greene, Azevedo & Tomey-Purta, 2008).

Case study research

Historically, some information systems research was criticised for a lack of relevance as it failed to

acknowledge the complex and multivariate nature of social settings and produce useful results

(Keen, 1991; Westfall, 1999). Therefore, since the end of the 20th century case study has become more prominent in information system research because it produces highly relevant research results and is grounded in practical action (Baskerville, 1999; Oates, Griffiths & McLean, 2022).

Case study is a methodological approach which can provide a detailed exploration and examination of a phenomena through an intensive, in-depth, holistic and in context study of one or more cases (Punch, 2013). In this research the experience of using MISs within secondary schools is explored. I believe that in order to produce highly relevant results, information systems research must explore real-life situations and attempt to understand organisations as whole entities rather than a loose collection of traits (Baskerville & Wood-Harper, 1996). Therefore, a case study approach, that can provide an opportunity for complexities to be explored in-depth and in real situations (Yin, 2009) and provide an understanding of unique features that may be lost in survey data (Hancock, Algozzine & Lim, 2021) was chosen to complement the larger scale approach used in stage one of this research.

Case studies aim to explain 'what it is like' to be in a particular situation and to provide a better understanding of participants' lived experiences of, thoughts about, and feelings for a situation (Cohen et al., 2017). This research aims to understand better the use of MISs and devise tailored training programmes to understand how to improve the use of MISs in secondary schools. Therefore, by using a case study approach to highlight details from the viewpoint of the participants, the voices, feelings, actions and meanings of interacting individuals can be heard (Muzari, Shava & Shonhiwa, 2022).

Although all case study research aims to study a contemporary phenomenon in its real-world context (Yin, 2013), many different types or categories of case study research have been described. However, two key approaches guide case study methodology (Baxter & Jack, 2008). Stake (1995) describes three different types of case study: intrinsic, instrumental and collective. In an intrinsic case study, the researcher has a genuine interest in the case and the purpose is to better understand

the case rather than to understand an abstract construct or generic phenomenon. In contrast, an instrumental case study is used to provide insight into an issue or help to refine a theory and therefore the case is used to help the researcher pursue an external interest. Finally, a collective case study is an instrumental study extended to several cases enabling the researcher to compare differences between and within cases. Yin (2003) describes three other types of case study: descriptive, explanatory and exploratory. Descriptive cases studies aim to capture a complete description of the real-life phenomenon in the context in which it occurred. Explanatory case studies are used to provide an explanation of cause-and-effect relationships whereas exploratory case studies set out to explore any phenomenon in the data which serves as a point of interest to the researcher.

The case or the object of study is a specific, unique, bounded system (Stake, 2013) and it is important that the boundaries of the case are clearly defined to avoid attempting to answer questions that are too broad (Baxter & Jack, 2008). This research consists of multiple cases where each case is defined as the staff member experience of MISs and MIS training within a secondary school. Therefore, this research may be described as collective or multiple case study research that demonstrates similarities and differences across three cases. I chose to use multiple cases as this allowed me to explore differences within and between cases and to help avoid the criticism that the case I had studied was a unique, single case (Yin, 2013). Furthermore, Campbell (1975) suggests that having two case studies for comparative purposes is more useful than having double the amount of data on a single case study. However, by keeping the number of cases small more detail can be collected therefore increasing the potential reliability of the information (Hammersley, 1992).

Through this research I will attempt to gain an understanding of some of the different contexts within which SIMS is used and attempt to improve that use through training. As a data manager working within a school, I felt that I needed to deepen my understanding of how to improve the use of SIMS through training so that my actions and those of data managers and senior leaders are

better informed. This research emerged from practical questions arising from concerns in my everyday work and aims to initiate change by generating practical wisdom (Elliott, 1991) for management information system users within schools with the intention of benefiting both me and the research schools. A case study research approach would give me the flexibility to analyse and evaluate the use of SIMS in schools and develop specific training programmes collaboratively with the participants in each school.

3.3 Role of researcher

However, one crucial aspect of case study research to ensure it is legitimate is the role of the researcher as a research instrument (Pillow, 2003). It is impossible for me to collect, analyse and interpret data without doing so in the light of prior knowledge (Morgan & Nica, 2020). Therefore, although objectivity and neutrality are clearly impossible to achieve (Savolainen, Casey, McBrayer & Schwerdtle, 2023), I believe that they are not desirable so long as the researcher acknowledges their positionality and fully engages with self-reflection throughout all stages of the research (Holmes, 2020).

Positionality is the practice of a researcher explaining and clarifying the personal experiences that have shaped their position and fully locating themselves in the research (Qin, 2016). Therefore, positionality is a multi-faceted and multi-layered concept influenced and shaped by a multitude of factors (Crossley, Arthur & McNess, 2015). Positionality is not fixed but can change depending on the context or situation (Milligan, 2016). In order to understand my impact as the researcher on this research I must provide a detailed explanation of my positionality (Thomas, 2017; Jacobson & Mustafa, 2019).

My professional progression from data manager to senior leader has equipped me with unique insights into the multifaceted use of MISs in schools. This perspective allowed me to appreciate

both the technical and practical challenges of using data systems in education. My inside knowledge of SIMS allowed me to establish a positive research relationship quickly with participants at the case study schools, which in turn may have made participants more likely to feel that they could be open and honest in their responses. Furthermore, my deep understanding of SIMS meant that I could quickly comprehend the features of SIMS participants were discussing with me, facilitating a deeper and more nuanced understanding of their experiences and challenges.

The positionality of the researcher may be considered in terms of insider / outsider perspectives (Merriam, Johnson-Bailey, Lee, Kee, Ntseane & Muhamad, 2001). Although it was originally assumed that a researcher was predominantly an insider or an outsider, more recently it has been argued that a researcher's status as an insider or an outsider can shift depending on the context or situation (Milligan, 2016). This changing positionality between insider / outsider has been described by Milligan (2016) as being an 'inbetweener' researcher. The unusual aspects of my positionality suggest that I occupy this 'inbetweener' position in terms of insiderness and outsiderness. I might have been considered an insider researcher by the data managers because I have been a data manager and have a high level of experience of SIMS, or they might have considered me an outsider because I have been a senior leader. The other participants, depending on their role within each school, might have considered me an outsider because I am not a teacher or an insider because I have been a senior leader. Simultaneously, all the participants might have considered me an outsider because I did not work in their schools. I must acknowledge my position as an 'inbetweener' researcher because there are issues that must be considered with both insider and outsider research.

Throughout this research, my professional identity has undergone a significant transformation. Initially, I approach the study primarily as a practitioner, deeply rooted in the practicalities of managing and using school information systems. However, as I engaged with the research process, developing reflexivity and connecting with the critical theoretical perspectives I encountered. This

process required balancing my role as an insider within the educational environment with the critical, reflexive stance of an academic researcher. Engaging deeply with the data and the theoretical frameworks, I realised the importance of seeing my practice through a new lens, allowing me to question and enrich my understanding of how management information systems are used in schools. This dual identity shown in Figure 3.1, being both a practitioner and a researcher, has enabled me to contribute to my field in a more profound and impactful way, embodying the transformative potential of the professional doctorate (Burnard, Dragovic, Ottewell & Lim, 2018).
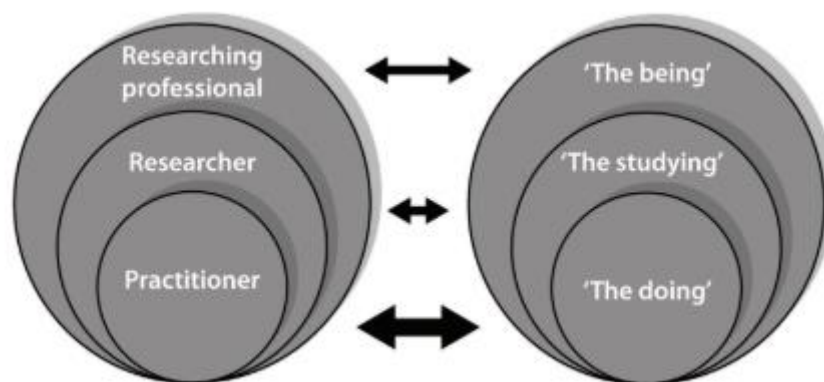
Figure 3.1: Overarching identity of the researching professional (Burnard et al., 2018)

However, my professional identity has evolved throughout the course of this research, and within the 'practitioner' element of my identify, or 'the doing', I have undertaken many different responsibilities. At the start of the EdD, I was a data manager, Assistant Principal and a SIMS consultant supporting data managers in other schools. However, I am no longer 'doing' these roles and instead have transitioned to teaching. This changing positionality has significantly influenced my perspective and approach to the research. Shifting from administrative and consultative roles to a direct teaching position has deepened my understanding of the practical challenges and impacts of MIS on day-to-day teaching and learning. It has allowed me to experience firsthand the realities faced by teachers, thereby enriching my insights and enabling a more nuanced analysis of how MIS can truly support data-informed decision-making. This evolution in my professional identify has highlighted the need for ongoing reflexivity during the research.

3.4 Reflexivity

Reflexivity acknowledges that researchers are part of the social world they are researching (Hammersley & Atkinson, 2019). Throughout all stages of this research, I have been the primary instrument of data collection and analysis (Lichtman, 2012), therefore I must demonstrate a reflexive awareness of the many factors that have influenced my interpretations, judgements and decisions to understand my influence on the research (Cohen et al., 2017). Understanding reflexivity is crucial as it directly relates to how my positionality has shaped the research process and outcomes.

As an experienced data manger with extensive knowledge of SIMS, one of my concerns as the researcher was being able to describe and interpret the participants' views appropriately. Atkinson and Pugsley (2005) argue that it is important that researchers suspend their tacit cultural assumptions. However, I believe that this is too difficult to achieve and by trying to uncover these assumptions might be more useful. Furthermore, misinterpretations are common in studies of behaviour foreign to the researcher (Becker, 2009). Given my background, my familiarity with SIMS and experience as a data manager, a senior leader and a SIMS consultant may have helped limit misinterpretations, as I am familiar with some of the participants' experiences of SIMS. However, during an interview with a data manager they showed me how they were using SIMS marksheets to analyse a school specific measure that they had created to mimic Progress 8. This incident highlighted that, SIMS can be used in many ways and each school has its own terminology. This reflection illustrated my outsider status in this moment and emphasised my frustration of knowing that I cannot immediately fully understand a participant's use of SIMS. By engaging in reflexivity through the use of a reflective journal I have helped to expose my position as a researcher and provide the context within which decisions have been made.

After each interview, I reflected on my thoughts, feelings and actions in my journal. By reflecting on these aspects of myself as the researcher I was able to acknowledge my assumptions and values and

the influence this might have on my actions throughout this study and the subsequent findings (Cohen et al., 2017). The insights learned from this reflective journaling enabled me to improve my interview technique. This type of reflexivity may be considered retrospective reflectivity (Attia & Edge, 2017), as this process helped me gain deeper insight into my evolving research practice and its connection to my positionality.

3.5 Reliability and validity

In qualitative research, reliability and validity are reframed to focus on trustworthiness, which encompasses credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). To ensure the trustworthiness and rigour of this research, several strategies were employed.

Credibility was achieved through prolonged engagement, persistent observation, triangulation and peer debriefing. Prolonged engagement and persistent observation involved trying to immerse myself in the school environments and interacting with various stakeholders over an extended period, building trust and gaining a deeper understanding of the context (Shenton, 2004). Triangulation was accomplished using multiple data sources, including questionnaires, semi-structured interviews, focus groups, and observations, which allowed for cross-verification of information and a comprehensive view of SIMS use (Denzin, 1978). Peer debriefing involved regular discussions with colleagues and supervisors to provide external checks on the research process, helping to identify biases and assumptions (Lincoln & Guba, 1095).

This case study research will not attempt to be generalisable, and the new knowledge will be context bound within the individual settings (Orlikowski & Baroudi, 1991). Detailed contextual descriptions can help enhance the transferability of educational research (Firestone & Gonzalez, 2007). Therefore, transferability was ensured by providing detailed descriptions of the research settings, participants and processes. This thorough documentation allows readers to determine the

applicability of the findings to their own contexts (Lincoln & Guba, 1985) and may help contribute to the expansion of theory (Yin, 2009).

A detailed audit trail was maintained, documenting the research processes, decision points, and changes in research direction, providing transparency and allowing others to understand the research path (Shenton, 2004) and ensure the dependability of this research.

Throughout this research, to help ensure the confirmability of the results, I focused on practising reflexivity so that the findings were shaped primarily by the participants and not overshadowed researcher bias. I kept a reflective journal to acknowledge and address potential biases (Berger, 2015). The audit trail and triangulation also contributed to the confirmability of the findings (Lincoln & Guba, 1985).

To maintain rigour, meticulous data collection and analysis procedures were followed. Multiple methods, such as semi-structured interviews, focus groups, observations, and questionnaires, were employed to gather comprehensive data (Creswell, 2014). A constant comparative method was used for data analysis, with data continuously compared and contrasted to identify emerging themes and patterns (Glaser & Strauss, 1967). Manual coding and thematic analysis ensured thorough examination and interpretation of the interview data (Braun & Clarke, 2006). Intercoder reliability was enhanced by having a subset of the data independently coded by two critical friends (Elliot, 1991), with discrepancies discussed and resolved to ensure consistency (Campbell, Quincy & Osserman, 2013).

Ongoing reflexivity through reflective journals and discussions with peers and supervisors helped identify and mitigate researcher biases, ensuring that the findings remained grounded in the data (Finlay, 2002).

3.6 Research Design

The research was conducted in two stages. This sequential mixed methods approach employed quantitative approaches during the first stage of the research and the second stage of the research where a small number of schools were used as case studies was dominated by qualitative approaches. Table 3.1 provides an overview of the research stages.

Stage 1

Instrument	Number of schools	Participants
Questionnaire	78 named schools including the case study schools 7 participants chose not to include the name of their school	122

Stage 2

Instrument	Case study school	Participants
Semi-structured interview	School 1	Data manager Attendance officer Three teachers
	School 2	Data manager
	School 3	Data manager Examinations officer Teacher
Focus group	School 1	Data manager Attendance officer Three teachers

Stage 3 at School 1 only

Instrument	Participants
Semi-structured interviews before and after training session	Data manager
Training session observation	Delivered by the data manager 9 teacher trainees
Feedback questionnaire	8/9 teachers

Table 3.1: Overview of the research tools used within each stage

3.6.1 Stage 1

Sample

The first stage involved sending an online questionnaire to selected staff members at 204 secondary schools in England. The schools were identified using the Schools, Students and Teachers Network (SSAT) Data Managers Members Network. This is an email forum used by data managers and senior leaders working at schools who are members of SSAT. I was a member of the network and could therefore search the emails to find schools that used SIMS. This non-probability convenience sample was not representative of the wider population but was used to gain insights into the experiences of and attitudes to SIMS at the chosen schools. I searched the forum for posts from the last year that mentioned that they used SIMS. This approach meant that it was likely that the school still used SIMS. I then used the school's website to identify the members of staff to send the questionnaire to. I sent the questionnaire to three members of staff: the data manager, the senior leader with responsibility for data and another teacher chosen at random from the staff list using random number tables. Due to their different roles, these members of staff will have different experiences working with SIMS and therefore were chosen to show different insights into MIS use at the school. Some schools did not have a list of current staff on their website. Therefore, I discarded these schools and chose another school from the forum to be included in the sample. Some schools listed staff and email addresses so I could send the participant invitation email directly to the chosen staff members. Where only names and job titles were listed on the website, I emailed the address listed on the 'contact us' section of the website asking for the email to be forwarded to the selected staff members.

I exhausted the list of schools on the SSAT Data Managers Network that had posted in the last year and indicated that they used SIMS. I sent the participant invitation to 207 individual staff members from 69 schools and had seven responses. Therefore, I had to use another method to identify schools that used SIMS. A Freedom of Information request in December 2018 to the Department for

Education asked for the MIS supplier for all schools from the Autumn Census 2018 (Thomas, 2018). I used this spreadsheet to identify more secondary schools that used SIMS. I removed schools that had already been contacted and then used random numbers to select schools. Schools were then included if I could access the staff lists and contact information on the school's website.

Instrument 1: Questionnaire

Design

An online questionnaire was used during the first stage of data collection as it allowed a relatively large amount of relevant data from many participants to be collected relatively easily (Munn & Drever, 1990; Chambliss, Schutt & Flick, 2012). One of the greatest obstacles encountered in questionnaire research is a reduced response rate (Nayak & Narayan, 2019). Therefore, I had to ensure the questionnaire was designed and delivered in a way that encouraged participation.

I chose to use a web-based platform for the questionnaire rather than use a paper-based questionnaire because it was cheaper, faster and easier to distribute and complete. I chose to use Typeform over other web-based platforms because it was free, attractive and easy to use, and I used it successfully as part of my Master's research on the attitudes to and experiences of SIMS in a single secondary school. Furthermore, Typeform places a strong emphasis on data protection and ensures the confidentiality and integrity of the data collected through its forms and surveys through the implementation of industry leading encryption, access controls and regular security audits (Typeform, 2023). The questionnaire used in this study was an adapted version of the questionnaire used in my Master's study. I devised the original questionnaire based on an extensive literature

review (Check & Schutt, 2012). I added additional questions based on training as that is a focus of this study and was highlighted as an aspect requiring more research both by my Master's research and Visscher et al.'s study (2003). In addition, demographic data such as age, gender and job title were added to the questionnaire as they have been identified as factors influencing technology use in other studies (Lee, Kozar & Larsen, 2003) and to add more contextual information to the results (Thomas, 2017). Ultimately, data on age and gender were not included in the analysis, as initial assessments indicated that these variables did not significantly impact the study's primary outcomes. By excluding these factors, the analysis focused on the core research questions without adding unnecessary complexity.

The questionnaire was designed to encourage participation by keeping questions clear and precise and the questionnaire as short as possible (Thomas, 2017) yet comprehensive for the aims of the research. In a questionnaire, the first question should be interesting, easy, apply to all participants and be connected to the primary purpose of the research (Dillman, 2011). Therefore, the first 19 questions were straightforward, Likert scale (1932) questions based on opinions of SIMS. These questions use a four-point, balanced, verbal scale. By using a scale with an even number of options, the middle option has been removed eliminating the tendency for some participants to over select this option (Thomas, 2017) and a four-point scale is easier to complete than a scale with more options (Cohen et al., 2017). A balanced scale should have eliminated the chances of skewing the results and a verbal scale produces more reliable results than a numerical scale (Schwartz, Knäuper, Rippler, Noelle-Neumann & Clark, 1991). However, there are limitations of using this scale. For example, each category will have a different meaning for each participant, and I cannot assume there are equal intervals between each category (Cohen et al., 2017).

The next questions were open questions. I chose to include these towards the end of the questionnaire because this type of question can discourage participation as they require more thought from respondents to complete and can make a questionnaire appear long (Cohen et al.,

2017; Thomas, 2017). I have used open questions when the range of possible responses to the question are unknown, or the list of possible responses would be extremely long (Gerson & Damaske, 2020). Therefore, these open, exploratory questions have been used for questions relating to training because I did not know what the responses will be.

Pilot questionnaire

The amended questionnaire was trialled on an Assistant Headteacher and a Data Manager from one school that used SIMS and therefore represented a sample of the participant population (Kelley, Clark, Brown & Sitzia, 2003). This trial helped to ensure that the technical vocabulary was suitable for the participants (Nassar-McMillan & Borders, 2002) and showed me how long each participant took to complete the questionnaire (Denscombe, 2009b). The trial was also used to help identify any issues I had not considered (Check & Schutt, 2012). One of these was that although a participant completed the question, they did not feel comfortable stating their age. Therefore, although all questions were optional, I made the answer to this question free text rather than a tick box so that participants could answer in a way they were comfortable with. Apart from this small change I did not need to make any other amendments to the questionnaire (Appendix B) based on the feedback from the participants of the pilot.

Distribution

A personalised email was sent to each participant containing a link to the questionnaire and attached the participant information sheet (Appendix C). I personalised each email to help increase response rates (Solomon, 2001) even though this process was much more time consuming. In addition, I included the average response time from the pilot study (approximately 5 minutes) to try to encourage responses by showing the questionnaire could be completed in a few minutes. Throughout the research I monitored this value using the tool on Typeform to ensure the information was accurate for participants. I sent one follow up email to all of the participants who

had not completed the questionnaire or had not informed me that they had completed the questionnaire between two and three weeks after the initial email to help increase response rates (Wu, Zhao & Fils-Aime, 2022). In total, 122 participants completed the questionnaire. Therefore, the overall response rate was 18%.

3.6.2 Stage 2

Introduction

For the second stage of the research, I planned to select three to five schools from the original 204 to use as cases in order to explore in more detail how SIMS is used and then develop and evaluate a training programme with the data manager at each school.

Gaining access to schools

The first method I used to determine which schools to use for the second stage of the research was by contacting the participants at the schools where two people had completed the questionnaire. I thought that these schools would provide interesting insights into SIMS because the respondents had given different responses to the questionnaire that could be explored. There were four schools where two participants had completed the questionnaire, so I contacted all of them. Unfortunately, most participants did not reply to my request and none of the schools wanted to take part in the second stage of the study. Therefore, I decided to use another method to select the schools. I emailed all of the 72 respondents who had indicated that they would like to receive further SIMS training inviting them to take part in the next stage of the research. I thought that these participants would be more likely to want to take part in the next stage of the research because of the focus on SIMS training than participants who did not want to receive further training. However, again most participants did not reply to my email and none of the participants wanted to take part in the next stage of the research. Finally, I believed that the data managers or equivalent staff members at each school would be the participants who would be most likely to want to participate because they use

SIMS more. Therefore, I contacted all of the data managers who had completed the questionnaire asking if they would like to participate in the next stage. By this point although I had not contacted all 89 respondents of the questionnaire, I believed that it was unlikely that any other participants would agree to the research at their school if none of the data managers wanted to participate. I had to overcome the problem of negotiating access as an external researcher (Saunders, Lewis & Thornhill, 2016) and find another way of recruiting schools or change the structure of Stage 2.

One of the responses from a participant who I contacted asking if they would like to take part in the next stage of the research indicated that they did not want to take part in the second stage because they did not know who I was. Therefore, I thought I might be more successful recruiting schools if they knew who I was. I did not want to conduct research in a school where I had worked or provided training because I thought the impact of me as the researcher would be too large so I used professional contacts who supported the research to suggest schools they thought might be willing to participate. This method of contacting schools that had been suggested to me was successful and three schools agreed to participate in the research. This approach is a legitimate and ethically sound strategy to enhance access to research settings so long as the settings are relevant (Bryman, 2004). An overview of the context for each of the schools is provided in Table 3.2.

School	School Type	Education phase	Number of students	Ofsted Rating	2019 Progress 8
School 1	Academy converter	Secondary and 16 to 18	1000	Outstanding	Well above average
School 2	Academy converter	Secondary and 16 to 18	1400	Good	Average
School 3	Community School	Secondary and 16 to 18	1200	Good	Average

Table 3.2: Characteristics of each the case study schools

Instrument 2: Interviews

Following the completion of the questionnaires at each school, I conducted an interview with the data manager. Interviews are a fundamental, flexible interpretive research tool as they can provide

in-depth clarified responses about complex situations (Mashuri, Sarib, Rasak, Alhabsyi & Syam, 2022). Therefore, I conducted the interviews to elicit more in-depth and contextual information about the use of SIMS and training at each school following the questionnaires.

An interview is a social, interpersonal encounter with a specific purpose where accurate data may be obtained (Punch & Oancea, 2014). In order to help put the participant at ease and therefore achieve the most useful responses, I asked the participants to choose the most suitable time and place for the interview to take place ensuring that the location was quiet and private (Tuckman & Harper, 2012; Opie, 2019). At the beginning of each interview, I tried to create a relaxed safe atmosphere to help build trust between participants and me (Cohen et al., 2017; Newby, 2014). In addition, I reminded participants of their right to withdraw at any time and that they did not need to give me a reason if they did not want to answer certain questions. Each interview was recorded using a portable digital audio recorder. Although audio recording is selective and neglects the visual and non-verbal aspects of the interview (Mishler, 1986), video recording would have been extremely time consuming to transcribe and analyse (Cohen et al., 2017) and may have made the participants feel uncomfortable as video recording is much more obtrusive compared to an audio recorder and most people are not used to being filmed (Mitsuhara & Hauck, 2021). Before the interviews, I planned to make a note of any non-verbal aspects of the interviews that I thought were important (Tessier, 2012). However, during the interviews I thought it was more important to engage with the conversation and therefore look at the participant to show that I was listening rather than take notes (McGrath, Palmgren & Liljedahl, 2019).

The interviews were semi-structured focused interviews. Semi-structured interviews ensured that all participants were asked the same main questions but provided me with the freedom to explore and develop different topics depending on each participant's responses (Thomas, 2017; Karatsareas, 2022). Therefore, before conducting the first interview I devised an interview schedule (Appendix D) to ensure that I covered all the main aspects identified in the questionnaire. To help put the

participants at ease the first question I asked was a general question that the participants should have found easy to answer (Knott, Rao, Summers & Teeger, 2022). A semi-structured approach allowed me to change the order of the following questions and probe further on particularly topics depending on the answers from participants (Scanlan, 2020). After the first interview, I evaluated the schedule. Although the interview lasted longer than I had anticipated, I knew that the schedule worked well because the participant understood all of the questions in the way that I had intended and their responses provided insights that were relevant to the study (McGrath, Palmgren & Liljedahl, 2019). Therefore, I did not amend the schedule.

Instrument 3: Focus groups

Following the interview with the data manager, I arranged a focus group with all of the participants who had indicated they would like to attend either a focus group or interview. I chose to conduct a focus group rather than individual interviews with these participants so that the views of the participants could emerge through interaction with one another allowing their agenda to dominate rather than mine as the researcher (Cohen et al., 2017). Furthermore, focus groups allow for a large amount of data to be collected in a short period of time. However, the focus group was not as successful as I had hoped. Due to the teaching commitments of some of the participants it was difficult to arrange a time during the school day when all participants could meet. Therefore, the focus group was arranged at lunchtime. Although this meant that all participants could attend, some had to leave early because they had lunchtime duties or because of other responsibilities. Furthermore, the scheduling of the focus group at lunchtime meant that there were many interruptions either by students or other members of staff which meant that other participants had to leave. The focus group ended when the only participant left was the data manager who I had already interviewed. In addition, the atmosphere was not as calm as during the interviews which were conducted during quieter times in the school day.

Although I had originally planned to conduct focus groups at all three case study schools this was only possible at School One. At School Two, although eight participants completed the questionnaire and two participants indicated on the questionnaire that they would take part in an interview only the data manager responded to my interview/focus group invitation email and at School Three only the data manager, examinations officer, and one teacher agreed to participate in an interview or focus group. Because the focus group at School One did not result in as much rich data being collected as the subsequent interviews and because of the differences in the job roles of these participants, I decided that an individual interview with each participant would allow me to collect more detailed responses from the participants.

3.6.3 Stage 3

Instrument 4: Observation of training

Following the focus group and subsequent interviews with the data manager, the data manager and I devised a training session to support teachers' use of SIMS. During this training session, I was a non-participant observer, positioning myself strategically to capture as much detail as possible during the session. I recorded and transcribed everything said by the participants and during the session. Non-participant observation offered a unique vantage point, allowing me to observe the dynamics of the session without influencing how participants interacted. In addition to recorded verbal exchanges, I observed body language, facial expressions, and interactions among participants, providing valuable context to the data collected.

In my role as an observer, I also had the opportunity to observe firsthand how four of the participants used SIMS during the session. By observing the training sessions rather than just interviewing participants about the session, I could observe their navigation through the

management information systems, their proficiency with its various features, and any challenges they encountered. This direct observation provided a deeper understanding of their actual practices, unfiltered by self-reporting biases that may arise in interviews or questionnaires. While the participants were aware of my presence as an observer, I endeavoured to minimise any potential influence on their behaviour, striving to capture authentic representations of their interactions with SIMS.

Despite the inherent limitations of using observation as a research tool, such as the possible of the Hawthorne effect, wherein participants may alter their behaviour due to the awareness of being observed (McCambridge, Witton & Elbourne, 2014), this approach offered invaluable insights into the efficacy of the training session and the practical application of SIMS in real-time scenarios. By bridging the gap between stated intentions and actual actions (O'Leary & Hunt, 2017), observational data complemented other research methods enriching the overall understanding of teachers' use of SIMS within School One.

Immediately following the training session, I interviewed the data manager. Additionally, participants completed a feedback questionnaire (Appendix E) following the training session. The feedback form used the same format routinely employed by School One to maximise the number of responses and limit the impact of the research on participants. This quantitative data complemented the qualitative insights gained through observation.

During my discussions with the data manager at School One, we had planned to conduct additional training sessions and observe them to further explore teachers' use of SIMS following additional training. However, the onset of the COVID-19 pandemic and subsequent closure of schools limited the opportunity for this.

Main Ethical Considerations

Research should be conducted in a way that reduces harm to all individuals involved (Bell, 2010). Furthermore, I needed to carefully anticipate and plan for any envisaged or other ethical challenges and have strategies in place to manage these (Coolican, 2017; Smyth & Holian, 2008). Therefore, I identified and considered ethical issues at each stage of the research (Abed, 2015). Furthermore, throughout all stages of the research I have followed the British Educational Research Association's guidelines (BERA, 2024) and for each stage sought ethical approval from the St. Mary's University Ethics Committee (Appendix F). Respect for participants was a cornerstone of my approach throughout the research. I ensured that participants were treated with dignity, autonomy, and sensitivity to their individual circumstances. Moreover, I maintained open communication channels with participants at the three case study schools, allowing them to voice any concerns or preferences, thus fostering a collaborative and respectful research environment (Pieper & Thomson, 2014).

Ethical Issues Relating to Negotiating Access

All participants received an information sheet explaining the research to ensure their consent was as informed as possible (Atkins & Wallace, 2012). The information sheets and consent forms were sent as an attachment to the questionnaire invitation email. However, most of the participants completed the questionnaire without completing and returning the consent form. I had anticipated that this might happen so had already included the information from the consent form again at the beginning of the questionnaire to ensure all participants had the opportunity to read it. Before starting the second stage of research, I received written permission from the Headteacher at each case school (Denscombe, 2009a). All participants who took part in an interview or focus group received another information sheet and completed a hard copy of the consent form (Appendix C). At each stage of the research, I reminded participants of their right to withdraw from the research. The design of this research depended on the data manager at each school and therefore if they chose to withdraw this would have resulted in a loss of significant data and would have had a huge

impact on the study. By using three different schools as cases, I managed this risk (Yin, 2009) and therefore did not have to compromise the right of each to participant to withdraw.

Ethical Issues Relating to Data Collection, Analysis and Reporting

The online questionnaire allowed participants to remain anonymous, even from myself as the researcher (Braun, Clarke, Boulton, Davey & McEvoy, 2021). This anonymity enhances the validity of the data collected as it allows participants to feel more comfortable in providing honest responses. However, with this level of anonymity, participants relinquish their right to withdraw from the study once they have submitted their responses. I included an optional question requesting participants to provide contact information if they were willing to participate in an interview or focus group. Throughout this study I have used pseudonyms for people, places and unique terms used at each school to ensure that readers cannot discern individuals or schools (Bell, 2010). Although it may be argued that full disclosure provides better contextual information within information systems research (Liebenau & Smithson, 1993), I believe that I have an ethical obligation to provide anonymity to individual participants and organisations (Le Voi, 2002). During one of the interviews, a participant mentioned sensitive information about colleagues, and they felt they were able to explain in full detail because I assured them that I would not disclose names or any other identifying information.

I did not explicitly discuss and explain my experience of SIMS with participants because I wanted to reduce my influence on their responses. I did not want my experience of SIMS to influence the data collected as participants might want to answer in a way that they thought I would expect or wanted them to (Ming, Heung, Azenkot & Vashistha, 2021). Although I did not explicitly explain to participants my background of using SIMS, all the data managers who I interviewed knew that I had extensive experience using SIMS and alluded to this during the interviews. For example, during the interviews, the data managers referred to technical aspects of SIMS that only an experienced user

would understand, and the data manager said, 'I can talk about the technical aspects of SIMS because I know you will understand'.

During one of the interviews, a data manager was explaining how SIMS was used at their school. Throughout the explanation I tried to remain impartial and did not comment or pass judgement on what was being said, I only asked questions to illicit a deeper explanation of the way SIMS was being used. This led the participant to question themselves and they said, 'You're making me wonder if we do anything right'. I could not hide my position as an experienced SIMS user and therefore by asking questions about how they used SIMS without commenting on what I thought, I had inadvertently through my questioning reinforced a pre-existing lack of confidence in the participant. Although the participant reflected and explained that they had not been in the position very long which may be the reason for them feeling this way, I felt that my questioning may have resulted in a loss of confidence. This was an ethical issue. After the interview, I tried to reassure the participant by apologising for the way the interview might have made them feel and explaining that the nature of an interview meant I could not comment on how they were using SIMS.

Data analysis

A description of the data analysis is provided here, and the results of the data analysis are presented in Chapter 4.

The quantitative data were analysed using descriptive statistics. Tables and bar charts were chosen to present the data rather than other possibly more visually appealing charts or graphs because they are accessible and show the data succinctly (Cohen et al., 2017).

The interviews and focus group data were analysed using inductive thematic analysis (Xu & Zammit, 2020). I transcribed all of the audio recordings of the interviews and the focus group within a few days of the interview taking place following Have's (2007) approach to transcription. I chose to transcribe the interviews verbatim because I feel that it is important to be faithful to the exact words

the participants used and ensure that the data were as rich and detailed as possible (Cohen et al., 2017). Furthermore, I chose to transcribe the audio recordings myself because transcription is the first stage of data interpretation as the transcriber decides what data are important and how they are recorded (Ayer, 2021). The transcription of the audio recordings took long time but provided me with the opportunity to become immersed in the data (Point & Baruch, 2023).

The data were coded manually using the Microsoft Word comment feature. Although I considered using an electronic tool such as NVIVO to support coding, I chose to code manually to ensure I remained engaged with the data and the contextual meanings embedded within it (Maher, Hadfield & Hutchings, 2018). In the first cycle of coding, in vivo coding was used. In vivo coding, through labelling data with participants' own words or phrases allows for a deep understanding of the data by preserving the authenticity and context of participants' expressions. Consequently, during this first cycle of coding, a very large number of codes were generated to comprehensively capture the richness of the data. For example, a participant described the use of SIMS as 'an immovable object', which was preserved as a code to reflect frustrations with system inflexibility (Appendix G). This approach highlighted recurring themes, such as user satisfaction, system quality, and data culture.

The following coding cycles involved pattern coding to reduce the number of codes and identify and describe themes which emerged during in vivo coding. This stage of coding was more interpretive (Punch & Oancea, 2014). Qualitative analysis is an iterative, reflexive process (Brown, 2019). Therefore, throughout the coding I added memos to record ideas as they happened to help move from descriptive analysis to a conceptual level (Glaser, 1978). For instance, codes such as 'limited flexibility' and 'supportive culture' were grouped into broader themes, including 'System Quality' and 'Data Culture'. These were cross-referenced with participant quotes to ensure authenticity and consistency, as demonstrated in Table 4.8 and the coded data example provided (Appendix G).

Appendix G presents an excerpt from the transcribed and coded data. It demonstrates how participants were coded for key elements, such as system usability, service quality, and training

needs. This example illustrates the iterative nature of the coding process and the progression from raw data to emergent themes. The themes derived from the coding, shown in Table 4.8, were designed to lead to inferences about the use of SIMS and training.

Chapter 4: Analysis of Findings

The purpose of this chapter is to present the analysis of the data generated from each of the three research instruments used: the questionnaire, the interviews and focus group at the case study schools and the training session. Therefore, this chapter is structured in three sections. The first section provides a descriptive analysis of the questionnaire. The second section is an analysis of the interview and focus group data from the three case study schools. The final section is an analysis of the observed training session and subsequent questionnaire and interviews conducted at one of the case study schools.

4.1 Questionnaire findings

This section provides a descriptive analysis of the questionnaire (Appendix B) findings from 122 participants. Some participants chose not to indicate their school. However, 83 participants included their school indicating that the participants were from at least 75 different schools. The participants included data managers, examinations officers, senior leaders and teachers.

The questionnaire findings are presented in relation to the first three research questions. The first section explores how SIMS is used within secondary schools. The second section is based on the results from the Likert style questions and addresses the second research question exploring user opinions of SIMS. The final section begins to address the third research question and explores training and barriers to training.

4.1.1 How SIMS is used: the use of different features in SIMS

The first research question of this study was to investigate how SIMS is being used in secondary schools in England (see Chapter 1.7). Three questions included in the questionnaire asked participants about how SIMS can be used. One of these questions asked participants to indicate what they used SIMS for and included a list of options such as completing registers, running reports and completing / viewing trackers. The list of uses did not include every possible use of SIMS

because the list would have been extremely long. There are numerous functionalities provided by

SIMS, with at least 30 distinct features and modules. These include identity lifecycle management,

authentication, single sign-on, data provisioning for services like Microsoft Office 365 and Google

Apps, attendance tracking, behaviour management, curriculum management, examination

organisation, finance management, and various integrated partner applications (SIMS, 2018).

Therefore, including all these potential uses in the questionnaire would have made it excessively

lengthy and time-consuming for participants to complete. I compiled the list of uses based on my

experience of using SIMS as data manager in a secondary school and Visscher et al.'s (2003) included

what were the main uses of management information systems in secondary schools (Shah, 2014).

The trial participants did not add any other uses to the list indicating that I had not left out any major

uses of SIMS that needed to be included. However, I also included a separate open question where

participants could add any other uses. The results in Figure 4.1 show that the main use of SIMS was

to view student details (99%) followed by accessing linked documents (80%), completing student

reports (76%) and completing registers (75%). The least popular uses of SIMS were viewing

graphical data in *Discover* (16%), completing / viewing trackers (26%), data analysis (51%) and

making/ viewing examination entries (51%).
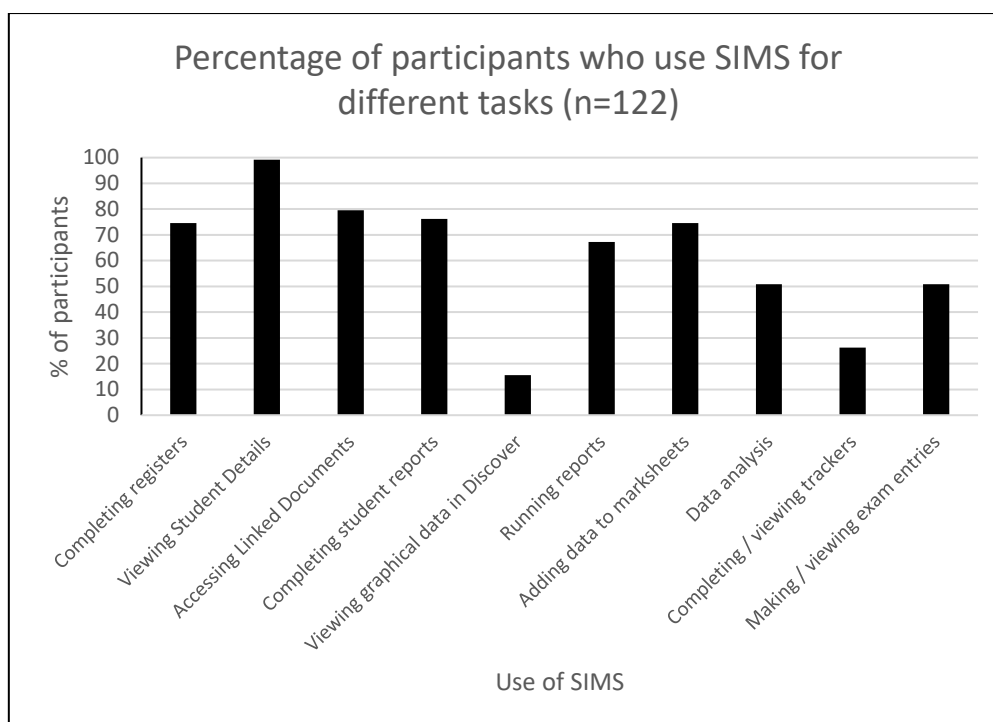
Figure 4.1: Percentage of participants who use SIMS for different tasks.

The open question asking participants to provide any other uses was answered by 15 respondents.

One of these was N/A and another stated that 'I think all areas are covered in previous questions'. A

further two did not answer the question but instead one participant indicated that they 'don't use

SIMS for assessment' and another stated that they 'use another system for recording data, reports,

attendance and behaviour'. The other uses of SIMS were to collect and store data related to; the

censuses, timetables including cover and options, personnel, behaviour management, parental

engagement, and to create emergency alerts. These results show that, as anticipated, some

participants use SIMS to complete a large number of tasks.

4.1.2 Job titles

All of the participants who answered the open question 'Please provide other uses' included the

word 'Data' in their job title indicating that these participants may use SIMS differently to other

members of staff. In total, 120 participants answered the question 'What is your job title?' and 81

unique job titles were provided by participants. These were categorised into Data Manager,

Examinations Officer, Teacher, Middle Leader, Senior Leadership Team (SLT), Other and Unknown. Table 4.1 shows the number of participants included in each category. Figure 4.2 shows the difference in the use of SIMS between data managers and all other participants. A higher percentage of data managers used SIMS for every task except taking registers compared with all other participants. For Viewing Student Details, Accessing Linked Documents, Completing Student Reports, Adding Data to Marksheets the percentage difference is 1-11%. These uses are either viewing or adding data. For uses that are using SIMS to manipulate data or analyse data (viewing graphical data, running reports, data analysis, completing / viewing trackers) the difference in the percentage of data managers and other participants is higher (25-39%). The difference between data managers and other participants for using SIMS to make / view examination entries is also higher (39%).

Job Title	Number of participants
Data Manager	42
Middle Leader	30
SLT	25
Teacher	10
Other	8
Unknown	4
Examinations Officer	3

Table 4.1: Job titles of participants.
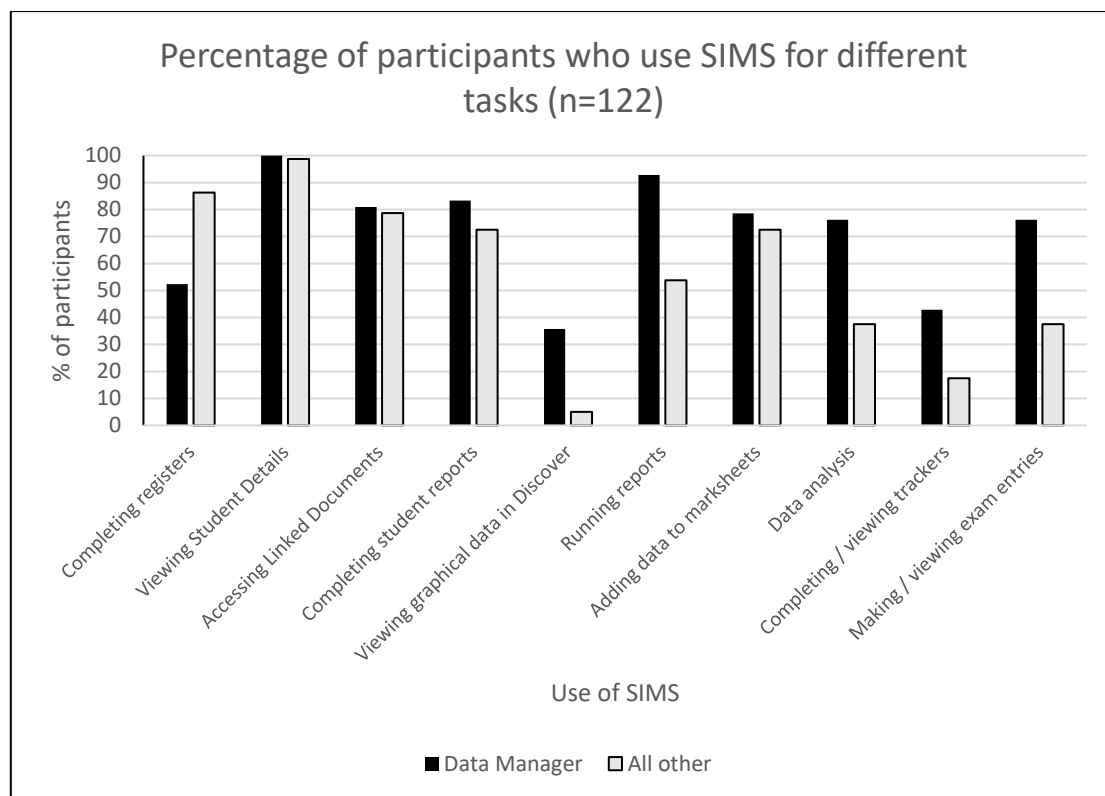
Figure 4.2: Percentage of participants who use SIMS for different tasks.

The main SIMS module is SIMS.net. Therefore, an additional question asked participants to indicate which areas within SIMS.net they had used or had heard of. Figure 4.3 shows the percentage of data managers and all other participants who have heard of or used these different areas. The results show that a higher proportion of data managers have heard of or used each included feature of SIMS compared with all other participants. Only seven of the 122 participants who answered this question only 14 used or had heard of every feature of SIMS and 13 of these were data managers. The features that the lowest proportion of participants had heard of or used were chance analysis, aspect analysis, group analysis, communication log and result set analysis.
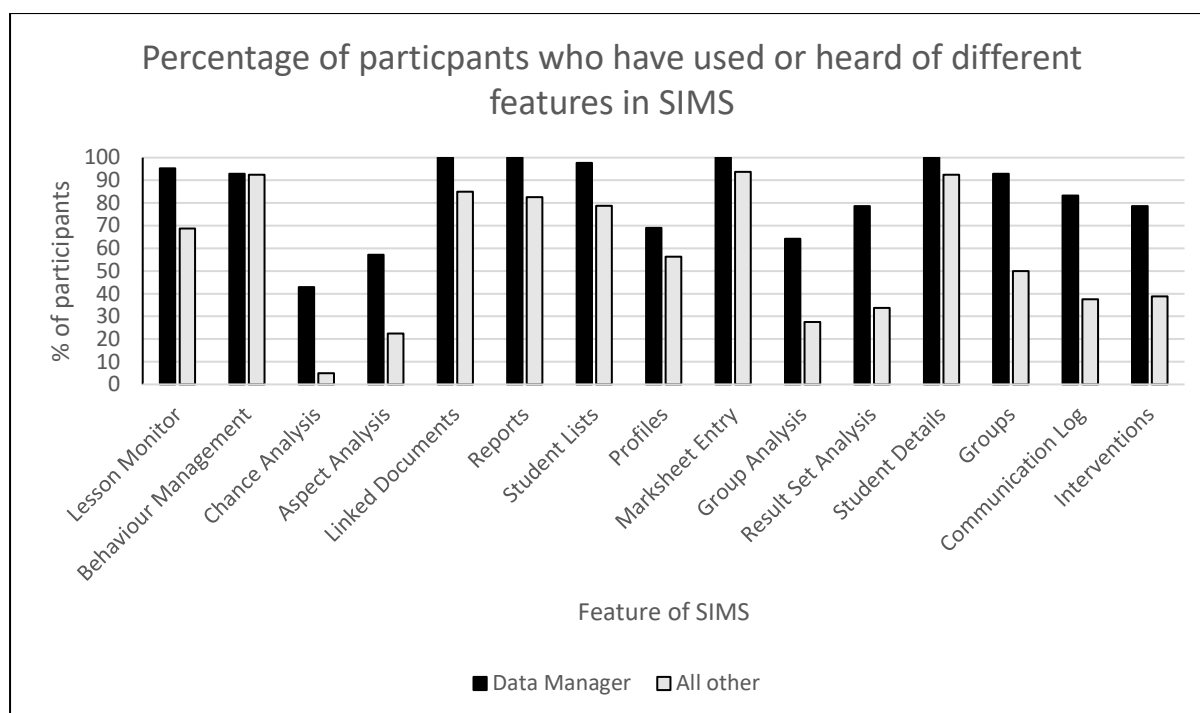
Figure 4.3: Percentage of participants who have used or heard of different features in SIMS

4.1.3 How SIMS is used: the amount of time spent using SIMS

Participants were asked on average how many hours per week they used SIMS. The question was an open question allowing participants to answer precisely or add detail using words to their answers. The answers were categorised into the groups shown in Table 4.2.

Hours per week	Number of participants
1-4	40
5-9	12
10-14	12
15-19	4
20-24	7
25-29	8
30-34	10
35-39	11
40+	8

Table 4.2: The amount of time spent using SIMS.

Although most participants provided a numerical answer as part of their answer five participants did not quantify their answer but instead answered 'every day', 'all the time' and 'lots!'. Although 'all the time' and 'lots!' imply that the participants use SIMS often they could not be included in the

numerical categories I used because they cannot be quantified. Two participants highlighted that the question was difficult to answer. One participant stated that it was 'hard to quantify but in it most days' and another stated that it was 'hard to say, I have it open all day every day at work and dip in and out of it'. These answers show that participants may have SIMS open on their computer but that does not mean that they are actively using it. Therefore, the answers given by participants could reflect how many hours SIMS is open on their computer per week or how many hours they are actively using SIMS. For example, a teacher may open SIMS at the beginning of a lesson to take the register and keep SIMS open to add behaviour data throughout the lesson. One participant may have included the whole lesson in their answer whereas another may have only included the minutes when they were actively viewing or adding data to SIMS throughout the lesson. Therefore, using a numeric comparison is problematic in terms of reliability.

Figure 4.4 shows that there is a wide range in the amount of time participants spend using SIMS each week. The category with the largest number of participants was 1-4 hours. To differentiate between the different types of users, Figure 4.5 only includes Data Managers and shows that only one Data Manager used SIMS for 1-4 hours per week and most Data Managers (79%) use SIMS for 25 hours or more per week.
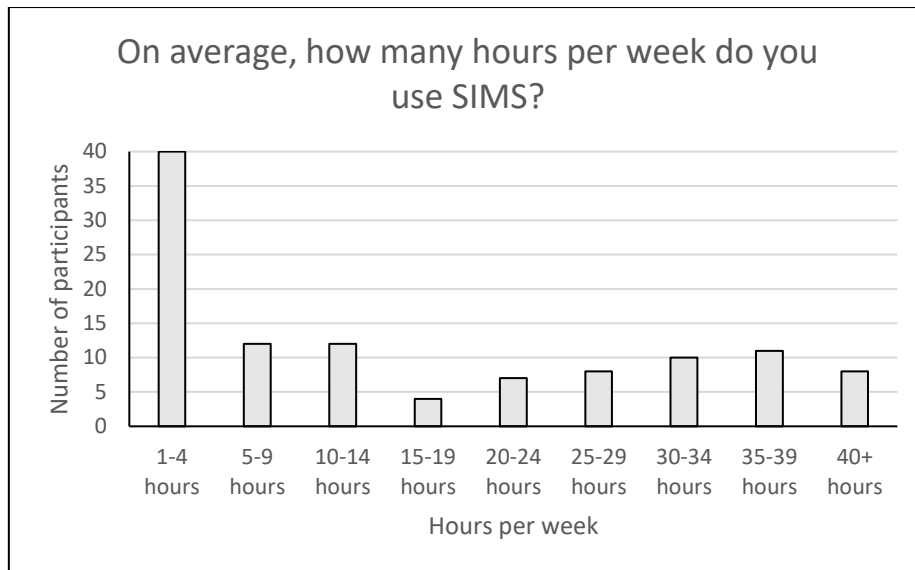
Figure 4.4: The amount of time spent using SIMS for all participants.
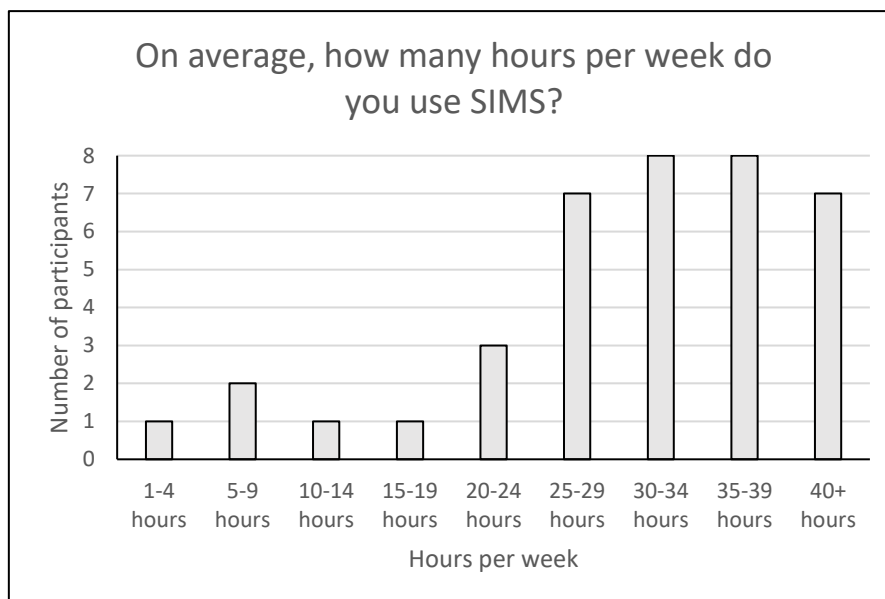
Figure 4.5: The amount of time spent using SIMS for data manager participants only.

4.1.4 User opinion of SIMS

The first 19 questions of the questionnaire were four-point Likert style questions. The questionnaire

results of these questions regarding attitudes and opinions towards SIMS indicate that all

participants have differing views to SIMS as no two participants' responses to all the questions are

the same. This result was anticipated as users may feel differently towards the same MIS due to

various different factors such as experience, confidence, and ability to access assistance (Visscher, 1995). Table 4.3 shows the responses to 11 of these questions. These results show an overall positive attitude towards SIMS. Over 90% of participants indicated that they agreed/strongly agreed with the statements 'I have the skills to use SIMS', 'I am confident using SIMS' and 'I am motivated to use SIMS'. However, the percentage of participants who agreed/strongly agreed with the statement 'I am satisfied with SIMS' is slightly lower at 80% and only 21% of participants strongly agree with the statement. The next seven statements relate to user opinion of SIMS and the use of data. Again, the results show a positive response to SIMS and most participants agreed/strongly agreed with the statements. Eighty-seven percent of participants agreed/strongly agreed with the statement 'SIMS provides easy access to useful information'. However, only 66% of participants agreed/strongly agreed with the statement 'SIMS promotes collaborative data use' and even fewer participants (55%) agreed/strongly agreed with the statement 'SIMS is user friendly'.

	Strongly Agree (%)	Agree (%)	Total (%)	Disagree (%)	Strongly Disagree (%)	Total (%)
I have the skills to use SIMS.	58	37	95	4	1	5
I am confident using SIMS.	50	43	93	7	1	7
I am motivated to use SIMS.	42	49	91	7	2	9
I am satisfied with SIMS.	21	58	80	17	3	20
SIMS provides easy access to useful information.	24	63	87	12	1	13
SIMS facilitates efficient and quick decisions.	10	60	70	29	1	30
SIMS improves the quality of student reports.	17	51	68	31	2	32
SIMS is user friendly.	10	45	55	40	4	45
SIMS helps me to efficiently record my assessment data.	22	59	81	18	1	19
SIMS helps me to use data effectively.	15	64	79	20	1	21
SIMS promotes collaborative data use.	10	56	66	29	5	34

Table 4.3: Responses to the Likert style questions.

4.1.5 Time and knowledge

The results of the Likert style questions relating to time and knowledge are shown in Table 4.4.

Overall, most participants agreed/strongly agreed with the statement 'I would like to use SIMS more'

and 'I don't know the full capabilities of SIMS'. These findings indicate that although participants

want to use SIMS more, knowledge about the capabilities of SIMS and how to use SIMS may be a

barrier to use. Only 18% of participants agreed/strongly agreed with the statement 'the use of SIMS

increases my workload'. However, only 54% of participants agreed/strongly agreed with the

statement 'I don't have the time to use SIMS effectively' indicating that although using SIMS does

not increase workload for most participants, time is still a barrier to use.

	Strongly Agree (%)	Agree (%)	Total (%)	Disagree (%)	Strongly Disagree (%)	Total (%)
The use of SIMS increases my workload.	2	16	18	69	13	82
I would like to use SIMS more.	22	53	75	25	0	25
I don't have the time to use SIMS effectively.	11	35	46	49	5	54
I don't know the full capabilities of SIMS.	36	42	78	18	4	22

Table 4.4: Responses to the Likert style questions relating to time and knowledge.

4.1.6 Training

Four of the Likert style questions related to training; three questions asked participants on the support and training they have received and provide. Table 4.5 shows these results. Although most participants agreed/strongly agreed with the statements 'I can get help to use SIMS' and 'I have received adequate training to use SIMS effectively', 73% of participants still agree/strongly agree with the statement 'I want more training related to SIMS' highlighting the need for additional training.

	Strongly Agree (%)	Agree (%)	Total (%)	Disagree (%)	Strongly Disagree (%)	Total (%)
I can get help to use SIMS.	33	55	88	10	2	12
I have received adequate training to use SIMS effectively.	13	48	61	31	8	39
I want more training related to SIMS.	26	46	73	25	2	27
I provide internal training on SIMS in my school.	12	38	50	37	13	50

Table 4.5: Responses to the Likert style questions relating to training.

An additional two open questions asked participants to state how many hours of formal and informal training they had received. Table 4.6 shows these results. The results show that there is a wide range in the amount of both informal and formal training received by participants from 0 to

over 50 hours. However, these results show that most participants who are not data managers have received fewer than 5 hours of formal or informal training.

Hours of training	Data manager (n=42)			All other participants (n=80)		
	Formal	Informal	Total	Formal	Informal	Total
0	0	10	10	19	10	29
1-4	4	1	5	39	36	75
5-10	5	9	14	5	15	20
11-20	5	0	5	6	0	6
21-30	4	0	4	1	0	1
31-50	9	6	15	4	4	8
50+	9	6	15	1	3	4
unknown	6	10	16	5	12	17

Table 4.6: *Hours of formal and informal training received for data managers and all other participants.*

The final question regarding training asked participants 'would you attend further training? If yes, please indicate what kind of training you would like to receive. If no, why?'. One hundred and thirteen participants answered this question and 80% (90 participants) answered yes or indicated that they may attend training in the future. There is a small difference between this figure and the lower figure (73%) who agreed/strongly agreed with the statement 'I want more training related to SIMS'. This discrepancy can partly be explained by participants who hypothetically would attend training on new products that do not exist at the moment. Another participant highlighted that they would attend training even though they did not want more because they wanted to use a different MIS: 'if we do not choose a better programme. I suppose so'.

The participants who answered 'no' stated different reasons for not attending further training. Some participants feel they already use SIMS effectively for their role or that training may be more suitable for other members of staff as suggested by these comments: 'no, because I don't feel I need to do anything else', 'no - I feel I can use effectively and admin team can do things that I am unable to do', 'no - no need in terms of my role', 'I would probably send my data manager first and foremost'. Another participant would not have attended training because they already know the

capabilities and limitations of SIMS: 'no - I know what SIMS can do, it just has its limitations, like all MISs'. Other participants would not attend further SIMS training because they 'use a different product to analyse data, behaviour etc' or 'mostly use other programs'. Another reason stated by two participants for not attending further training was that training was unsuitable for them and they believe that using manuals and forums is sufficient.

Most of the participants indicate that they would attend further training. However, there was a wide range in the kind of training they would like to receive. Some participants used the question to identify areas of SIMS they would like further training on. Table 4.7 shows these results and shows that data analysis and reporting were the most common responses from participants.

Area of training	Number of participants
Data analysis	14
Reporting	16
Discover	5
Timetabling / Nova	4
Behaviour	3
Personnel	2
Marksheets / trackers	2
Attendance	2
Course Manager	1
Lesson Monitor	1

Table 4.7: The area of training participants wanted to attend.

Some participants did not specify the area of SIMS they would attend further training on but instead indicated that they would like to attend general or holistic training to either better understand the capabilities of SIMS or learn how to use different features as shown by these comments:

Yes - how to use all the features, getting the most out of SIMS.

Yes- find out what else I could do with it.

Training on different aspects of SIMS

Other participants (six other participants and one data manager) would like training to improve how they use SIMS to use SIMS more 'effectively' or 'efficiently', 'personalise it' to 'navigate easily', 'find

shortcuts' or learn 'tips and tricks'. Other participants (eight data managers and two other participants) stated that they would attend training for new products, features or updates in SIMS.

Some participants (including both data managers and other participants) understood the question to mean the style of training rather than the topic covered. Two participants would like to receive 'practical' training. These participants did not explain what they meant by the term 'practical'. They may mean they want to receive 'hands-on' training that offers real-world experience focussed on the application of theoretical knowledge to complete specific tasks to support their role. One participant stated they would like to attend 'internal school training' whereas another participant would like to attend 'formal training'. In addition, another participant would like to attend 'personalised training', and another would like to access training online: 'web-based training that could be picked up as and when needed would be fantastic. Being able to find a video on You Tube would be great'. The wide range of answers to this question shows that participants want different types of training to suit their individual needs.

4.1.7 Barriers to training

The questionnaire responses of some participants highlight the potential barriers of cost and time to accessing the training they would like to receive, as shown by these comments:

> Depending on costs
>
> Yes (but there is always a cost implication)
>
> Yes, but the courses typically aren't included in the very high license price, are located far away, typically distant from railway station, so making the cost of training much higher
>
> Am always looking to improve my knowledge, but the cost is too much to go on regular training courses
>
> Yes - report building/SQL enquiry but I doubt I would be given the time!
>
> Yes, I don't think the school would pay for it though.

Moreover, some participants, particularly the data managers, highlighted concerns about the relevance of training sessions, indicating that they may prefer self-directed learning due to their

existing expertise. Two participants, who were both data managers, identified the relevance of training sessions as a potential barrier as shown by these comments:

> I would but find it is often not relevant. I have spent so much time teaching myself the ins and outs of SIMS that I find I can answer my own questions quicker than any training can

> I would like to know more about the capabilities of SIMS, but training only seems to benefit those with no knowledge, rather than extend the knowledge of key people

Another participant stated that they would attend training, but they would be unable to benefit from the training because they either cannot access these areas of SIMS or because the school does not use them:

> Yes, there are many programmes within SIMs that would be of benefit to me however I do not have access to them, or we do not use them in school

The limitations posed by inadequate access to specific features within the training modules or the non-utilisation of certain software functionalities within each school further highlights the complexity of overcoming barriers to training. Moreover, some of the responses indicate that participants may not know what training is available:

> I don't know what types there are.

Participants may not know which types of training area available due to a lack of knowledge about the capacity of SIMS or because training is not routinely offered to them.

These responses from participants show that it is important for schools to consider more flexible and targeted training approaches that account for the individual needs, awareness gaps and the practical relevance of the training for individual SIMS users. Therefore, the inclusion of a training component in the design of this research was not only justified but also essential to address these challenges identified by the participants.

4.2 Interview and focus group findings

This section provides a preliminary analysis of the interview and focus group findings at the three case study schools in relation to each of the four research questions. Many of the themes that emerged from the data were related to the existing elements of the DeLone and McLean Information System Success Model as shown in Figure 4.6 and therefore this been used to structure the findings and to show how SIMS is used and the user opinions of SIMS in the three case study schools.

The DeLone and McLean Information System Success Model has been used because it offers a comprehensive and multi-dimensional framework for evaluating the success of information systems, making it particularly suitable for analysing the complex interactions between users and SIMS in schools. The DeLone and McLean Information System Success Model is useful because it encompasses multiple dimensions of information system success, including system quality, information quality, service quality, use, user satisfaction and net benefits. These dimensions provide a holistic view of how an information system performs and its impact on its users and the organisation. By applying this model, I can systematically evaluate not only the technical aspects of SIMS but also the perceptions and experiences of its users. Furthermore, the model's adaptability allows it to be applied in various contexts, including educational settings, where the dynamics of data use and management are distinct from other sectors. By mapping the themes from the interviews and focus groups, as shown in Table 4.8, specific insights into user interactions and system performance can be uncovered, thereby providing targeted recommendations for enhancing its use. This approach also facilitates the generation of new knowledge by revealing how the success factors identified in other contexts manifest in the unique environment of secondary schools.
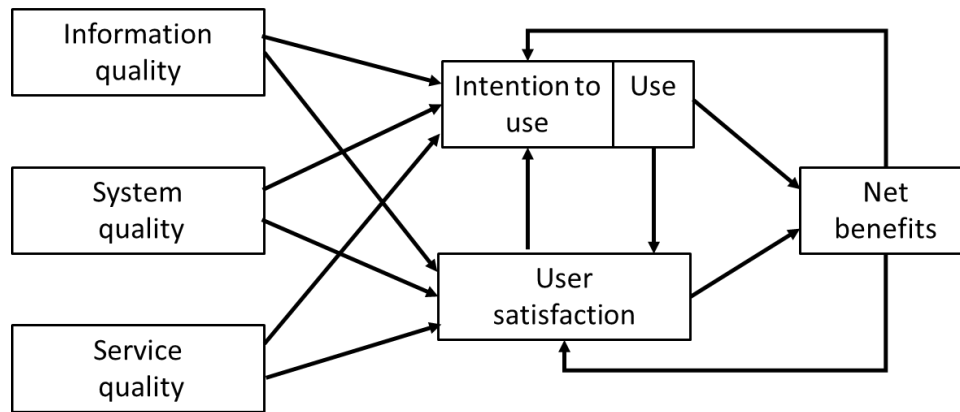
Figure 4.6: The DeLone and McLean Information System Success Model (2003)

Existing element of the DeLone and McLean Information System Success Model	Additional themes within each element
Information quality	Accuracy Availability Usefulness
System quality	Access Interface Customisation Convenience Efficiency Navigation Ease of learning
Service quality	Responsiveness Cost Appropriateness Third-party support Quality of software
Use / intention to use	Barriers (knowledge, time, access)
User satisfaction	Positive Negative
Net benefits / net impacts	Positive Negative

Table 4.8: Additional themes identified within each existing element of the DeLone and McLean Information System Success Model (2003)

The findings presented begin with an analysis of the use/intention to use of SIMS at the case study schools. The model shows that use/intention to use and user satisfaction are influenced by the information quality, system quality and service quality. Therefore, these factors are also presented. The net benefits of SIMS are influenced by all other factors and influences use/intention to use and user satisfaction and therefore is described throughout.

Although the DeLone and McLean Information System Success Model provided a framework for many of the themes, other themes were identified. In seeking to explore and understand a wider and deeper set of ideas about the use of SIMS, it became necessary to go beyond the confines of the DeLone and McLean model. Therefore, additional themes were included to capture the full complexity of SIMS use in educational settings. These additional themes are presented in Chapter 5.

I have allocated pseudonyms for each of the participants. In addition, for ease of reference, I have allocated a code for each participant indicating their job role and school, as outlined in Table 4.9.

| Pseudonym	School	Job Role	Code
Alex	School One	Data Manager	DM1
Lawrence	School One	Teacher	T1
Paul	School One	Teacher	T1
Kim	School One	Teacher	T1
Alex	School One	Attendance Officer	AO1
Stephanie	School Two	Data Manager	DM2
Beth	School Three	Data Manager	DM3
Natalie	School Three	Examinations Officer	EO3
Lucy	School Three	Teacher	T3

Table 4.9: Participant pseudonyms and codes

4.3.1 The DeLone and McLean Information System Success Model: Use

The 'use' element of the DeLone and McLean Information System Success Model refers to the degree and manner in which the information system is utilised by users, encompassing both the frequency and the breadth of its application in daily operations.
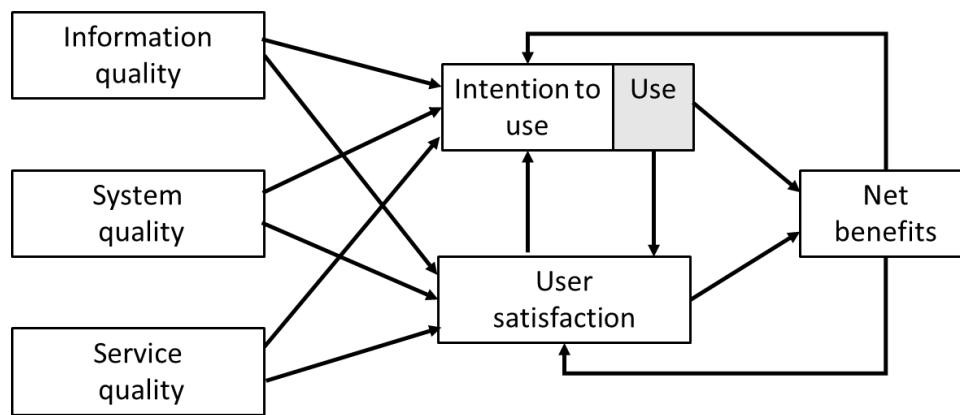
Figure 4.7: Use element of the DeLone and McLean Information System Success Model (2003)

At all three schools it was evident that SIMS is used multiple times every day by each participant and is relied on within each of the schools.

> So, I think in terms of data, SIMS is, I mean, it's huge. It's our number one thing really. (DM2: Stephanie)

SIMS is used as the primary MIS at each of the three schools and is therefore described as 'our number one thing'. The uses described by participants included taking registers, looking up individual students, achievement points, tracking progress and effort grades. However, the main use of SIMS is described as data collection. SIMS is described as a 'database' by participants and is therefore used to collect and store student data.

> SIMS from the data perspective, analysis perspective. They enter, staff, teachers, enter their data…I think the main issue for us is what we do with that data. So, at the moment we use it to collect the data. (DM3: Beth)

At School Three they also use SIMS to collect data, but Beth (DM3) describes that the analysis of the data is an 'issue' and therefore other software is used in conjunction with SIMS. Although SIMS has the functionality of an MIS rather than just a database, all three schools use other software to assist certain elements of school data and information. This finding supports the findings from the questionnaire which indicated that schools were using other products, like 4Matrix, SISRA or Microsoft Excel for data analysis. Stephanie (DM2) provided an explanation as to why they use an additional piece of software to support whole school data analysis:

I think that's harder to get to in SIMS, to set up in the first place and use so all these, as much as I spend a lot of time thinking it's me, I don't know enough. I also think no it's the software because everybody else is having these problems otherwise these additional things wouldn't exist. (DM2: Stephanie)

Stephanie (DM2) knows that SIMS is capable of helping her analyse data but explains that she finds the process of setting up SIMS more difficult and it takes more time and therefore using the tools in SIMS is more difficult compared to the other software that she uses. Stephanie (DM2) is a relatively new data manager who has only been in post for two years and therefore she feels unconfident about her abilities in SIMS and thinks that she might not have the required skills to use these tools in SIMS. However, upon reflection, she believes that if it were as easy to use SIMS then these additional products would not exist because there would not be a market for them. The fact that these products exist shows her that other, more experienced, data managers are facing the same problems and therefore unable to use SIMS in this way.

Participants described how they personally used SIMS and acknowledged that although all teachers use SIMS to take the register there are contrasts in the areas of SIMS different staff members use:

Me personally, I am a Head of Year, so I use it an awful lot in terms of behaviour referrals is my main use really. (T1: Lawrence)

Obviously, the exams module is mainly what I use and that is for everything to do with exams. (EO3: Natalie)

The use of different areas within SIMS directly reflects the job role of each participant. As anticipated and comparable to the findings from the questionnaire, the data manager at each school described more extensive use of SIMS compared with all other participants. The role of the data manager and their use of SIMS is discussed in more detail in section 2.7.3.

Intention to use
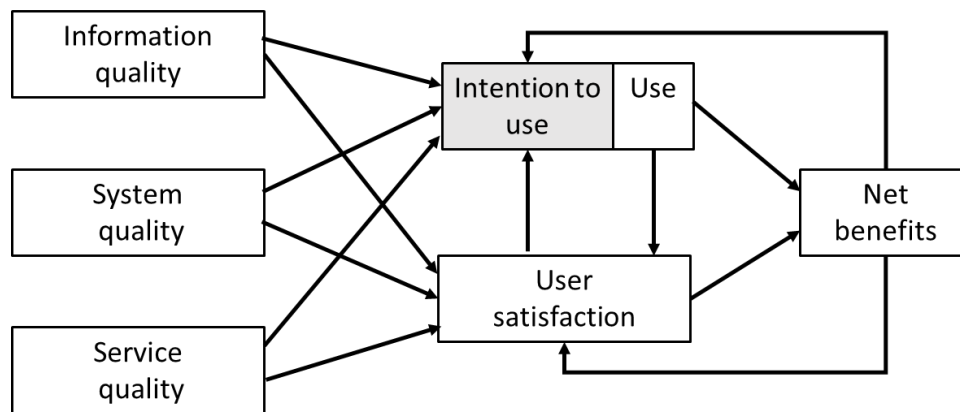
Figure 4.8: Intention to use element of the DeLone and McLean Information System Success Model (2003)

Although all the participants acknowledged that they used SIMS regularly, many wanted to improve or extend their individual use of SIMS or the whole school's use of SIMS.

> I would love if everything was in SIMS so that it could be done in one. (DM3: Beth)
>
> I don't see why we should have to export data from SIMS into something else. (DM3: Beth)
>
> Ubiquitous in terms of everything would be through SIMS. (T1: Paul)
>
> I see much more potential there to use it. (T1: Lawrence)

Ideally, participants want to use SIMS more as they would prefer to use one piece of software rather than having to use many pieces of software. For example, Beth (DM3) does not want to export data from SIMS into another piece of software to complete data analysis. In addition, Lawrence (T1) acknowledges that he thinks that there is the potential to use SIMS more in the school. The barriers preventing the increased or improved use of SIMS are extensive and varied. These barriers are discussed below using the DeLone and McLean Information System Success Model framework.

4.3.2 DeLone and McLean Information System Success Model: System quality

The 'system quality' element of the DeLone and McLean Information System Success Model evaluates the performance characteristics of the information system, including its reliability, usability and functionality.

```
┌──────────────┐           ┌─────────────────┬──────┐
│ Information  │──────┐    │ Intention to    │ Use  │◄──┐
│ quality      │──┐   └───►│ use             │      │   │
└──────────────┘  │        └─────────────────┴──────┘   │
                  │              ▲         │            │
┌──────────────┐  └────┐         │         │        ┌───────────┐
│ System       │──────►│         │         ▼        │ Net       │
│ quality      │──┐    │     ┌──────────────────┐   │ benefits  │
└──────────────┘  │    └────►│ User             │──►└───────────┘
                  │          │ satisfaction     │        │
┌──────────────┐  └─────────►│                  │◄───────┘
│ Service      │──────┐      └──────────────────┘
│ quality      │──────┘              ▲
└──────────────┘─────────────────────┘
```
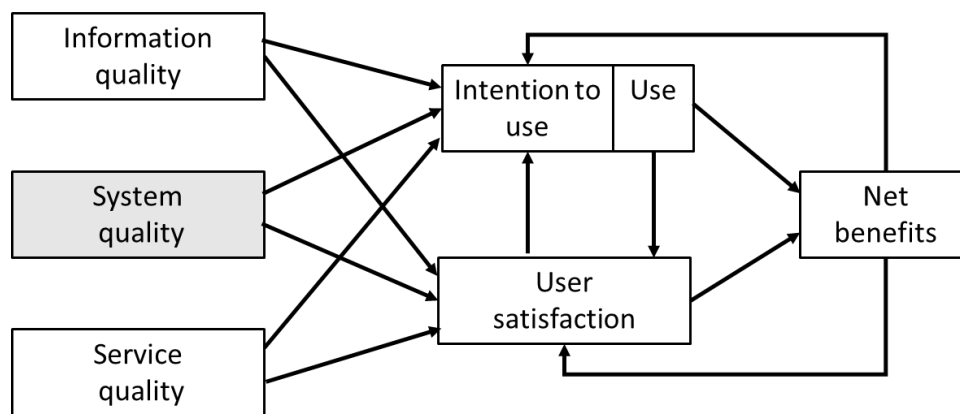
Figure 4.9: System quality element of the DeLone and McLean Information System Success Model (2003)

Within the system quality element, a range of critical factors were identified. This included access, controlling access, ease of use, quality of software, customisation, convenience, efficiency, flexibility, navigation, ease of learning, features and functions, accuracy.

Access

At all three schools, teachers can access SIMS in the classroom using the desktop computers. At School One, although the school has used SIMS for many years, teachers have only been able to access SIMS in the classroom for the past two years. Teaching staff were unable to access SIMS in the classroom due to concerns about 'child protection and GDPR' (DM1: Adam). However, a change to the school ICT network means that SIMS logs out automatically and therefore teachers are allowed to access SIMS in the classroom. All the participants at School One viewed this change extremely positively and this change in access resulted in a transformation in how users viewed SIMS:

> I believe making it available in the classroom. Until then it was difficult for teaching staff to easily access it and therefore it was limited by their access to computers throughout the school and we don't have that many computers outside of the classroom and that was the step that transformed it almost literally overnight from a tool that people had to refer to when they had to do something to as (another participant) says something that, well, that's the quickest way to get information. (DM1: Adam)

By allowing teachers to use SIMS in the classroom, teachers now view SIMS as the quickest way to access information rather than a piece of software that they were forced to use for certain tasks. Furthermore, this minor change in access resulted in a significant impact on the use of SIMS for individuals and across the school:

> I think over the past few years, usage has increased significantly in terms of how we use SIMS. Before, I think, we generated from SIMS and it was all output based and now I think that and I might be wrong but I think staff are now well they're encouraged to use it more because our registration is through it, assessments through it, and also the putting out of data related to pupil premium and SEND et cetera can be accessed through the use of a separate spreadsheet which has encouraged staff to be more involved with it. So now it's sort of input as well as output in terms of use of SIMS. (DM1: Adam)

> SIMS became therefore accessible and then suddenly we realised what SIMS could start doing and I think SLT thought why not put that on as well now we all have access. (T1: Lawrence)

By allowing teachers to access SIMS in the classroom both teachers and the SLT were able to begin to understand that they could use SIMS for other functions therefore increasing use across the school. The type of use has also changed. Previously, SIMS was viewed solely as a tool to generate from whereas now, because staff are encouraged to use SIMS, it is used to input data too. Through using SIMS to input data, teachers become active contributors to the data and information stored within SIMS rather than acting as passive users simply accessing information others have entered. However, teachers are do not have the autonomy to decide which type of data are stored within SIMS. This lack of autonomy highlights the importance of decision-making culture in schools. When teachers are given more control over the data they input and manage, it can foster a sense of ownership and responsibility and a more collaborative and positive school data culture.

At School Three all teachers theoretically have access to SIMS in the classroom. However, one teacher participant described trying to log on to the computer in her classroom to access SIMS:

> See my first struggle is just to try and get into the programme which is maybe why people don't like to use it but then (other software) does the same. It kicks you out or won't let you log in…And sometimes mid-report it can just kick you out but it's not SIMS, it's trying to get onto Windows. (T3: Lucy)

Lucy (T3) explains that to logon to SIMS they first have to logon to Windows, and this is difficult. During the interview, it took her almost seven minutes and eight attempts to log onto SIMS in her classroom. For this reason, Lucy (T3) believes that one reason that colleagues do not like using SIMS is because simply logging onto SIMS is a 'struggle' and therefore they do not want to use it. Furthermore, she explains that this can happen while using SIMS ('mid-report') further discouraging the use of SIMS. This is not a safety feature where SIMS will log a user out after a period of inactivity but appears to be an error. However, Lucy (T3) acknowledged that this problem is not unique to SIMS and the same problems can happen when trying to use other software.

Controlling access

At all three schools, participants described using SIMS marksheets to record assessment grades, usually in the form of predicted GCSE grades, for students. These marksheets can be used to create reports that are sent to parents or used as electronic markbooks or 'trackers' by teachers. At each school the marksheets are created by the data manager and completed by classroom teachers. Although some elements of these marksheets are fixed, different columns can be added by the data manager. Teachers can typically view marksheets for their own classes or students they have responsibility for, although permissions can be amended to allow any user to view any marksheet.

At School One, teachers have only been able to access SIMS in the classroom for the past two years. Because teachers had limited access to computers outside the classroom and therefore limited access to SIMS, reports were completed on Excel spreadsheets and then imported into SIMS by the data manager. Adam (DM1) explained the process:

> So, Assessment Manager, yes, I had to generate the marksheets. Fine you've got to do that regardless. I then had to export them every single one into Excel, into XML files. I had to format them to stop the teachers being able to put incorrect information in. I had to make it that they couldn't write more than a thousand characters within the file. I had to et cetera, et cetera, et cetera. Then I had to place them on our shared drive. Then I had to import them. Then I had to clean up all the crap they had written in there when all along they could have been putting them in themselves. They took to it like falling off a log because it was fundamentally no different from what they'd done in Excel for years. (DM1: Adam)

Adam (DM1) had to complete a complex, multi-step process of exporting, data cleansing and importing to enable teachers to complete reports in Excel and then create reports in SIMS. By allowing teachers to have access to SIMS in the classroom and therefore are completing the reports directly in SIMS, the process is simplified for Adam (DM1) as the data manager and essentially the same for the teachers. Adam (DM1) thinks that the transfer from Excel to SIMS has been smooth for teachers because the process was very similar in both programmes.

Two of the teacher participants, Kim (T1) and Lawrence (T1), described wanting to be able to view the grades inputted by other teachers in other subjects:

> What I don't like is that you can't see everyone's marksheets so for stuff that is being reported to parents. I'd like especially for my form and my GCSE (classes). (T1: Kim)

> I think it could all be probably in front of me, and I could have a quick check so how is pupil A doing in my subject compared to others let's have a look and I don't think that's, I don't know how easy. I don't know if it's even possible or easy. I'm not sure. I just think that's a useful tool to have really. (T1: Lawrence)

These teacher participants want to be able to access the grades in other subjects immediately and at a time that is convenient to them to help support them in their roles as teachers or form tutors. Kim (T1) does not like SIMS because she cannot access this information. However, this feature is available in SIMS, but it has just not been set up by the data manager Adam (DM1). Lawrence (T1), on the other hand, theoretically believes it is possible, but he does not know how it would work, highlighting his lack of knowledge of the functionality of marksheets.

At first Adam (DM1) thinks that the solutions to either allow teachers access to all marksheets or to create new marksheets are problematic:

> And that scared the shit out of me them all being able to see all the marksheets. They'd get bored. (DM1: Adam)

> I was reluctant to do it because all you're doing is creating more and more marksheets for someone (laughs) to housekeep because I'd wanna delete those marksheets after a while et cetera et cetera. (DM1: Adam)

Adam (DM1) is extremely worried that if teachers are able to access all of the marksheets then they would 'get bored'. He has limited expectations of teachers and their use of SIMS and data. If teachers were able to use SIMS effectively to access relevant marksheets, then they would have the autonomy to choose which marksheets to access themselves and therefore it is unlikely that they would not 'get bored'. Another reason Adam (DM1) is reluctant to create more marksheets is because they will have to manage more marksheets and therefore this will lead to an increase in his workload.

Adam (DM1) explains that the SLT want to limit the amount of data teachers can access within a marksheet:

> They're (SLT) saying what we want teachers to see their most recent data and that's enough and I think that's the end of the discussion. (DM1: Adam)

> Why? Because they are trying not, to their perception, they're trying not to overcomplicate things… I think someone who's half competent would have no problem at all with a universal marksheet…Some of them it would confuse them. (DM1: Adam)

Adam (DM1) is describing a marksheet where a teacher can access all of the data for a class for the year representing much less access than the idealised situation wanted by the teacher participants where they can access student data in other subjects. Adam (DM1) believes that SLT are trying to simplify and reduce the number of data points teachers can view to ensure the process is not overcomplicated. He does not think having all of this information in one marksheet ('a universal marksheet') would be a problem for 'half competent' teachers but concedes that it would confuse 'some of them' implying that they believe some of the teachers are not competent in using SIMS or viewing data. There is a large difference between the access that the teacher participants want, and the access controlled by SLT through the data manager.

A teacher participant at School Three describes having to wait until after GCSE results to find out the grades of students in their class in other subjects:

Unfortunately, it seems to be when you get to the end of Year 11, and you have to do your analysis that you get to see what the students achieved across the board to know. (T3: Lucy)

Lucy (T3) believes this important information about GCSE grades is hidden from her until after the results and is therefore only used for compulsory post results day analysis rather than during the course when the information could support teaching and learning. However, at this school, after each data drop Beth (DM3), the data manager, exports all of the data for all subjects for all students into an Excel spreadsheet and emails this to staff:

So, it's just a spreadsheet that they can just open and look at themselves. The thing is they always complain that they're stressed…So I think what (Deputy Headteacher) is trying to do is trying to make everything accessible, really easy…And yeah so, I think that's why we send it as a spreadsheet because then you know it's sent and they don't have to login to SIMS and then open up the whole thing they use iPad as well. It wouldn't be that easy. I don't know, I think that might that's my understanding…It's just to give them the data. So, they've got the data. So, they can't complain that they've not got the data. And it's easy to do. Very easy to set up but I don't think, I just think the way where we are at the moment is that give them as much information as you can…Because they don't have enough time…I mean we're saving them time from having to like to find the information. If we just send it to them, then they've got it as a spreadsheet and then they can open it up because they're complaining that they don't have enough time. (DM3: Beth)

The purpose of sending out this data is to ensure all teachers have access to the data 'easily' and therefore save them time. Opening an email and viewing the data in Excel is considered 'easier' for staff simply because they do not have to open SIMS or remember how to find the information even though staff members have had to open SIMS and enter the data themselves. Once the email has been sent, the onus is on the teacher to access the data because having the skills to open email and Excel are considered necessary whereas being able to use SIMS to access these data is not an expectation. Beth (DM3) feels that she has to 'give them as much information as you can' in an Excel spreadsheet to save the teachers time by not opening SIMS. She is not concerned with how useful the data are to teachers because teachers can only 'complain' if 'they've not got the data'. However, the spreadsheet attached to the email is not specific to each teacher and therefore contains all of the students in the whole year group. Lucy (T3) explains:

> We do get it kind of an email link to all of that but yeah, so I can see but again it's just, you get the whole year…It would be nice if it was a bit more tailored broken down but then that's a big job for someone, so I understand why we don't get that. (T3: Lucy)

The emailed spreadsheet does not make it easier or save time for Lucy (T3) because she has to search for the students in their class and therefore does not use it. Because she does not understand the functionality available within SIMS, she believes that making this information available would be a 'big job for someone'. However, this is not the reason that they are not able to access these data in SIMS because Beth (DM3) knows that it is 'very easy to set up'.

Examinations marksheets

In addition to permissions within SIMS, users can have access to other modules. Natalie (EO3), an examinations officer, describes access to the examinations module and associated examinations marksheets:

> This place is full and in fact every school I've ever worked in is full to the brim with really, really bright stupid people… because I've seen what can happen if you allow teachers to enter marks into marksheets and to change their entries on the marksheets.
>
> If you don't understand the workings of the exams module then you have no right to be inside it and nobody should be touching the data that's in there because it will impact not just financially on a student, on the school but it could impact on the long-term results of a candidate. (EO3: Natalie)

From previous experience, Natalie (EO3) will not allow anyone else to enter marks on examinations marksheets. She believes that her teacher colleagues are 'bright, stupid people'. They are bright because they are 'fantastic teachers' but they are stupid because they do not understand the examinations module or have made mistakes entering marks.

Natalie (EO3) explained that she is the only person in the whole school who has access to the examinations module because she is the only one who understands how it works. She does not want anybody else to have access to it because other people cannot be trusted to have access to the examinations module because of the huge impact of the data it stores both financially on the school and on the outcomes for students. The process used by the school to make examination entries

involves teachers sending the entries they would like to make in an email to Natalie (EO3) who then manually inputs these into the marksheets they have created in the examinations module. When these marksheets are created, similar marksheets are created in SIMS so teachers can enter their entries directly without having to access the examinations module or send emails therefore reducing workload. However, when I asked the participant if teachers could use this function in SIMS rather than the examinations module they replied:

> I don't know because I'm not a teacher…There is absolutely no reason for your teachers to be touching your marksheets. (EO3: Natalie)

Natalie (EO3) is not a teacher user of SIMS and therefore does not know that the marksheets can appear in SIMS for the teacher to access. Furthermore, she views the marksheets as hers and belonging to her rather than belonging to the teacher who has responsibility for the class. Therefore, although the teacher decides which entries should be made for each student, only the examinations officer can 'touch' the marksheets. The data within the examinations module, while managed by Natalie (EO3), fundamentally belongs to the school and its students. These data are the collective property of the school, intended to be used for the benefit of student outcomes and school operations. Although Natalie (EO3) handles the data input and management, the information pertains to the students' academic records and should ideally be accessible to those directly involved in the students' education, such as their teachers. This centralisation of data control raises questions about data ownership and the potential benefits of a more collaborative approach to data management, where teachers can interact with the marksheets directly to reduce workload and streamline processes.

Knowledge about access

Participants described situations where access was limited by knowledge about the capabilities of SIMS rather than permissions in SIMS. Some participants are unaware of how they can use SIMS and

therefore believe that certain areas of SIMS are inaccessible to them. Adam (DM1) describes accessing SIMS remotely from home on results day:

> A teacher would come and say, 'Ah but I can't get SIMS at home', and I'd go, 'yes you can'. 'No, only you and SLT can get SIMS at home'. 'Well (data manager's daughter) can get SIMS at home'. 'Yeah, but that's because she's using your computer' and I'd go 'No!'. It is a bit convoluted, but it is not impossible. (DM1: Adam)

Adam (DM1) explains that all users are able to access SIMS remotely. However, another member of staff believes there is a hierarchy of access to SIMS and only the SLT and the data manager can access SIMS remotely and another teacher can only access SIMS because they are using the data manager's computer. Although teachers technically have remote access to SIMS, Adam (DM1) concedes that it is a 'convoluted' process. Therefore, knowledge is the barrier to access SIMS rather than permissions.

Beth (DM3) described how teachers could use SIMS to access data:

> The reports are actually there; you don't need to always come to us for a report. That's one thing I would definitely like to show them. So, the data is there. You just need to use it and I think for that it is good. Because it's all there; behaviour, attendance, data personal data about the about the students, where they are, where they are now, their last report. It is all there. (DM3: Beth)

Beth (DM3) explains that there is a lot of data teachers are able to access through SIMS. However, teachers either do not know this information is available to them or do not know how to access reports or other information within SIMS and therefore have to access this information through the data manager. Although Beth (DM3) wants to show teachers how to use this themselves, she has not been able to yet.

A teacher participant explains that they want to access information about students in other subjects:

> And that's something that maybe needs to be picked up on and that's not visible. I don't know how to access that. (T1: Lawrence)

Lawrence (T1) says that the information is 'not visible' meaning that it is not visible to him because he does not know how to access the information even though the information is technically accessible when he logs in to SIMS.

Stephanie (DM2) agrees:

> If they, if people don't know where to go and get things, how to get things, whether its accessible or not. I think if they're not trained on where to get it from then they're always gonna think 'data again', whereas if you've shown them how. (DM2: Stephanie)

It does not matter if teachers have access to SIMS or not because if they do not know how to use SIMS to access the data then it is inaccessible to them. Stephanie (DM2) believes that training impacts how teachers use SIMS but also how they view data. If teachers are not trained on how to access data, then the notion of using 'data' becomes a chore from the first step of accessing the data.

Beth (DM3) explained that at School Three some departments use SIMS marksheets to 'track' students in their classes and monitor progress and some departments use Excel. Beth (DM3) is responsible for managing the marksheets in SIMS but not the Excel marksheets. In the following extract Beth (DM3) is recalling a conversation with the Head of English about the Excel English tracker:

> The Head of English she sent me a spreadsheet of her tracker. I asked her 'So where did you get this from?'. It was from the former Head of English, and I said 'It's fine. The only problem with this marksheet, with your tracker is that it's got students that have left, and it doesn't have students that have that are new'. And so, she was complaining that it doesn't tally up with SIMS. And I said, 'That's the reason'. So, what I did for her. 'I can put this on SIMS for you so that you have it you have everything on SIMS, and it will calculate as you put data in for you as well'. And she, 'Like fine', and I did it for her and she said, 'It's fine'. So, I guess people don't know that you can do it in SIMS. Yeah, and if you don't ask because I know maths, they've asked, 'OK can you add this too because we want to use it to monitor progress'. But if you don't ask then you wouldn't know what you can get from SIMS. (DM3: Beth)

The Head of English has approached Beth (DM3) when they have found a problem with their Excel tracker. Before this, Beth (DM3) did not know that the tracker existed and could not access the

tracker in Excel. She explains that the tracker can have the same functionality in SIMS but will update the students automatically and therefore the tracker will have fewer errors and be more useful for teachers. The Head of English is familiar with Excel and did not know that tracker marksheets could be created in SIMS and therefore automatically used Excel. The mathematics department on the other hand do use SIMS marksheets as trackers and will therefore ask the data manager to add certain columns to the marksheets in SIMS. Teachers have to approach the data manager to create a marksheet in SIMS. Beth (DM3) believes that teachers do not know how SIMS can be used because they have not asked how it can be used. She acts passively and does not promote the functionality of SIMS unless there is a problem. Beth describes how different departments could share their trackers to increase knowledge about SIMS across the school:

> Beth (DM3): So again, it's to do with sharing what you have with others so that they can see, 'OK maybe I could do this or maybe I could merge these two together or play around with it or'. If they don't know that it can do this or if they don't know what other people are doing, then they're not gonna know.
>
> Interviewer: Mm could you be the person to share that information?
>
> Beth (DM3): Erm I could. However, I don't know what everybody's using.
>
> Interviewer: OK.
>
> Beth (DM3): I only know of people that have approached me or have actually seen.

Beth (DM3) does not believe that she can share how SIMS can be used to create trackers because she does not have access to the other trackers used by teachers. She believes that teachers should create a tracker and then ask if SIMS can be used to create it rather than the data manager showing other staff how SIMS can be used.

Ease of Use

Ease of use is a function of many different elements of a piece of software. In a holistic sense, many participants described SIMS as a product that is not 'user friendly' because it is 'clunky' and therefore a difficult programme to use.

So, I've tried to run reports and I find them very difficult. I've tried to edit reports that have been written to what I want and that's really awkward. It doesn't come out in the product that you want either in Excel or whatever. I've tried simply my front homepage. (laughs) I tried to set my front homepage to get it to show me what I want it to do and as soon as I turn it off and put it back on again the stuff comes back that I don't want. Just simple stuff like that…I do find it one of the most frustrating programmes I've ever used. (laughs) (T1: Lawrence)

Lawrence (T1) is describing two different areas of SIMS that he finds difficult to use. He believes that what he is trying to achieve in SIMS is 'simple stuff' and therefore find it frustrating when he is unable to complete simple tasks.

Natalie (EO3) finds the examinations module difficult to use:

You know because none of it makes any sense. It doesn't match anything. It's not like anything else you know. (EO3: Natalie)

Natalie (EO3) finds the examinations module difficult to use because it is so different to all other programmes she has used before, even SIMS. She believes that the module is illogical and cannot use her experience of other software to help make it easier to use. Her opinion of the examinations module may be a reason why she is reluctant to allow anybody else within the school to have access to this module.

Interface

The user interface of SIMS is described negatively by participants. Paul (T1) believes that the poor user interface of SIMS directly and negatively influences the use of SIMS:

In terms of the user interface, it you know it's a really poor user interface and that prevents people using it significantly, I think. (T1: Paul)

At each of the schools an additional product was used for the analysis of attainment data and SIMS was compared unfavourably to these products in terms of the ease of use. These other products are described by participants as:

Quicker, clearer, easier and more accessible. (DM2: Stephanie)

Really useful easy to use interface. (T1: Paul)

> Really graphical, very easy to use. (T1: Paul)

> More graphic, clearer nature is better. (DM2: Stephanie)

> Very user-friendly and it's quite intuitive. (DM2: Stephanie)

This comparison underscores that while SIMS struggles with a cumbersome and unintuitive user interface, alternative products excel by offering more efficient, visually clear, and user-friendly experiences, which significantly enhance their usability and appeal.

Quality of software

SIMS is perceived as an old product that has not been updated in the same way participants have seen other products change:

> If you look at even how even any OS (operating system) has moved on over the years and SIMS as a product hasn't changed substantially. (T1: Paul)

Paul (T1) has witnessed every other operating system evolve and improve. However, he has not seen any substantial changes within SIMS as it looks and functions similarly. Some participants at School One believe this stagnation is due to a lack of competition within the MIS market:

> Because they've had a captive market, they haven't really had to catch up with the sort of google-esque designs that you'd see on every other product. (T1: Paul)

> It feels like it's captive market that they can do as they please with and have not really bothered with because they know it's not really got any competition for it really. (T1: Lawrence)

SIMS is viewed as lagging behind other software because the design is outdated and does not look like any other products Paul (T1) uses. Lawrence (T1) feels as though Capita are complacent about SIMS because there are no competing products and therefore, they do not need to innovate. SIMS is perceived as the only MIS available on the market. Although other products are able to perform aspects of a MIS, SIMS is believed to be the only product that functions as a full MIS and therefore these participants feel that schools have to use it because a suitable alternative is unavailable. In addition, the process of changing to a new MIS is considered too difficult:

> They've got a captive audience and because so much data is stored by schools in it, I think that the fear of transferring to something new is so great that you know people don't want to do it because of the time effort. (T1: Paul)

MISs store a vast amount of data in schools and therefore the task of migrating all of these data from SIMS to another MIS is avoided by schools because it requires a large amount of time. Schools rely on data and therefore Paul (T1) believes schools avoid changing MIS because they are fearful of problems.

SIMS is perceived as an old product and therefore participants believe SIMS is unable to meet the requirements of end users. For example, the examinations module was described as follows:

> So, they created the exams module and I'm pretty sure that initially it was wondrous. It must have been fabulous but then every year the requirement for the Census and what we are required to report on and how we are required to report on changes and so what Capita have to do is add a bolt on to the side of it to make this exhaustive tired old exam module try to produce the information that you require. So it's clunky and you know what should be a simple one or two or three step process is a seven or eight or nine step process of and if you miss one step you haven't made your entry, you haven't made your withdrawal, you haven't made the submission, you haven't sent it to the exam board, you haven't got the right class code, you haven't got the right entry code. Everything can go wrong…They've got something that is so old. It's no longer fit for purpose and they're literally dragging it on its knees like a dead carcass behind them and still getting it to do what the government requires it to as well as what we need it to do. (EO3: Natalie)

Although Natalie (EO3) thinks that when the examinations module was first introduced as a new product in the early 1990s, before she became an examinations officer, 'it must have been fabulous', she believes the examinations module is now so old that it is 'like a dead carcass'. Therefore, the module is 'no longer fit for purpose'. However, she describes Capita as 'still getting it to do' what is required by the government and examinations officers. Natalie (EO3) believes this is because as new updates are required, Capita 'add a bolt on to the side' resulting in a product that is extremely difficult to use because 'everything can go wrong' and it is inefficient because what the participant believes should be a simple process requires many steps. Capita must provide regular updates to the examinations module to ensure the software is able to meet external requirements from examination boards. Although Capita is able to make these changes, Natalie (EO3) believes that the software does not meet the internal requirements required by users because it is not easy to use.

In contrast to Natalie (EO3) who describes the examinations module as being updated every year, albeit ineffectively, Lawrence (T1) describes hardly being able to notice the updates in SIMS:

> It hasn't been developed in what I've been at this school almost twenty years now and I don't think it's changed an iota almost I see the updates every year, but I never see anything change really. (T1: Lawrence)

Lawrence (T1) does not believe that SIMS has changed even a small amount in the twenty years that he has been using it. SIMS is upgraded each term every academic year. A page describing the main changes appears when you login to SIMS for the first time immediately after the upgrade has been completed. Lawrence (T1) describes seeing this page but not being able to notice a change in the appearance or functionality of SIMS following an update.

Participants' perception of SIMS as an old product has resulted in them not realising the functionality of certain areas of SIMS. In the first example, Natalie (EO3) is describing the process of seating students for exams in the examinations module and her experience of being shown how to 'drag and drop' candidates into their seat:

> It's so complicated. Seat the room, find them, readjust the entire student body one at a time so I can shuffle them into the right place, and he looked at me and went no you don't have to do that, and we took everybody out of it, and we just dragged one student and I said to him, 'Nothing in exams is draggable. Nothing! So why?'. Did you know? To have (trainer name) click on a student and drag it across. I could've cried. I genuinely. Sixteen years! But because nothing in SIMS is click and drag, why would I assume it's click and drag? You know nothing in SIMS. It's so old fashioned. Who thought that up and who implemented and whoever implemented it why didn't they tell any of us? (EO3: Natalie)

Natalie (EO3) believed that the process of seating students for examinations was complicated because she only knew one method of allocating seats and was trying to use this method when it was inappropriate, unaware that another more suitable technique within the examinations module was available. She later explained that she wanted to cry because she had 'spent hours shuffling one student at a time' and therefore wasted a lot of time. When she found out about the functionality, she was surprised because she views SIMS as 'old fashioned' and this 'click and drag' or 'drag and drop' feature, as they are more commonly known, is usually available in more modern

products. In addition, she did not expect SIMS to have this function because 'nothing in exams is draggable' and therefore she had never tried to 'drag' a student into a seat because she expects the functions to be consistent within the module. Even after I said that I did know that this function existed, she believes that there was a lack of communication between Capita and examinations officers when this functionality was implemented and therefore examinations officers as a group do not know how to use it. Therefore, Natalie calls for more advanced training:

> It is probably capable of doing way more than we know but when you go for training, they give you the basics and you are so inundated you are like a deer in headlights. If they did second a second stage. (EO3: Natalie)

Natalie (EO3) acknowledges that the capabilities of the examinations module are far greater than she knows and therefore would want to attend further training or 'second stage' training to learn more about the functionality available in the examinations module. The amount of basic material covered in the initial training session was overwhelming and therefore a second stage would enable examinations officers to learn more about the functions available in the module.

At one of the other schools the following exchange between a teacher and the data manager shows how another feature using 'drag and drop' was not known:

> Paul (T1): In a world of drag and dropping icons. Why is SIMS not drag and drop?
>
> Adam (DM1): Ironically and it's funny you should say drag and drop because we've not had time to show you. I've shown individuals as time has gone on reports in that drop down are very old fashioned. There is a simplified SIMS reports which you drag and drop that data you want.

This exchange illustrates Paul's (T1) expectation of drag and drop functionality in SIMS, based on its prevalence in contemporary software. Additionally, it highlights that the feature does exists in SIMS, but Adam (DM1), as the data manager has not been able to show it to other participants due to time limitations. Adam (DM1) describes two areas of SIMS where the same data can be compiled and viewed with one being 'old fashioned' whereas the other area is easier to use and utilises a 'drag and drop' feature. He feels that it his responsibility as the data manager to 'show' colleagues how to use

SIMS and therefore describes showing 'individuals as time has gone on' about the 'old fashioned reports' implying that there has been time for ad hoc training over a long period of time and that they only had knowledge of the 'drag and drop' reports more recently even though they are not a new feature in SIMS.

Customisation

Participants explained that being able to customise the Homepage of SIMS was beneficial and therefore they were able to make better use of the information stored within SIMS as it is easier to access and more applicable to them:

> Formatting your home area to make the information more useful I think staff would really like because everyone now sees their home page when they go in to do their registers…. So, if they knew how to format some of that information to look at their form to look at their classes I think that would be really beneficial. (T1: Paul)

Staff members have to log in to SIMS to complete their registers and therefore have to view the Homepage so it would be advantageous to have pertinent information, such as information about their form or classes on this page. However, the extract shows that Paul (T1) does not think that other members of staff know how to 'format' or customise their Homepage. Another teacher participant School One describes customising their Homepage:

> I also try and get my home screen to show me a little bit of positive and the sanctions and the positive stuff as well to come up on the home screen. (T1: Lawrence)

Lawrence (T1) explains that he tries to have certain information to show up on his Homepage implying that they have had some success with this, but they are not always successful, or the information does not always show correctly.

At School Three, another programme for behaviour management and seating plans is used in addition to SIMS and Lucy (T3) describes customising the screen to instantly show the information required:

> So, you can kind of instantly see you can see more the achievement points, than the behaviour points but you can tailor it as well so you can have things on visible on the front or you can hide information. (T3: Lucy)

Lucy (T3) describes this other product and the function to customise positively. However, she is unable to customise SIMS in the same way so she can view information about her form:

> I don't know how to, I've been shown roughly how to configure, but I still haven't managed to do it for my form. (T3: Lucy)

Although Lucy (T3) knows that within SIMS the Homepage is customised using the 'configure' tool, she believes that they have only been shown 'roughly' and therefore the training she received was inadequate and she has not been able to customise the Homepage for her form.

Convenience

Participants expressed the advantage of having different types of up-to-date data, including contextual data, 'all in one place'.

> The other thing they use it for is pupil profiles and understanding the background data and that used to be in a separate spreadsheet which was not regularly updated so that's another massive bonus that staff really like is the fact that all the data is there in one place. (T1: Paul)

> Because it's all there; behaviour, attendance, data personal data about the about the students, where they are, where they are now, their last report. It is all there. (DM3: Beth)

The consolidation of various types of data within SIMS, as highlighted by the participants underscores a significant advantage of the system despite its criticised user interface. The ability to access comprehensive and regularly updated contextual data in one place facilitates a more holistic understanding of each student, which is critical for effective teaching and learning. This centralisation is particularly useful for creating detailed student profiles, as it eliminates the inefficiencies and inaccuracies associated with maintaining often outdated spreadsheets. By integrating behaviour, attendance, academic performance, and personal data, SIMS provides educators with a robust tool for monitoring and supporting student progress. This convenience not only enhances administrative efficiency but also empowers teachers to make more informed and

timely decisions, ultimately contributing to improved educational outcomes. However, for SIMS to fully realise this potential, addressing the issues with its user interface is essential to ensure that all staff can use the system's comprehensive data capabilities.

Efficiency

In general, SIMS is described as an inefficient system in terms of the number of clicks required to input or access data.

> I find it quite clunky sometimes and there's lots of there's not a very quick way to get to one simple thing you have to go through lots of different stages. So sometimes I find that bit not very conducive to teachers with timeframes especially if you're in a lesson and you want to just get through and teach and you just need to fiddle with SIMS. (T3: Lucy)

> I've just counted in my head, and I think there's about fifteen clicks minimum to change one kids referral and I could have twenty of those in a morning and I'm clicking fifteen times possibly even seventeen times to change and save that referral and I just think that's madness you know and I'm spending my morning three hundred and fifty odd clicks just to change fifteen referrals. What I'm doing is just adjusting them and it's just absolutely madness. So, it's just simple things like that that just let alone working out big stuff like what assessment you want to. Simple basics are just not good and not effective. (T1: Lawrence)

Due to short timeframes, teachers need to be able to access or input data quickly into SIMS. However, the teacher participants describe having to click multiple times or 'go through lots of different stages' to complete what they believe to be simple tasks. Larwrence (T1) is concerned with how many clicks a task has taken, which will be the same for any user, rather than how much time the task has taken which could vary depending on the user's experience. He believes that SIMS is not an effective programme for completing simple tasks and therefore is discouraged from exploring its use for what he perceives to be more complex uses, such as tracking students' assessments.

The number of clicks required can impact the use of SIMS:

> When actually if it's taken you, this click click click click and you have to go through ten clicks to get there one it puts people off doing it. (T1: Lawrence)

Lawrence (T1) believes that staff members will not want to use SIMS because of the large number of clicks required to access an area to input data and therefore will not use it. Stephanie (DM2) describes using another programme instead of SIMS because she finds it faster:

> I don't always find it's easy to get out what I need, and I find its often quicker to put it into Excel and analyse it that way and that may be my lack of training in SIMS, or it may be because I've always used Excel. I don't know maybe it's just a faster thing. (DM2: Stephanie)

Stephanie (DM2) finds that exporting the data from SIMS into Excel is quicker. This may be because she has more experience of Excel or because Excel is generally a quicker programme to use compared to SIMS. However, she acknowledges that it might be her 'lack of training in SIMS' implying that she does not know the full functionality of SIMS and therefore does not know how it can be used to complete this task.

Although SIMS is generally described negatively in terms of efficiency, some participants describe certain instances where SIMS is used to improve efficiency within lessons:

> And that's a massive difference so everyone can now immediately give rewards and sanctions. (T1: Lawrence)

The use of SIMS within the classroom at School One allows teachers to give students achievement and behaviour points in real time during the lesson. Previously teachers could give students rewards and sanctions throughout lessons but because they could not access SIMS there was a delay in logging this information.

Lawrence (T1) also describes using the reports area of SIMS to improve efficiency:

> So, I had a report for my Saturday detentions it was really easy to just go click and straightforward. (T1: Lawrence)

Lawrence (T1) describes using this report to access information about Saturday detentions as 'really easy' because he has reduced the number of clicks required to access the information. He has used a report to streamline a process to obtain information from SIMS that could take many more clicks.

Beth (DM3) describes how marksheets can be created to automate a manual task that teachers used to have to do:

> And they enter the raw score when they enter the raw score, I've set it up so it calculates what that grade should be. So instead of them now having to look at the, they've got the raw score what grade it is SIMS will automatically do it for them. (DM3: Beth)

Furthermore, Lawrence (T1) describes how he sees other staff members using SIMS more efficiently than he is:

> Some use it probably more efficiently than me I know some will you know they'll have the home screen, and the behaviour comes up and they'll see it and they'll click on it sometimes they'll go and get the kid there and then and you can deal with things in that immediate sense which is pretty positive. So, I think there's different levels of use of it, different levels of how people feel about using it as well so its varied. It's very varied actually. (T1: Lawrence)

Lawrence (T1) has seen colleagues use SIMS more efficiently than he is able to because they have been able to configure their homepage to show the information that is most pertinent to them. This means that they are able to access and act on information almost as soon as it is entered into SIMS by another member of staff.

In addition, Lawrence (T1) describes ways in which they believe SIMS could be used to improve efficiency:

> I would also like to see the reports used much better. I think we could be clicking a button and sending a letter home without even going through the office. I can almost see it happening… I think I can't believe there's not a report set up for every single type of incident you can then just go click this was a disruptive behaviour up comes the email letter template you put in a bit of detail. Ping, sent, done. I can't believe that doesn't happen. It feels possible and I just think and then all those letters that we send to me should be attached to the file in SIMS and I don't think any of them are. (T1: Lawrence)

This example shows that Lawrence (T1) acknowledges that he does not fully understand the technical workings of SIMS but that he 'feels' that a more efficient process is possible with SIMS. He is able 'click a button' to produce information about Saturday detentions very easily and therefore believe that other reports could theoretically be set up to produce letters in similar way. Although Lawrence (T1) cannot set this up himself in SIMS because he does not have the knowledge to do so

he is still shocked that somebody else has not set it up and the school does not use SIMS in this way. Furthermore, he thinks that SIMS should be used as a database to store sent letters but admits that he does not know if SIMS is used in this way already.

Flexibility

Within SIMS there are often different ways of accessing the same data or performing the same task. Therefore, Lawrence (T1) described how SIMS is used differently between colleagues with the same role when they were completing the same task:

> It's funny because we all have our own ways of doing things. None of us do it the same way and I think you find your own I guess going back to the word efficiency you find your own efficient level, don't you? You find what suits the way you work best. (T1: Lawrence)

The flexibility of SIMS to perform the same task is presented positively. Lawrence (T1) explains that colleagues are able to use SIMS to suit their way of working therefore increasing efficiency. SIMS can be used creatively to suit the needs of different members of staff and there are often many ways of accessing or manipulating the same data.

However, more generally the inherent flexibility of SIMS is described negatively by participants. Participants want to know the 'best way' or the 'right way' to use SIMS and the option to do the same task different ways is a source of frustration.

> So, I know there are things I do on there that I think I'm probably doing the long-winded way and there are probably shortcuts. I also know there are multiple ways to do things and I don't know which one is the most effective because I don't know all the ways. And that's what's frustrating. (T1: Lawrence)
>
> I won't know if that's the quickest way, the most efficient way. I just know that is a way of doing that thing…If it's been a massive job and it's taking me loads of time then yes, I would like to know the best way to do it. (DM2: Stephanie)

These participants, constrained by time, express a clear need for efficient use of SIMS. Their frustration stems not merely from completing tasks, but from a lack of clarity on the most effective methods to accomplish these tasks. They want to know the 'quickest way' to complete the task in

the shortest amount of time or 'the most efficient way' to complete the task in the simplest or most elegant way. Despite understanding that SIMS offers multiple ways to access and manage data, their limited knowledge of these methods, coupled with uncertainty about whether they are aware of all possible options, hinders their ability to make informed decisions. This challenge reflects a broader issue identified in this study: the gap between the system's potential capabilities and the users' ability to fully exploit them due to inadequate training and support.

Although time is the most important factor for these participants, the 'right way' of using SIMS is constructed slightly differently by Adam (DM1):

> Adam (DM1): She normally tries to do a workaround which I try to resist and persist with her until we find the right way of doing it.
>
> Interviewer: When you speak about the 'right' way to do something what exactly do you mean?
>
> Adam (DM1): The way that SIMS is designed to do it.

Adam (DM1) believes that the 'right way' to use SIMS is the way it has been designed to be used and therefore all other ways of using SIMS are described by the participant as 'workarounds'. However, the intentions of the designers of SIMS cannot be known and every use with SIMS has been designed. Therefore, he views better ways of using SIMS as 'designed' whereas others are 'workarounds'.

In some areas, SIMS is described as inflexible and therefore unable to perform required tasks:

> Like recently we've had another group. Like somebody might say like this group of students we want to monitor them. You can't set that up as a group in SIMS to run in the CA template report whereas (other analysis software) you can just easily add in extra things that you want…So it's just being flexible, being able to you know amend to adjust to edit whatever you've got there. It's so difficult. (DM3: Beth)

Beth (DM3) is describing two different areas of SIMS she would like to be more flexible. In the first example, she compares SIMS to another piece of software that she considers to be more flexible because she can amend it and 'add in extra things' such as different groups of students whereas she

is unable to do this in SIMS. The second example shows that although SIMS may have the flexibility to create the reports needed, Beth finds it difficult to use them and therefore does not consider SIMS as a flexible product.

Navigation

In general, participants find navigating SIMS difficult. Within SIMS, drop-down menus are used to navigate from one area to another. Participants are frustrated with these drop-down menus:

> It's one of the any of the drop down. Routines let's, the routines that you can chose from. They're not in any logical order. Is it really beyond the realms of Capita to say that every selection will be alphabetical? It won't be…. All of the other different fields even though they may be elsewhere on their SIMS records are all out of order, all out of date and there is this sort of that's the Capita update. It's stuck at the end. It's like they've just gone right just stick it on the end there. (DM1: Adam)

> Do you know what I've been looking at that for sixteen years and wondering why. Why is exams right near the bottom? It makes absolute. It's like some buffoon somewhere who's never worked in a school designed that and thought that was OK. You can tell what order that it is. it is the order that they designed those modules, isn't it? (EO3: Natalie)

Adam (DM1) and Natalie (EO3) explain that the drop-down menus are frustrating to use because the order does not seem logical to them. Furthermore, the same drop-down menus in one area of SIMS may be different in another area and are therefore not consistent within the programme. Adam (DM1) believes that the designers of SIMS do not really care about the order and therefore 'just stick it on the end'. Natalie (EO3) believes that the designers of SIMS do not understand what it is like to work in a school and therefore do not know what would be logical to end users.

Ease of Learning

SIMS is described as 'overwhelmingly massive' and therefore difficult to learn. In addition, the integrated nature of different modules within SIMS makes it more difficult to learn:

> I find it quite hard to teach myself it because it's not intuitive where things are or how they're linked together. So, for me I'm quite a self-learner to just sit and go right where is course manager? Like even that bit just finding it is difficult and then once you're in it to go well how does this sit with exams? Where does it sit with? What do I affect if I change

something here? Where's it changing? That's quite hard to teach yourself. (DM2: Stephanie)

Stephanie (DM2) describes attempting to learn how 'Course Manager' works and how it is integrated with other areas of SIMS. She understands that each of the different areas of SIMS are connected but does not fully understand how and therefore finds it difficult to teach herself how to use SIMS.

In addition to SIMS as whole, participants described individual areas of SIMS as difficult to learn and therefore use other products. In the following extract Stephanie (DM2) is comparing SIMS to another separate software used for the management of school performance data:

I think it would take me a lot longer to get there because it's harder to learn how to use it as an analysis tool. Like (laughs) it's just lots to learn more than anything and quite difficult to learn. (DM2: Stephanie)

Stephanie (DM2) believes that SIMS is capable of performing a similar function to the other programme, but it is more difficult to learn and would take more time in SIMS and therefore another product is bought and used instead.

Adam (DM1) described how the seating plans in the examinations module were difficult to learn:

I think if you explored it for long enough, you would find a way of getting it to work. But it's not, it doesn't feel intuitive. (DM1: Adam)

Again, Adam (DM1) believes that SIMS exams is capable of working but that he must 'explore it' himself to find out how it works rather than using an alternative training method. However, due a lack of time to try and learn how the seating plans worked in SIMS Adam (DM1) does not use them and instead uses Excel spreadsheets.

Features and functions

On several occasions participants explicitly described features or functions they wanted to use that would make using SIMS easier or better not knowing that they already exist. In the following example the teacher participant at School Three is describing using marksheets:

> Lucy (T3): I think it is quite small and there doesn't seem to be a way to increase the size of it or zoom in.
>
> Interviewer: Do you use the zoom button?
>
> Lucy (T3): Well, err I don't think I know there is one then.

The lack of knowledge about a simple feature on a marksheet that can be used via one click indicates that Lucy (T3) has not received adequate training to support her use of marksheets.

4.3.4 DeLone and McLean Information System Success Model: Information quality

The 'information quality' element of the DeLone and Mclean Information System Success Model refers to the desirable characteristics of the output produced by an information system, encompassing aspects such as accuracy, relevance, completeness, and timeliness of the information provided.
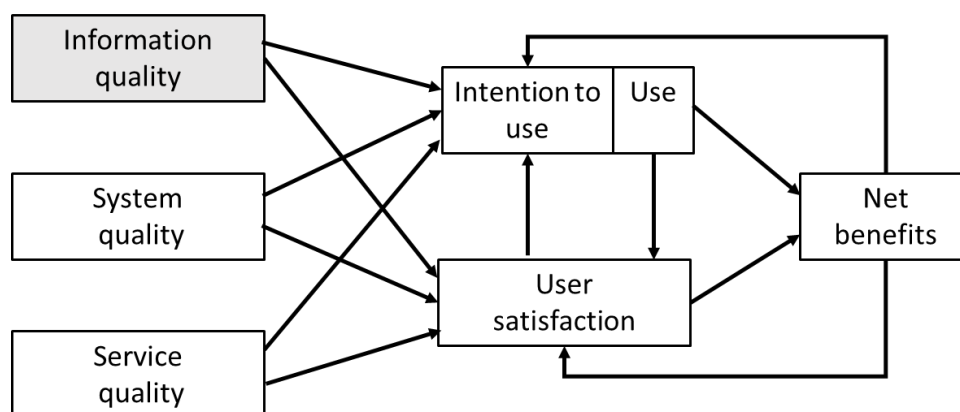
Figure 4.10: Information quality element of the DeLone and McLean Information System Success Model (2003)

The importance of the quality of information and data stored within SIMS was highlighted by participants. SIMS can store a vast number of different types of data in different areas. Several of

these are discussed in relation to the quality of the information. Certain elements of information quality depend on how SIMS is used whereas other elements are inherent in the design of SIMS and cannot be changed.

Accuracy

Participants highlighted that the data stored within SIMS needs to be accurate:

> Storing and collecting data and as long as the data is accurate. (DM3: Beth)

> And then I gave it to them and said look this is entirely dependent on what you've put in SIMS. (DM2: Stephanie)

These data managers highlight that the quality of the information stored within SIMS is dependent on the data that is entered into SIMS. However, Stephanie (DM2) explains how she cannot trust SIMS to perform accurate analysis:

> Is just so huge to give your Head here's our here's our provisional P8 and it isn't just awful isn't it or and if you only had it in SIMS and you've only got that and you're like what have I done. (DM2: Stephanie)

Stephanie (DM2) feels great pressure to ensure the provisional P8 figure is correct before she gives that information to the Headteacher. Therefore, she prefers to use multiple software to help ensure the analysis is accurate because of the importance of the figure. Stephanie's (DM2) concern underscores a broader issue of trust in the data and analytical capabilities of SIMS. For data managers and school leaders to rely on SIMS, they must have confidence in the system's ability to produce accurate and reliable results. Without this trust, users may feel compelled to cross-verify data with other software, which can undermine the perceived usefulness of SIMS.

Although many participants acknowledged that when entering data into a system sometimes there will be mistakes or 'human error' and therefore each school has a system of 'checking' the data for inaccuracies, one participant described purposefully entering inaccurate data:

> I put her as a three, but I know if she was to sit the full actual GCSE of course she's not even gonna get close to a three but what do I do? What do you say zero because she's she wouldn't be able to sit the GCSE right now. That's where I get conflicted with data. (T3: Lucy)

In this example, the Lucy's decision to assign a grade of 3 to a student who would not realistically achieve it exposes a larger concern regarding data accuracy and integrity and the potential implications of how this data is used in the school.

> We're not allowed to have reds… I find sometimes there the whole data thing is just it's just all inflated. It's almost for that quiet life. It's not an accurate projection. (T3: Lucy)

Lucy (T3) describes purposively inflating a student's grade to appease senior management. When she enters data onto a marksheet a predetermined hidden formula determines the colour the cell will turn. In this instance red is used to show that the student is not making enough progress based on the formula entered into SIMS. Although technically SIMS will allow a teacher to enter a value that will mean the cell turns red, she does not feel that she is allowed to because of the potential repercussions on her:

> You have lots of reds you're scrutinised as a teacher that you're not doing the job that you're supposed to be doing. (T3: Lucy)

Lucy (T3) feels that the grade is used primarily as a reflection on how well they are performing as a teacher rather than a reflection of the true progress the student.

At another of the schools, a participant described a similar situation where teachers were asked to enter a predicted grade at an early stage of the course:

> I don't think everybody was comfortable with it and actually what's the point in putting one that's not really what you think they're gonna be getting. It's better not to say anything even and I don't think a parent would necessarily be looking for that at that point. So, from that perspective we've looked at what we're asking for it's not going to produce anything of use so don't collect it and that's what happened. (DM2: Stephanie)

Stephanie (DM2) describes teachers being uncomfortable entering grades that were not accurate and highlights that the grades are only useful if they are accurate. The purpose of the grades for informing parents is highlighted and it is clear that is a consideration by staff when deciding what

data are collected. Following a discussion between teachers and SLT at this school, the data collected was changed to only include data that the teachers felt they could report on.

Some of the information that can be included on the marksheet is updated automatically from another area of SIMS. For example, student information such as attendance, pupil premium and special educational need. The automatic nature of these updates means that the information within SIMS remains accurate. However, at each of the schools, participants described exporting data from these marksheets into Excel. At School One a teacher participant described exporting a marksheet containing student characteristics at the beginning of each term and then accessing the marksheet in Excel rather than in SIMS. Therefore, when something automatically updates in SIMS they do not know because they are accessing an older exported version with inaccurate data. Lawrence (T1) provides the following explanation as to why he does this:

> Because SIMS is awkward its clunky to get to my, even to get to my register to get those tabs up I'm one two three four five clicks. Again, it's not I dunno whereas actually I can save an excel spreadsheet and pin it on my desktop one click and I'm straight there. (T1: Lawrence)

However, there is functionality within SIMS to enable the participant to access this marksheets in one click rather than the many clicks described but a lack of knowledge of the functionality of SIMS prevents him from using this:

> Interviewer: So, if this marksheet was on your homepage as a favourite?
>
> Lawrence (T1): Yeah, I could do that couldn't I? I don't know how to do that.

Lawrence (T1) knows that the homepage exists on SIMS because they have spoken about trying to use it. However, he does not know how to configure it to show his 'favourite' marksheets.

4.3.3 DeLone and McLean Information System Success Model: service quality

Service quality is a measure used to describe the support for end users provided by the SIMS system provider, Capita. This measure includes the quality of support, training and software. High service

quality is essential as it directly influences users' ability to use the system, thereby impacting their overall satisfaction.
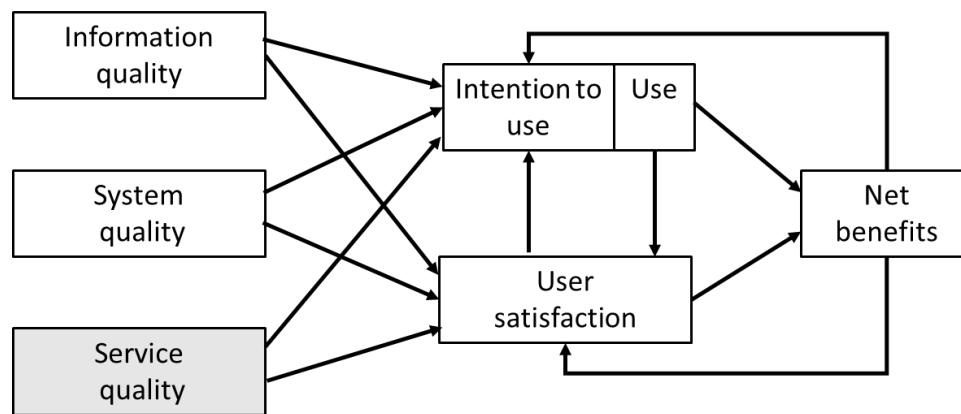
Figure 4.11: Service quality element of the DeLone and McLean Information System Success Model (2003)

Quality of support

There was an overwhelming sense that in general the quality of the support or training provided by Capita and other third-party providers was low. The data managers and Natalie (EO3) described contacting Capita or third-party providers for ad hoc support with SIMS typically over the phone or via email when there was a problem with SIMS. However, all of these participants described how they rarely use this type of support from Capita. The main reason that this type of support is not accessed is because the perceived quality of the support is low based on previous experience:

> Capita to me are not always helpful…I've spoken to Capita, and they haven't been able to help me (DM3: Beth)

> As to Capita, the provider. I rarely approach them. When we have approached them it's very rarely been fruitful. (DM1: Adam)

> So, you know how when you have a problem you ring Capita, and you get through to line one and its usually some lovely young kid who has no clue what you're talking about. (EO3: Natalie)

The lack of effective support has led to a significant erosion of trust in Capita's ability to resolve issues, further discouraging users from seeking help. This mistrust not only affects immediate

problem-solving but also contributes to a broader reluctance to engage with the system's more advanced features, ultimately limiting the utility of SIMS for school practices.

Responsiveness

Participants describe frustration towards the support offered by Capita due to the speed at which queries are answered. The process of 'raising a ticket' and progressing through the lines of support is described by participants as lengthy, meaning they cannot solve their problem when they need to:

> They don't always come back when you really need their help because if something is urgent sometimes it will take three days before they come back and that is why that's for me, I don't really like SIMS that much it's because of that delay. (DM3: Beth)

Beth (DM3) explains that the delay in support from Capita influences how much she likes SIMS as a product. The lack of support means she is unable to use SIMS to perform urgent tasks. Beth (DM3) compares this experience with using another support line where the problem is sorted immediately on the same phone call showing the difference between the two providers.

Third-party support

At School One some of the participants use the support line from their third-party support. However, the participants view the quality of the support differently:

> There have been three or four occasions I had a conversation with (third-party provider) who are supposed to be our support and they don't know (AO1: Alex)

> First port of call if I had an issue would be to bounce it off (third-party provider) …they are going to know more than me. One of them I would particularly use is the one I would pick up the phone to is quite effective. She normally tries to do a workaround which I try to resist and persist with her until we find the right way of doing it (DM1: Adam)

The first extract shows that the Alex (AO1) believes that the provider should be able to answer his query because that is part of their role as a provider of support. Adam (DM1), who as the data manager, has more knowledge of SIMS, views the role of the provider slightly differently and instead uses them to 'bounce' ideas off and therefore work collaboratively until they both find a solution

together even though Alex believes 'they are going to know more than me'. Therefore, because a solution is found to the problem, he views the support as effective.

Quality of external training

The participants highlighted several factors that influenced whether they were able to attend external training and the quality of the training they had received.

The participants discussed additional issues around attending formal external training provided by Capita or a third-party provider.

> As our provider have made their courses widely available but as 'Adam' (DM1) has already alluded to it is having the time to do those courses and attend those courses…. Frustratingly there were two courses I was supposed to attend from (third-party provider) last year that were cancelled and that's frustrating as well. (AO1: Alex)

Time is identified as a limiting factor preventing participants from attending courses. Furthermore, cancellations from the training provider resulted in the participant being frustrated with it.

Some of the participants had attended formal external training and described some of their experiences:

> If I'm honest having used SIMS for 15 years now I often know as much as them, if not more…You know you're sitting in a room with the provider and you know more than the trainer and you're sharing with your colleagues which is really useful but you're hang on a minute I'm here for training not to train and that has happened…Makes you a little cynical about training you know. I said to you much of it I know more than they do, and I really didn't mean that arrogantly. (DM1: Adam)

Although the extract shows that Adam (DM1) believes that sharing with colleagues at these sessions is really useful, the overall experience for him is not one of collaboration. Instead, he shows that the knowledge of the trainers is inadequate and therefore as an experienced SIMS user he has had to become the trainer at a paid training session. These experiences have made him 'cynical' about attending training and therefore they will now rarely attend training:

> I don't give it enough chances to find out because we can't afford to. I can't afford to go for four days a year in case one of them's good (laughs) (DM1: Adam)

Because the quality of the training he has experienced is low, Adam (DM1) feels that he cannot afford, in terms of time or money, to attend further training if the quality continues to be low. However, he implies that if the training were 'good' then it would be worth the cost.

Cost

Other participants identified cost as both a barrier to attending training as training was often 'expensive' and a deciding factor when choosing which support or type of training to purchase.

> Is it better for me to walk into the room with twenty teachers in front of me and use an hour or is it actually better for us to pay three hundred pound and get Capita in to do it properly but that might take two hours? (DM1: Adam)

Adam (DM1) shows that he is unsure which scenario would be better; himself as the data manager in the school providing free training, in terms of monetary cost, that takes less time or paying Capita to provide training that would take longer. Interestingly, he believes Capita would be able provide adequate training and 'do it properly' compared with the training he could offer. However, this statement contradicts Adam's earlier example described above of attending third-party training and having to become the trainer. Although Adam (DM1) describes himself as an experienced user of SIMS, but he is not confident in his own abilities to train his colleagues.

Appropriate

Lawrence (T1) on the other hand was wary about attending training in case he was unable to follow the training:

> I wouldn't want to do is go to a SIMS training and find out it's way up here above where I am I haven't got a clue what's happening. (T1: Lawrence)

Lawrence (T1) is concerned that his existing knowledge in SIMS is inadequate and therefore does not want to attend training and not be able to understand it. Natalie (EO3) described a training session

they attended provided by an examination board. Although this training did not specifically relate to SIMS, she explained that she thought that the training was 'gonna be the basics'. However, when she attended the session, she did not understand the terminology being used and therefore could not follow the training. Therefore, Natalie (EO3) thought it would be better for there to be varying sessions for different levels of knowledge of abilities.

Other participants are concerned about the value of attending training led by somebody who does not know the school and how they use SIMS providing the training:

> They'd have to come and work here for a week to work out what we do and how we do it in order to tailor make the training so that it's appropriate. (DM1: Adam)

The extract shows that each school uses SIMS differently and the only way to understand how a school uses SIMS is to spend a significant amount of time working there. Therefore Adam (DM1) believes that they need training that is appropriate for their school. However, he acknowledges that he does not think this is possible:

> The trouble with Capita and (third-party provider) is they can't, let's get real, they can't tailor make every day of training for the school. (DM1: Adam)

Therefore, as a compromise Adam (DM1) believes that the best trainers are the ones who work in a school and therefore understand how a school uses SIMS:

> Some people and I think this is really powerful work for Capita two days a week, teach in School two days a week and I think they're the best trainers. I remember a girl who worked for Capita who did only work for Capita two days a week and she was on the coal face for the other three, therefore. She knew what the requirements were because they were real rather than theoretical. (DM1: Adam)

Adam (DM1) believes that the best trainers understand the 'real' requirements of SIMS in schools rather than just the 'theoretical' knowledge of how SIMS works. Beth (DM3) and Natalie (EO3) agree that they prefer training that is highly specialised for them and their school. Therefore, they arranged for a trainer from SIMS to come to their school to provide individualised training for them.

Although they found this training extremely useful, they understood that this could not happen regularly due to the high cost.

Other external support and training

In addition to accessing support and training from Capita and third-party providers, some of the participants described accessing other types of external support and training. Adam (DM1) and Stephanie (DM2) explained that they are members of groups for data managers on Facebook.

> So, you go into the group search the thing, somebody has asked the question before 'How do I do this?' and somebody's answered it so within seconds I've found my answer…And it usually works because it's real people asking. Now there is a knowledge base on EIS that I can go online and type in my question. I just find the language I'm using isn't correct to bring up the article I need. (DM2: Stephanie)

They prefer this to other training or online support because they are able to find responses quickly from other real users of SIMS.

Knowledge about what training to ask for

Another barrier to training identified by participants was knowing what kind of training they needed:

> It's like walking into a dark room and saying I want something but I've no idea what's here. (T1: Lawrence)

This analogy illustrates how teachers may lack awareness of SIMS capabilities and are unsure about what training to seek or what options are available. This lack of awareness is reflected in the questionnaire responses, where participants expressed a desire for more holistic training to better understand the full range of SIMS features and how they could use them. This uncertainty is compounded because many participants are unaware of the available training options, making it difficult for them to identify and request the most appropriate training. Addressing these gaps in knowledge through more comprehensive and accessible training options could enhance the use of SIMS across schools.

Data manager role

The data managers at each school broadly described performing similar tasks such as managing

SIMS, creating and managing marksheets and student reports in SIMS and providing support for

other members of staff. The following extracts from the data manager at each school shows slight

differences in how they view their role as data manager:

> Well, a data manager I believe should be responsible for data in the database as and
> updating it and analysing it and finding different ways of presenting data to staff, to
> leadership, to governors in this simple format that they can easily understand. (DM3: Beth)

The focus of the role for Beth (DM3) is the data stored within SIMS. She views her role as being

responsible for updating, analysing and formatting data so that it can be understood by other

members of staff, leadership and governors.

Similarly, Stephanie (DM2) describes producing reports for the SLT and governors using data:

> Support the rest of the school, I think. All of them mainly I thin- I find mainly it's SLT. So,
> producing reports, producing data for governors or anything that helps them. I don't, what
> do I mean? (laughs) Anything that helps them guide the philosophy of the school the
> learning within the school I just making people's lives easier really. (DM2: Stephanie)

Although there are similarities with Beth (DM3), the focus of the role for Stephanie (DM2) is support.

The data she uses to produce reports has a purpose (to help and guide SLT in leading the school) and

therefore her role is to help produce 'anything that helps them'. Stephanie (DM2) wants to support

staff and therefore make colleagues jobs easier.

Adam (DM1) describes his role similarly to the other data managers, but he describes additional

aspects of his role:

> Officially it involves being responsible for the assessment system in the school and I'm
> responsible in a non-teaching sense obviously. It and it involves having overview of
> everything that involves in SIMS and it involves doing gear for the reporting. Officially
> not the Census but I end up doing it anyway. It also, on a more holistic scale, it involves
> recommending changes to the SLT whether formally or informally and making
> myself available to the teaching staff well all staff to support in SIMS. (DM1: Adam)

Adam (DM1) leads the school's use of assessment within SIMS. Furthermore, he describes his role as 'having overview of everything' in SIMS rather than physically updating data or producing reports. Due to his expertise regarding data and SIMS he therefore recommends changes to the SLT.

All of the data managers acknowledge that the role of the data manager is not clear:

> My post didn't exist four years ago five years ago. It was someone did that. Someone did that. Someone did that. We created me and my role isn't particularly clear. We all know what it is, but it isn't particularly clear and that doesn't create a problem. (DM1: Adam)

Adam (DM1) explains that his role is a new role that was formed by combining tasks that many other people used to do. Although it does not have defined boundaries that does not matter because the role is tacitly understand by Adam (DM1) and by colleagues within the school.

Although the lack of clarity 'doesn't create a problem' for Adam (DM1) it does for Stephanie (DM2):

> I worry a lot that I'm not doing things the right way and I'm mean that both efficiency wise, the right way in terms of if I went to another school would my knowledge be what they were looking for but also perhaps that I'm not doing what (school's name) want me to do. (DM2: Stephanie)

Stephanie (DM2) is new to the role and therefore worries because she does not know if what she is doing is 'right'. She uses 'right' to mean doing a task the quickest way but more importantly she is not sure if they 'doing things the right way' more holistically as a data manager. Although she is a data manager she does not know if what she is doing or the things she knows would be suitable to be employed as a data manager at another school. Furthermore, she is worried that she is not fulfilling their role as data manager at her current school.

Beth (DM3) has been a data manager at other schools:

> And I thought I knew a lot about SIMS until I came to this school. (DM3: Beth)

During her role as data manager at her current school, she has had to learn a lot more about SIMS in order to fulfil her role as data manager therefore highlighting both the vastness of SIMS and the

differences in roles between the two schools. Beth (DM3) describes how even within the same

school the role is viewed differently by colleagues:

> Teachers, I think for them I think most of them would see that role as somebody getting all the data together. If possible, putting the data in for them as well. Yeah, but they because they come to use for little things some very little, some very big. So, I think for each person again it differs what they see our role as. (DM3: Beth)

Teacher workload

Within each school participants described teachers' workload as high, and teachers were 'busy'.

Therefore, the data managers believed it was part of their role to help ease teacher workload:

> So, teachers easing their workload is a big priority within the school at the moment. But also, the admin staff so anything we can do to help them. (DM2: Stephanie)

Stephanie (DM2) views that an aspect of her role is to provide support to both teachers and

administrative staff in order to help reduce workload. Beth (DM3) described an attempt to ease

teacher workload that resulted in a huge increase to their workload:

> We had to print every single marksheet out. That took a lot of time. I said to them, 'But I don't understand why we are printing it out?'. We're saying no paper. It's on their iPad. If you're going for information, surely, they could just open it up?'. No, we had to print it out. So that took like literally the whole day and what the Head now wants me to do she wants that now to be done at the beginning of each term. So, during that summer holiday before they come back on the Monday, she wants to print out every single marksheet for every teacher. Even though I said to her the first week is used to change students. We're changing students all the time. That's what she wants me to do. (DM3: Beth)

Beth (DM3) was asked to print out a marksheet for each class to be given to teachers for a meeting

so that they had a physical copy of the students in their class even though each teacher has an iPad

and therefore has the permissions to access this information themselves in real time ensuring the

information available is the most up to date. Teachers are expected to take registers using SIMS and

accessing these marksheets is one click from a register. Furthermore, teachers are used to using

these marksheets to complete reports and therefore have the knowledge and experience of how to

access them. However, Beth (DM3) is still expected to spend a day each term printing these

marksheets for teachers. Although Beth (DM3) understands the reason why teachers are not asked

to print the marksheets themselves ('because they don't have any time'), this does not explain why they cannot use their iPads in the meetings and access the information electronically. This solution to reducing teacher workload by having Beth (DM3) print marksheets for them indicates a possible lack of understanding about how easily teachers can access this information.

4.4 Context and Data culture in schools

Although the DeLone and McLean Information System Success Model (2003) can help explain how SIMS is being used in secondary schools, another factor was identified that appears to influence the use of SIMS in the three-case study schools, the data culture. The themes related to data culture included: data democracy versus data dictatorship, data analysis, data overload, the role of the data manager and the role of the SLT.

The flow of data through the SIMS and the positioning of data managers and teachers by SIMS provides an insight into the data culture at each school. I have used the data culture continuum framework described by Kelly et al. (2010) to represent how the use of SIMS and data management practices with each case study school promotes or hinders the development of a positive data culture. Table 4.9 shows the data use practices at each school in relation to the data culture continuum proposed by Kelly et al. (2010).

Data dictatorship			Data democracy
Led by 'data gatekeepers'	SLT members who 'don't do data' (School One) Data manager controls access to marksheets (School One, School Two, School Three)		Led by 'data advocates'
Deficit view of colleagues	Natalie (EO3) believes teachers are bright stupid people Data manager believed teachers are 'quite backward' (School One) Teachers given printed copies of marksheets (School Three) – reducing workload Data manager believed teachers would be 'bored' with access to more marksheets (School One) Teachers judged by 'red' (School Three)		Developmental view of colleagues
Data manager: views self as 'data expert'	Data manager is 'guru' (School One) Concerns about job security (School Two) Data managers job to use SIMS, teachers not expected to be experts (School Two)	Data manager showing Assistant Head how to access pupil premium information (School Two) Data manager believed teachers access and understand data (School Three)	Data manager: views self as 'data facilitator'
Need to control	Control through restricted access to marksheets (School One and School Three)		Need to support
Teachers get what they are given	Restricted access to marksheets (School One and School Three) Restricted access to data in marksheets (School One and School Three) Data manager believed teachers only want to look at their own data (School Three) Limited access to teachers to prevent increases in workload (School Two, School Three)	Access to SIMS in classroom (School One) Access to SIMS from home (School One) (but teachers do not know how) Access to data through SIMS reports (School Three) (but teachers do not know how)	Teachers given appropriate access

Pre-digested data-bytes	Data manager provides reports for SLT and teachers (School Three) Data manager exports data to Excel (School Two and School Three)		Undigested data sets
Prevented from exploring further	SLT trying to not overcomplicate (School One) Teachers viewed as data inputters (School Three) Believes teachers are 'afraid of data' (School Three) Lack of knowledge prevents further exploration (School One, School Two and School Three) Teachers must approach data manager first to create a tracker (School Three) Inadequate training (School Three)	Teachers encouraged to ask questions and 'play' in training session (School One)	Encouraged to explore further
Colleagues de-skilled	Support is removed to expose weakness (School One)	Data manager wants to provide training (School One)	Colleagues upskilled
Stilted self-evaluation	Not allowed to have reds (School Three)	Data used as part of evaluation (School Two)	Wide-ranging self-evaluation

Table 4.10: The practices at each school that either support a data democracy or data dictatorship.

The contrasting approaches to data use in the three case study schools reflect a spectrum of practices ranging from data democracy to data dictatorship. In schools where data culture leans towards data dictatorship, access to and control of data is tightly regulated by data managers, often resulting in limited engagement and trust among teaching staff. Conversely, schools that promote data democracy encourage broader access and use of data, fostering a more collaborative and transparent environment. The position of data managers as either gatekeepers or facilitators significantly impacts how data is perceived and utilised within the school, ultimately influencing the overall effectiveness of data-driven decision-making.

At each of the schools, the data managers discuss analysing whole school data to produce information or reports for SLT. However, Stephanie (DM2) describes how the SLT wanted to use data to support a change they wanted to implement:

> I think sometimes they might have an idea in mind a change to our curriculum perhaps but to sort of present it to governor's or to get it implemented they would need to prove something student specific like they are 50% of our predictions are actually being attained and sometimes. I think I wonder if they think I can make it show that.
>
> Whereas I think I should present the truth. (laughs) So sometimes we have that kind of I can't really show you that. And one of the things that comes up quite a lot as when we have the results and obviously, they want to put out a positive press release. So, you're looking for positives within data and it can be what sometimes I feel they already have in mind what they want to say and you're trying to make it fit it so I'm like 'No don't try and say that. This is what you're good at say that'. Like for me it's the data provided. It's been correctly submitted collected, or you know the exam results are pretty hard to argue with. It's the truth. I don't think you can, I'm not a spin doctor. I'm a data manager. (DM2: Stephanie)

Stephanie (DM2) explains that the SLT want her as the data manager to find student specific data to support their idea to ensure it is implemented. She is conflicted because she thinks that data should be used to 'present the truth' and therefore the data should be used as the beginning of the process to help inform the change rather than at the end of the process and be made to fit the idea. Stephanie (DM2) is unsure if the SLT understands what data can and cannot be used to show or prove. In addition, she is asked to interpret the results in a particular way and find statistics to support a positive press release on results day. Stephanie (DM2) is uncomfortable with this process

because it deviates too far from the 'truth' the examination results present and therefore they become a 'spin doctor' rather than a 'data manager'. She understands that the press release needs to present the school positively, but they would rather analyse the data first to find positive statements that can be used in the press release than use the data inappropriately to support predetermined positive statements.

Although the data managers believe that whole school data analysis is important there is an acknowledgement that some teachers may not view data in the same way:

> But having an understanding of the data what we use it for and where to get it from ultimately will help them and inform their learning, their teaching. But you sort of have to tread very carefully because you sort of don't wanna put more on them. So, it's sort of a bit of a balancing act really. (DM2: Stephanie)

> It's irrelevant to them and because they've got so much to do. They always complaining about too many data to enter. They've got marking to do and they've to grade as well. So, there's always something so I think some of them data analysis is not a priority. They just wanna teach. So, I don't know for some teachers the analysis will probably help them with their teaching, whereas some don't see how the two fit in with each other, just teach. (DM3: Beth)

In the first extract although Stephanie (DM2) thinks that data can be used by teachers to inform teaching and learning it is viewed as separate or additional to the core process of teaching rather than integral to the role of a teacher. She feels that they have to help manage the workload of teachers by providing teachers with the data, so they do not have to spend time finding or analysing the data. The second extract shows that Beth (DM3) believes that for some teachers the analysis will help with their teaching but for other teachers the data analysis is viewed as an extra task separate to teaching that teachers do not have time for.

However, Beth (DM3) thinks that it is crucial that teachers use data:

> Yeah, because I strongly believe that you need to know your students. You need to know their ability. You need to know the progress. It's really important…So I know that it is important you know for you to always be checking your data and also if your student is not doing well in your subject you need to know if they're doing well in other subjects as well because it could be your subject or the way you're teaching, or it could be there's a problem

with the student. Anyway, but you're not knowing and you're just teaching and you. I'm not a teacher, anyway, so. (DM3: Beth)

Beth (DM3) believes that 'knowing' students is a key aspect of teaching and teachers can only really 'know' their students by understanding and 'always checking' their data. Furthermore, teachers need to know how students are progressing in other subjects to help inform their own teaching and support their students. By not analysing or using data, teachers are less knowledgeable about their students and therefore 'just' teach. However, Beth (DM3) qualifies this theoretical view of how teachers should be using data by saying 'I'm not a teacher'.

Stephanie (DM2) has a completely different view of 'knowing' students:

> I think sometimes, because data isn't representative what's actually happening in the school… I don't think necessarily if you look at your exam results on paper that is indicative of that cohort. Only the teachers know that cohort…We're talking about kids, humans' real life it's not a set of numbers so I think sometimes I only have access to the numbers. They don't always show the whole picture. (DM2: Stephanie)

There is an acknowledgement that data are not a representation of students or a year group of students and therefore the reality within in school. Students are too complex to be completely reduced to numbers and only teachers really 'know' the students. The data manager only has access to the numbers used to represent the students and therefore does not understand the 'whole picture'. This disparity in perspectives highlights a significant theme related to the role of data in schools. While some data managers see data as an essential tool for understanding and supporting students, other view it as an incomplete representation that must be contextualised by teachers' qualitative insights. This tension reflects broader issue with the data culture of schools, emphasising the need to balance quantitative data with qualitative insights to effectively support both student learning and teacher practice.

4.5 Training

At School One following the interviews a training session was developed by the data manager and me. The interviews highlighted that a training session, showing the capabilities of marksheets, and therefore help develop basic data analysis skills, would be beneficial to teaching staff.

The training session covered the use of marksheets and associated tools such as zoom, filter, summary and adding additional columns. The findings from the interviews showed that participants wanted practical, hands-on training relevant to their immediate needs. Therefore, the training was delivered by the data manager using PowerPoint in a computer room. All teachers at the school were invited to attend the training. Of a possible 68 teachers at School One, nine teachers chose to attend the training. During the training I observed all nine participants and from my location I was able to see the computer screen of four participants so I could view exactly how they were using SIMS and hear any conversations or interactions they were having with other participants. Immediately after the training session I conducted an interview with the data manager. In addition, I conducted an interview via email with one of the participants after the training session.

4.5.1 Overall effectiveness of the training session

Overall, I perceived the training session as a success. The training session was voluntary and held after school. Therefore, both the data manager and I expected that participants were likely to be engaged with the training as they had chosen to attend the session. Throughout the session participants asked pertinent questions about the use of marksheets. These included technical questions such as 'should I right click or double click?' and questions about the use of different types of student data such as the difference between predicted grades and target grades. These questions indicate that, as anticipated, most participants were engaged with the technical aspect and the content of training, enabling them to use the marksheets in SIMS to analyse data. In addition, the data manager thought that most participants were engaged 'because most of them were

occasionally asking for help or direction'. Some of the exclamations from participants showed that they were interested in the marksheet tools. One participant said 'ooh' every time they were able to use a new button. Some other behaviour showed that participants found the training useful. One participant had a conversation with their neighbour and said, 'it's useful' and this prompted a conversation about individual students where they accessed student information in real time during the conversation. Towards the end of the training session one participant said to their neighbour 'we are gonna be SIMS gurus'. This comment indicates that the training was successful, and the participant feels so confident in their new skills that they may be able to become a 'guru' in SIMS and transfer the knowledge to colleagues. It also aligns with responses from the post-training questionnaire, shown in Table 4.11, where participants expressed high satisfaction with the training session, noting its relevance and the practical benefits of using their own class data during the training. While most participants appeared engaged, one participant was not fully engaged during the session and was not following the instructions and completing the tasks on their own marksheets. Instead, they spent most of the training session reading a GCSE specification online and reading emails. Although I was not in a position to ask the participant why, there could be various reasons why they chose to engage with other tasks rather than participating fully in the training session, even though attendance at the training session was optional. It is possible that they perceived the training as less relevant to their immediate priorities or they could have felt overwhelmed or disinterested in the training content and therefore sought alternative tasks. Alternatively, the participant may have had other responsibilities that required their attention during the session.

At the end of the training session, all participants were invited to complete the questionnaire feedback form. However, only eight of the nine participants completed the feedback form. Table 4.11 shows the results.

	Very Satisfied	Satisfied	Quite Satisfied	Not Satisfied
The presentation methods were easily understood	7		1	
The pace was appropriate	6	1		1
The content was relevant to your needs	6	1	1	
The delivery was engaging and interactive	7			1
The session had useful and engaging resources	7			1
The objectives of the session were fully met	7			1
You were given a clear idea of how to implement what you have learned	7			1
You are satisfied that you are able to implement the learning from the session	6	1		1
That the session will help improve your teaching	7			1

Table 4.11: Participants responses to the feedback form after the training session.

The results indicate the overall the participants were very satisfied with the training session. Seven out of the eight participants who completed the feedback form answered (very) satisfied to all questions. The other participant answered 'not satisfied' to most questions. This is the same participant who did not appear engaged with the training and was completing other tasks. The participant explained their answers by writing 'it would be really useful to have a session like this but for managing behaviour' and when asked if there were any further CPD they would identify arising from this training they answered 'this for behaviour' indicating that they had found the content of training useful but wanted to analyse a different type of data.

The feedback form included open questions. The first question asked participants the most useful aspects of the session. Most of the responses identified a tool such as 'filtering' or 'summary' but some participants provided a more general response such as 'being able to use SIMS for exams analysis and for analysis for intervention' showing they had understood how to apply the tools to conduct their own analysis. One response reflected on the style of training, rather than the content 'practical working through especially with own classes'. This participant found being able to use their own marksheets and therefore analyse data for students they teach useful.

During the observation I heard one participant exclaim 'I will be practising that now! If I keep doing it, I will remember how to do it' just before they left the training. The participant has found the content of the training useful and therefore wants to remember the skills they have learnt. However, they think that if they do not keep practising then they will not remember how to use these tools. This comment echoes comments from other participants during the interviews when they stated that SIMS is 'not intuitive'.

Many of the participants stayed in the room after the session had formally ended practising the skills they had learned during the session. Two pairs of participants were discussing marksheets and individual students within each class. One participant was shocked at the difference in results between students with special educational needs and disabilities and pupil premium students and this prompted a discussion about the results with another participant. Another pair of the participants had a more in-depth conversation with the data manager about the complexities and interactions between target grades, predictions, and the use of colour on the marksheets. These conversations showed that participants were engaged with the training and marksheets in SIMS and were beginning to apply the tools they had learned to support teaching and learning.

The data manager reflected on the training:

> You and I know SIMS is imperfect. But they saw SIMS as a powerful tool to support their analysis and in due course their teaching and learning which is what we're trying to achieve. (DM1: Adam)

Adam (DM1) believes that people with more extensive knowledge of SIMS understand that it is flawed. I agree with Adam (DM1) that all management information systems have limitations and agree that SIMS is 'imperfect'. However, he knows that he is able to shape the view of SIMS within the school through internal training and was able to present SIMS more favourably as a 'powerful tool'. He believes that the training was successful in showing colleagues the tools within SIMS marksheets to support their analysis. However, he does not believe that trainees have made the link between data analysis and its potential impact on teaching and learning.

Some of the responses to the feedback form support Adam's (DM1) belief that the impact on teaching and learning is yet to be realised. The second question was 'will you do anything differently in your teaching as a result of today?'. Two participants left the question blank. Two participants answered 'no' and another participant answered, 'not in my teaching but in my role as HOD'. All of these participants answered, 'very satisfied' to the statement 'that the session will help improve your teaching'. These responses appear to be incompatible because teaching cannot be improved if you do not do anything differently. However, there is no other information provided by the participants as to why they provided these answers.

However, two participants answered that they would do something differently. Although one participant answered generally and stated that they would 'use SIMS much more often to analyse data' and did not explain how they would change their teaching. One participant provided a much more detailed response:

> Yes. I know five students per class who will make my biggest V8 difference so I shall adapt lessons and interventions accordingly. (T1: Kim)

This response shows that Kim (T1) has used the tools presented in the training session to immediately analyse her classes to identify individual students and will therefore adapt lessons and interventions to meet the needs of these students. In Kim's (T1) response, the focus on students who will make the biggest V8 difference reflects a common consequence of accountability pressures. By targeting interventions at students who are on the cusp of achieving a higher performance band, teachers can improve the school's overall performance metrics. However, this approach can marginalise students who are either comfortably achieving or struggling significantly, as they do not directly contribute to the school's performance targets in the same immediate way. This selective focus exemplifies how data, while valuable for identifying areas for improvement can also lead to 'gaming' behaviours that prioritise short-term gains over long-term educational equity and comprehensive student development.

An unintended benefit of the training was that participants were shown how to add additional student columns directly onto the marksheet therefore the participants were able to access examination numbers:

Teacher at School One: is the exam number the same?

Adam (DM1): Yes

Teacher at School One: so, we don't need to ask you.

This interaction shows that previously participants were asking the data manager each time they needed student examination numbers when they could have accessed the information themselves using the marksheets. This is a quicker way of accessing the information and helps to reduce the data manager's workload. Adam (DM1) reflected on this as well:

There's benefit to me as well. Because I am the 'guru' and I'm always getting asked questions which were all answered this afternoon. (DM1: Adam)

Adam (DM1) views the process of teachers accessing information themselves positively as it will save time as questions are answered in a group rather than individually. He understands that he is currently perceived as a 'guru' or the data expert and therefore having to provide teachers with data. However, the training session has helped to transform his role into a 'data facilitator' by providing teachers with the tools to access information themselves.

4.5.2 Future training

One participant answered the question 'is there further CPD that you would identify for yourself arising from this training?' by stating 'further uses of SIMS as a classroom teacher. Intervention in SIMS'. The first part of the response shows that the participant wants more SIMS training focused on the needs of classroom teachers, but their vague response indicates that they are unsure what training is available or how SIMS can be used by a classroom teacher because they do not ask for specific training. The second part of the response shows that the participant wants to use more of the tools in SIMS marksheets and highlights 'intervention in SIMS'. This was one area that was

discussed during the session. The school do not use this function and therefore this area is not completed on the marksheet.

The training session prompted a conversation between the data manager and a member of SLT who had attended the training. The member of SLT said that using marksheets in the way shown during the training session was more useful for class teachers than the analysis package the school uses. The data manager agreed and so they discussed arranging more training and ways in which teachers could have more access to marksheets. At the end of the training session another participant commented that 'we don't need to buy (another product) now'. The training session had shown this participant that they were able to use the tools in SIMS to begin to analyse data rather than have to buy another piece of software to support them with this task.

Adam (DM1) reflected on these comments:

> I had perceived resistance. Show you what it can do and you're going, 'Oh I see now'.
> (DM1: Adam)

The member of SLT who has responsibility for data either did not know the capabilities of the functions in SIMS marksheets or how these tools could be applied and used by classroom teachers until the training session highlighting a lack of basic SIMS knowledge across the school and the need for training. This lack of knowledge was perceived as resistance from the member of SLT by the data manager. The data manager was pleased that the training had helped transform the view of SIMS for this member of staff in particular:

> I was so encouraged as I hope you were by (SLT member's) feedback because he's the one
> that can move it forward. 'Oh, you mean they could look at their exam results with this?'.
> So, he will now go off and enthuse about it at SLT. (DM1: Adam)

Adam (DM1) believes that now that the member of SLT understands how SIMS marksheets can be used and how useful they are they will discuss the training with SLT and therefore he will be allocated more time to provide training possibly during the next INSET day. On these days members

of staff choose the training they would like to attend. Through this process Adam (DM1) believes that the training will be well attended:

> You look at the menu of sessions and you choose the least worst and I would probably be comfortable in the package of least worst. So, they'd think, 'Oh yeah, we can cope with that it sounds actually relevant rather than some weird thing'. So, I can imagine quite of lot of people coming to it. (DM1: Adam)

4.5.3 Barriers to training

Adam (DM1) encouraged trainees to explore SIMS and the functions described by saying 'feel free to play'. During this time one participant clicked on the zoom button but does not know how to remove it. After asking the data manager 'how do I get out of zoom?' and receiving the response 'close it' they explained that they were scared to close it by using the X on the right-hand side of the screen because they thought this would close the whole marksheet. Although participants have been encouraged to 'play' this participant is still scared to click the wrong button.

Throughout the session there were moments where participants could not follow the instructions. Sometimes these were minor problems resolved quickly by asking the data manager such as double clicking instead of right clicking or trying to use a filter on a column where the function is unavailable. At one time during the training, Adam (DM1) showed a marksheet that was different to the ones participants were accessing. In addition, Adam (DM1) had not updated some of the formulas in the participants' marksheets so some of the functions would not work. At this point some participants were confused and did not know how to proceed. However, this problem did not phase one participant who said, 'it's OK, I can look at another' and accessed another marksheet instead. The confusion caused another participant to cynically joke 'who designed SIMS?!'. Adam (DM1) supported the negative view of SIMS and started their response with 'the massive flaw is this...'.

Adam (DM1) highlighted how it is easy to not explain all of the steps in a process fully:

> When you eat and sleep SIMS like we do you do forget the obvious and some of the things you picked up before I even presented were some of those things, but they caught me out a couple of times…You forget that you've got apply filter browse because you just do it…I just do it innately. If I said to filter, I browse. I don't think, 'Oh I've got to move up to the browse screen now and they're all'. So, there's one example there where my instruction wasn't clear. (DM1: Adam)

He is explaining that his extensive experience of SIMS means that he is able to complete tasks without thinking about all of the steps he is completing. Therefore, at times he delivered instructions too quickly or did not explicitly explain each click.

Summary

This chapter has reported the main research findings that were made following the data collection. The questionnaire, completed by 122 participants from at least 75 different schools, including data managers, examinations officers, senior leaders, and teachers, revealed key insights into the usage and user opinions of SIMS. The primary uses of SIMS included viewing student details, accessing linked documents, completing student reports, and completing registers, with less common uses being viewing graphical data in Discover and completing/viewing trackers. Participants expressed varied opinions on the effectiveness and user-friendliness of SIMS, highlighting issues such as time constraints and insufficient knowledge as barriers to more effective use. The analysis identified a significant need for more comprehensive training programs to overcome these barriers.

Interviews and focus groups provided deeper insights into the practical applications and challenges of using SIMS in the three case study schools. These findings, structured around the DeLone and McLean Information System Success Model, revealed that SIMS was primarily used for data input and storage rather than data analysis, with users preferring other tools like 4Matrix and Microsoft Excel for data analysis. Additional themes such as accessibility, customisation, convenience, and efficiency emerged, underscoring the need for improvements in the system's user interface and training.

The observed training session demonstrated that participants found hands-on training beneficial, particularly when they could use their own class data. The training session had a positive influence

on participants' intentions to use SIMS more effectively, though some faced challenges such as difficulties in following instructions and fear of making errors. These barriers emphasise the need for clearer and more comprehensive training materials and support.

In conclusion, while SIMS is widely used for various administrative tasks, there is a significant gap in its use for data analysis due to lack of training and user knowledge. Improving internal training programs and addressing the identified barriers could enhance the overall effectiveness of SIMS in supporting data-informed decision-making in schools. A discussion and critical analysis of the findings in relation to the relevant literature is presented in the following chapter.

Chapter 5: Discussion of findings and answering the research questions

5.1 Introduction

In this Chapter I will address the research questions in the light of the findings from the study.

1. How is SIMS used? This question explores the practical applications and functionalities of SIMS within secondary schools, seeking to understand the current landscape of its use.

2. What are user opinions of SIMS and how it is used? This question aims to capture the perceptions, feedback and opinions of users regarding SIMS, providing insights unto user experiences and potential areas for improvement.

3. How is training related to the use of SIMS? This question explores the existing connections between training initiatives and the use of SIMS, identifying any correlations or gaps in the current training practices.

4. How effective do users report the internal training to be in developing their productive use of SIMS? This final question assesses the efficacy of new internal training programmes developed through this research, evaluating their impact on users' proficiency and overall improvement in SIMS use within secondary schools.

This study's findings reveal significant insights into the use of SIMS within secondary schools, focusing on practical applications, user opinions, training and the effectiveness of internal training programmes. First, SIMS is predominantly used for data collection purposes rather than data analysis. Users common employ SIMS to store student information such as attendance, behaviour records and attainment. However, the complexity and perceived user-unfriendliness of SIM's analysis tools lead many to rely on other software, such as 4Matrix or Microsoft Excel, for data analysis indicating a gap between the intended functionality of SIMS and its practical application by users.

User opinions of SIMS are mixed. While a majority of questionnaire respondents expressed overall satisfaction with SIMS, detailed feedback from interviews and focus groups highlighted significant frustrations. Users find the system's complexity, outdated user interface, and inadequate training to be major impediments. These factors contribute to a perception of low system quality and impact the use of SIMS. Participants emphasised the need for more comprehensive and practical training, tailored to their specific roles within their school.

Training emerged as a key factor in the use of SIMS. This research found that practical, hands-on training sessions, where users can work with the data from their classes, significantly enhanced user proficiency and confidence. There is a notable gap in training provision, with many users feeling inadequately trained. Internal training programmes developed through this research were found to be effective, with participants reporting increased satisfaction and improved ability to navigate and use SIMS features. These training programmes led to a positive shift in both the intention to use SIMS and its actual use for data management tasks. The findings underscore the importance of addressing system quality issues and providing practical training to improve user satisfaction and use of SIMS in secondary schools.

5.2 Research aim one: to understand better the use of MISs in secondary schools in England

5.2.1 Actual use of SIMS

The findings from the questionnaire and the interviews show that SIMS is used daily by all participants and the majority of participants, including data managers, teachers and examinations officers all use a variety of different modules within SIMS. Furthermore, the interview participants emphasised how the use of SIMS is considered integral to many aspects of school life at each of the three case study schools. This finding contrasts with the findings of Visscher et al.'s (2003) study on the use of SIMS in English secondary schools. They found that many modules were rarely used including modules that they believed were relevant to support high quality schooling. Although

many of the SIMS modules have been developed and changed since 2003 and therefore a direct comparison cannot be made, Visscher et al. (2003) found that only 21% of users used the attendance module every day. In comparison, at each of the case study schools all lesson attendance was recorded by teachers using SIMS and 75% of questionnaire participants used SIMS to complete registers and therefore used the Attendance module. This difference may reflect the changing practices and advancements in recording attendance data over the past 20 years, including the introduction of the school census at the national level by the Department of Education in 2006 (Griffiths, Franklin & Heyne, 2022). The school census involves collecting termly school level attendance data from each individual school and therefore this requirement has led to progress in the recording of these data in schools. However, this difference may reflect that in Visscher et al.'s (2003) study the sample did not include teachers and therefore it is unclear if the Attendance Module was used directly by teachers in schools or not used at all. In light of these factors, Visscher et al.'s (2003) research may not offer a meaningful basis for direct comparison with the findings of this study. Instead, it highlights the importance of considering the temporal context and sample characteristics of research. Additionally, with no other studies examining the use of SIMS in schools, Visscher et al.'s (2003) research stands alone in this field, further emphasising the need to consider its limitations.

The findings from my research indicate that participants use features in SIMS to input or view data rather than analyse data. The four analysis features included (Chance Analysis, Aspect Analysis, Group Analysis and Result Set Analysis) are least used or heard of by participants. These findings are similar to Visscher et al. (2003) who found that many modules, including the 'Analyst' module, were rarely used with over 90% of participants indicating that they never used them. Therefore, although SIMS is used more, the type of use appears to be similar to the use identified by Visscher et al. (2003). SIMS is primarily used as a database to collect and store data rather than to analyse data. This finding does not mean that schools are not analysing data. Instead, the findings show that schools are using other products, such as 4Matrix, SISRA or Microsoft Excel for data analysis. There

are two main reasons for this; users do not know how to use SIMS for these purposes, or they find other products easier to use. For example, Stephanie (DM2) describes using 4Matrix as 'quicker, clearer, easier and more accessible' in comparison to SIMS.

The findings show that data managers use SIMS more often than other users and have used or heard of more modules than all other participants. This result was anticipated as data managers in schools are usually responsible for managing SIMS. The findings show that not only are data managers responsible for managing SIMS, but they are often viewed as the SIMS expert, for example, at School One where the data manager is described as the 'guru'. Furthermore, at School Two the data manager does not expect teachers to be 'whizzes' in SIMS because it is the data manager's job to be able to use SIMS to access data.

Visscher et al. (2003) made the distinction between direct use of SIMS (using SIMS oneself) and using SIMS indirectly (using SIMS data provided by someone else). They found that most of the use of SIMS was direct. Although I did not specifically distinguish between direct and indirect use in the questionnaire, most of the use was direct; participants described using their own logon to access and use SIMS. This finding was expected. However, some participants described use that could be considered indirect. For example, at School Three participants explained that class marksheets were printed out by the data manager and given to class teachers at the beginning of the year even though teachers could access this information themselves and are expected to access the marksheets themselves using SIMS to complete student reports. Although Visscher et al. (2003) consider that indirect use can support strategic management, these examples of indirect use do not. Instead, they increase workload and reduce the information quality because the printed copies do not update as students change classes. I would consider this example to be a missed opportunity to use SIMS rather than indirect use. Another example of indirect use was described by Natalie (EO3). Instead of teachers entering examination entries using SIMS, Natalie (EO3) used email to collect the examination entries from teachers and then entered these data into SIMS because she did not allow

teachers to have access to these marksheets. Again, this indirect use of SIMS increases workload as data entry is duplicated and the opportunity for errors is increased.

Although for most participants, the use of SIMS did not increase their workload, time was identified as a barrier to SIMS use. This finding is consistent with other studies. In their study, Schildkamp, Karbautzki and Vanhoof (2014) examined data use practices in five European countries (United Kingdom, Germany, Poland, Lithuania and the Netherlands). They found that teachers and school leaders in each of the countries studied complained about a lack of time to use data. While some studies have shown that teachers may be sceptical of data use and data systems because of concerns that initiatives will add to their workload (Ingram, Louis & Schroeder, 2004; Valli & Buese 2007; Wayman Cho & Richards, 2010), participants in this research enquiry largely indicated that they wanted to have more use of SIMS.

5.2.2 Intention to use SIMS

One of the modifications made by DeLone and McLean (2003) to update the original Information System Success Model included adding the variable 'intention to use' to address concerns with interpreting the multidimensional aspect of 'use' (Seddon, 1997). DeLone and McLean (2003:23) suggest that 'intention to use' may be a worthwhile alternative measure in some contexts. However, given 'intention to use' is not a measure of actual use, both be evaluated and cannot be interchanged.

Many participants, including data managers and teachers, at each of the case study schools wanted to improve or extend their individual use of SIMS and in addition some wanted the use of SIMS across the whole school to be extended. For example, one participant stated that they 'would love if everything was in SIMS' and another participant believed that they could 'see much more potential' in SIMS. The DeLone and McLean Information System Success Model shows that intention to use is associated with each of the other variables. The arrows in the DeLone and McLean Information

System Success Model demonstrate associations between the dimensions and do not show whether these associations are related to positive or negative outcomes (DeLone & McLean, 2003). For example, increased use does not necessarily lead to increased user satisfaction. More use of a perceived low-quality system may decrease user satisfaction whereas more use of a higher quality system may lead to increased user satisfaction. DeLone and McLean (2003) suggest that the nature of each association can only be understood within the context of each study. The findings show that each association is complex and sometimes contradictory. Therefore, each dimension is discussed below with reference to intention to use and use and user satisfaction.

5.2.3 Influence of system quality on the use of SIMS

System quality is a measure of an information system from technical and design perspectives (Gable, Sedera & Chan, 2008). Therefore, system quality relates to the desired characteristics of an information system such as ease of use, ease of learning and system flexibility.

In general, the findings from the interviews indicated that participants thought that the overall system quality of SIMS was low, and this negatively impacted the use of SIMS. Participants often compared SIMS to other programmes, both school data analysis software and other software, and thought that SIMS was 'old fashioned' in comparison. Participants viewed SIMS as 'old fashioned' because of the poor-quality user-interface of SIMS compared with other products that were easier to use. Paul (T1) highlighted that although other products have 'moved on over the years' whereas 'SIMS as a product hasn't changed substantially' (T1: Paul).

However, the perceived system quality of SIMS for some participants was influenced by the data manager controlling access within SIMS. Data managers restricted access to marksheets, or certain data in SIMS but also restricted knowledge about how to use SIMS or to analyse data. The data managers used their power, both in the sense that they control permissions and access to marksheets, and they have more knowledge about how SIMS works, to control other users.

From a critical theory perspective, this situation illustrates the concept of 'knowledge of the powerful' and 'powerful knowledge' (Young, 2007). Knowledge of the powerful refers to the control exerted by those who have exclusive access to certain information, while powerful knowledge refers to the ability to use that information to empower individuals to think critically and make informed decisions. In this context, data managers use their specialised knowledge and control over SIMS to shape educational provision and opportunities for students. By controlling access to data and the ability to analyse it, they influence which data are used in decision-making and how it is interpreted. This control can limit the agency of teachers and other staff, impacting their ability to fully participate in data-driven practices that can ultimately shape the educational experiences of students.

However, the other participants did not know that their use of SIMS was being controlled directly by the data manager; they thought that either they did not have the knowledge to use SIMS 'properly' or that SIMS itself prevented them from accessing other data. SIMS is a site of hierarchical control from above (Selwyn, Nemorin & Johnson, 2017). The implementation of information systems created the possibility of democratising data access and use within schools. However, data related technologies are used primarily to control the activities of teachers (Decuypere, Ceulemans & Simons, 2014; Roberts-Holmes, 2015) and most data remains inaccessible to many people within the school organisation (Selwyn, 2016).

This dynamic highlights the tension between the potential for information systems to democratise data access and their actual use of tools of control. As Decuypere et al., (2014) and Roberts-Holmes (2015) argue, data-related technologies can reinforce existing power hierarchies by centralising control and restricting access. Selwyn (2016) further emphasises that much of the data within schools remains inaccessible to many users, perpetuating a top-down approach to data management and decision-making.

Although some of the control by the data manager was intentional, there were numerous examples from participants, including the data managers, where a lack of knowledge about how to use SIMS influenced how they perceived the system quality of SIMS. Although the questionnaire findings showed that 78% of participants strongly agreed or agreed with the statement 'I don't know the full capabilities of SIMS', the findings from the interviews highlighted the impact of this lack of knowledge on the perceived system quality of SIMS. The differences between the questionnaire and interview data show that the qualitative aspect of this study provides valuable insights into the nuances of participants' experiences and perceptions of the use of SIMS. By exploring individual perspectives further through interviews, this study uncovers the underlying reasons behind the quantitative findings.

In contrast, Adam (DM1) also described using 'workarounds' to increase the flexibility of SIMS. Freeland and Hernandez (2014:6) describe that due to unmet demands from school information systems, schools have to implement 'workaround solutions built on top of legacy technology systems'. However, the data manager later describes these as 'not really workarounds just good use of SIMS'. In these instances, the data manager's extensive knowledge of how to use SIMS allowed them to use SIMS more flexibly to meet their needs. Again, this indicates that perceived system quality is related to an individual's knowledge of how to use SIMS.

Despite an overwhelming sense that, in general, participants perceived the systems quality of SIMS to be low, all of the participants wanted to use SIMS more with many acknowledging that they did not fully understand the full capabilities of SIMS but believed that there was the potential for increased SIMS use in their school. The findings presented here show that perceived system quality, and therefore system use, is influenced by other organisational factors within each of the case study schools and cannot be understood without reference to the context within the system is used.

5.2.4 Influence of information quality on use

The quality of the data is imperative for decision-making. If the data are not accurate measures of the aspect of education being examined, such as student performance, then they are unable to inform meaningful decision-making (Schildkamp & Datnow, 2022). The data manager participants highlighted the importance of using 'accurate' data. However, most of the analysis conducted by data managers was based on GCSE predictions from classroom teachers. Although predicted grades form a key part of the education system in England as they are used to form the basis university applications, they have been shown to highly inaccurate (Anders, Dilnot, Macmillan & Wyness, 2020; Murphy & Wyness, 2020).

One teacher participant explained that they purposefully entered inaccurate GCSE prediction data because they were fearful of the repercussions on them from senior leadership. They did not want the data to be used to be used against them to negatively represent their effectiveness as a teacher. The same teacher participant also highlighted that some data was considered 'inaccurate' by teachers, such as student targets and was therefore 'questioned a lot by teachers'. Empirical studies have shown that information quality is strongly associated with system use (Weill & Vitale, 1999; Wixom & Watson, 2001; Rai, Lang & Walker, 2002). Therefore, it could be expected that the participant may be discouraged from using SIMS because they know that the information they have entered is inaccurate. However, the participant still wanted to use SIMS more to access similar data entered by other teachers because they believed that the data would provide them with 'more of an understanding of that student'. The teacher participants believes although they have entered inaccurate data into SIMS, the data in SIMS entered by other teachers will enable them to know more about the students in their classes.

This specific example shows that data are always incomplete, flawed approximations or representations of reality (Fawns, Aitken & Jones, 2021). It underscores the inherent limitations of data in capturing the complexity of educational phenomena. Critical pedagogy emphasises the

autonomy of teachers and interrogates power dynamics within educational systems (Giroux, 2011).

In this context, the prevalence of inaccurate data entry by teachers, driven by fear of negative

repercussions from senior leaderships, reflects a power dynamic where educators feel compelled to

conform to institutional pressures rather than prioritise pedagogical integrity. Furthermore, the

scepticism surrounding certain data, such as student targets, reflects a critical engagement with

knowledge production and dissemination within schools. Drawing on critical pedagogy's concepts of

'powerful knowledge' and 'knowledge of the powerful' (Muller & Young, 2019), this example

highlights how the reliance on flawed data can perpetuate power imbalances and shape educational

practices.

5.2.5 Influence of user satisfaction on use

The findings from the questionnaire show an overall positive attitude towards SIMS and 80% of

participants agree/strongly agree with the statement 'I am satisfied with SIMS'. However, again the

interview and focus group findings show a much more complex view of SIMS with many participants,

including teachers, data managers and an examinations officer, expressing frustration with SIMS.

For example, relatively inexperienced SIMS users such as the teacher participant at School Three

described even logging into SIMS a 'struggle' and more experienced SIMS users such as the

examinations officer at School Three expressed feelings of frustration when drop-down menus were

inconsistent.

Despite these feelings of frustration with SIMS, many of these participants still wanted to use SIMS

more. Furthermore, the participants who were more experienced in using SIMS, the data managers

and examination officer, also described instances when their user satisfaction was low. These

findings show that user satisfaction is a complicated variable that can change depending on the task

the user wants to complete and therefore cannot easily be measured. This finding shows the

importance of using interviews to collect in-depth responses from participants rather than relying on

simple measures of user satisfaction.

5.2.6 Influence of service quality on use

The findings from the interviews and focus group show that overall participants perceived service quality to be low. The external training participants had received was described as poor quality. A lack of training on SIMS meant that participants did not know how to use some features in SIMS. For example, although Natalie (EO3) was an experienced SIMS user they did not know how to use the drag and drop function to seat students for exams. Furthermore, access to support, another aspect of service quality, discouraged Stephanie (DM2) from using SIMS because she was not able to complete the task required. In their study on data use practices in Europe, Schildkamp, Karbautzki and Vanhoof (2014) found that although many teachers in the UK had access to sophisticated systems to support data use, not knowing how to use them was a barrier to data use, highlighting the key role of training in promoting data use. Training is a pivotal aspect that can be modified within schools to enhance user proficiency and satisfaction in SIMS. The impact of the implemented training session on user satisfaction is discussed in Section 5.6.

5.3.1 Data democracy or data dictatorship

At each of the case study schools in this study the participants reported that the data manager acted as a SIMS gatekeeper in relation to marksheets. The data managers create the templates and therefore control all aspects of the marksheets from the data that is included in the marksheet to who can access and edit the marksheet. At each of the case study schools access to marksheets is restricted and teachers can only view marksheets for classes which they are responsible for. However, there are different reasons for restricted access at each of the schools. At School Two, Stephanie (DM2) did not know that it was possible for colleagues to view the marksheets of other classes in SIMS and therefore acted as a gatekeeper due to her own lack of knowledge about the system features.

At School One, Adam (DM1) believed that access is restricted because SLT are trying not to 'overcomplicate things' and therefore only allows teachers to view the data SLT deem the most important to them. At School Three, Beth (DM3) believed that teachers do not want access to other marksheets because they assume that the data stored within the marksheets is only useful to the class teacher and not useful to other teachers. However, teacher participants at both School One and School Three explained that they want to access more data about the students in their class to support teaching and learning. Access to data has been identified as a pre-condition for effective data use (Breiter & Light, 2006; Hoogland, Schildkamp, Van der Kleif, Heitink, Kippers, Veldkamp & Dijkstra, 2016) and a lack of access to different types of data has been identified as a factor hindering data use (Schildkamp & Kuiper, 2010). Mandinach (2020) highlights the importance of teachers having access to a wide variety and broad spectrum of data about the students in their classes, so they are better able to understand each student. For example, if teachers have access to surrounding and contextual data about students, such as medical challenges, behavioural or attendance data, they are better able to understand student performance and determine the best course of action. However, it is that only relevant and appropriate data is shared with teachers to uphold student privacy.

The lack of access to marksheets for other classes may reflect a lack of shared ownership of data within each school. Shared ownership of data refers to the belief that all staff are responsible for the learning outcomes of all students in the school, not just those in their classes (Lasater et al., 2020). In their study examining teachers and school leaders' experiences using data in schools in Arkansas, Lasater et al. (2020) found that when shared ownership of data did not exist data were viewed and used as an evaluative weapon and teachers were more likely to become defensive with data. At School Three, the teacher participant described how they input inaccurate data by purposefully inflating the predicted GCSE grades of students in their class. They inputted inaccurate data to ensure it is not used against them indicating that there is a lack of shared ownership. The Teachers' Standards (Department for Education, 2021) states that a teacher must 'be accountable

for pupils' attainment, progress and outcomes'. Each individual teacher is therefore accountable for the data for students in the classes they teach. The data belongs to the teacher rather than the student because the pressure of accountability is felt by the teacher rather than the student ('it doesn't go on the student it goes on staff'). Although the same pressure to inflate student grades was not expressed by teachers at School One, the data was still repeatedly described as 'my data'. However, one of the teachers explained that they described the data as theirs because of the responsibility to enter it rather than the repercussions based on the data.

The dynamics of data management within the case study schools illustrate a complex interplay between centralised control and individual ownership. Through the role of the data manager as a gatekeeper, access to marksheets is tightly regulated, reflecting varying motivations ranging from a lack of system familiarity to intentional limitations imposed by school leadership. Despite these restrictions, teachers consistently express a desire for expanded access to student data to inform their instructional practices highlighting the importance of ensuring equitable access to data to enable informed decision-making. Moreover, the absence of a shared sense of data ownership within schools leads to fragmented accountability, underscoring the significance of fostering a collective responsibility for student outcomes.

5.3.2 Deficit view of colleagues versus developmental view of colleagues

At each of the case study schools, there were examples of the data manager and senior leaders explicitly simplifying or condensing data in an attempt to prevent data overload on teachers. At School One the data manager believed that teachers would be 'bored' with access to more marksheets and therefore restricts access to marksheets. Furthermore, the data manager believed teachers are 'quite backward' (School One) and therefore cannot use SIMS. By restricting access to data, the data manager is attempting to prevent data overload and reduce the amount of irrelevant data individual teachers can access. A large amount of irrelevant information has been identified as the most important factor relating to information quality (Ackoff, 1989). However, the data

manager and senior leaders have decided the data is irrelevant and restricted access completely rather than allowing teachers to decide whether the data is useful to them. Teacher participants at School One and School Three expressed that they wanted access to more marksheets. For example, they wanted to access marksheets in other subjects and for students in their tutor group. This centralised control over data access and the assumption of teachers; inability to use the data aligns with critical theory perspectives on power dynamics within schools. These actions perpetuate a hierarchical structure where control over data is wielded by those in positions of authority, reinforcing power imbalances and limiting teachers' autonomy in decision-making processes. By restricting access to marksheets and making assumptions about teachers' capabilities, the data manager and senior leaders are effectively exerting control over the flow and use of data, which may ultimately hinder teachers' ability to fully engage with and benefit from the available data.

Other examples of explicit simplification of data have been found by other researchers. For example, Hartong and Förschler (2019) describe examples of one-page data summaries used at schools in Massachusetts and Hamburg. These data summaries were implemented to make the data easier and more ready-to-use by including visualisations to promote a clear narrative and therefore it can be better 'understood' and more used by non-experts. This type of simplification is accompanied by a significant risk of neglecting the multiple possible interpretations of data intended to be viewed in a context-sensitive manner. During my work as a senior leader in a secondary school, I experienced a similar situation. Although I wanted to promote and encourage multiple interpretations of data by teachers, I was asked by the Principal to create a form for teachers or subject leaders to complete to help make the process of analysing and interpreting data easier for teachers. The process of completing the forms resulted in data being manually copied from SIMS to the form by teachers and did not require teachers to use the data to support decision-making. The data was primarily used by teachers to complete the form rather than analysed and interpreted to help develop a meaningful plan of action. This example reflects the findings of Schildkamp and Datnow's (2022) qualitative case study research on less successful data use practices in schools in

the Netherlands and the United States. In addition, Schildkamp and Datnow (2022) found that teachers were primarily using data to complete forms rather than use data to inform instruction due to over regulation and time constraints. Hardy and Lewis (2016) describe this process as the 'doublethink of data' where teachers and school leaders engage with the performative processes of data use for compliance but do not understand the value in their actions.

My data also revealed similar trends, as teachers expressed frustration with the lack of practical application in data use. They reported that while data visualisations were helpful, they often felt pressured to complete administrative tasks that overshadowed meaningful data analysis. Despite improved understanding of SIMS features through training sessions, the actual integration of data into decision-making processes remained limited. Teachers found themselves caught in a cycle of data input and compliance rather than genuine instructional improvement.

At School One, teachers expressed that although SIMS was accessible in classrooms, their engagement with the system was still primarily for administrative tasks rather than for data analysis to inform teaching strategies. They noted that while this shift to using SIMS in the classroom was positive, it had not fully translated into deeper data use due to persistent administrative burdens. At School Two, the data manager reported that although teachers were willing to engage more with SIMS, the lack of practical, hands-on training and ongoing support hindered their ability to effectively integrate data into their teaching practices. Teachers indicated that despite attending training sessions, they still felt unprepared to utilise the full capabilities of SIMS for instructional decision-making. At School Three, the data manager controlled access to marksheets, which limited teachers' ability to explore and utilise data independently. This control was intended to prevent data overload and ensure accuracy, but it also restricted teachers' opportunities to engage with data meaningfully. Teachers at this school expressed a desire for more autonomy and better training to use SIMS effectively for enhancing student learning outcomes.

In essence, the push for simplified, ready-to-use data can paradoxically complicate the real goal of data use by hindering informed and effective decision-making in educational practice. By focusing on compliance and ease of use, we risk undermining the deeper engagement with data that can drive meaningful educational outcomes.

Furthermore, at School Three Natalie (EO3) further restricted the access to data and the use of SIMS by preventing access to marksheets because or her view of her colleagues. She believes that teachers are 'bright, stupid people'. Although Natalie (EO3) believes her colleagues are 'brilliant teachers', they cannot be trusted to access examination marksheets despite the teachers being expected to use SIMS to access marksheets to complete student reports. Therefore, the data are sent to the Natalie (EO3) via email who then accesses SIMS to makes the entries. This process involves duplicating data, therefore increasing workload and is more likely to result in errors. Natalie (EO3) feels that she has to protect these data to ensure they are correct and therefore they can only be accessed in SIMS by herself as the examinations officer. These data are protected due to their importance within the school. The school cannot afford these data to be wrong in part due to the financial cost of examination entries and the importance of GCSE grades to the school and to individual students.

5.3.3 Teachers get what they are given versus teachers given appropriate access

At each of the case study schools access to marksheets and decisions surrounding the type of data collected within marksheets was controlled by senior leaders through the data manager and SIMS. The rationale for this provided by some of the participants was that this was an attempt to prevent teachers getting lost in 'data overload' (Breiter & Light, 2006) and prevent collecting 'data for data's sake' (Hardy & Lewis, 2016). However, the teacher participants wanted access to more data, and some were collecting additional data.

At School One and School Three participants described how teachers access to marksheets in SIMS was restricted. The data managers at these schools explained that they restricted access to marksheets in SIMS because teachers did not need access to other marksheets because the data was not useful to them. However, teacher participants at each of these schools expressed that they wanted to access other marksheets using SIMS to view data for students in their classes. This behaviour reflects a lack of critical democracy in relation to data use. The senior leaders and data managers decide which data are important to teachers and therefore only allow teachers to access these data in SIMS and purposefully restrict access to other data. This control raises the question of who decides what constitutes 'appropriate' access to data. The decision-making process about data access appears to be top-down, driven by senior leaders and data managers who may not fully understand the data needs of teachers. This approach can hinder the democratisation of data use and stifle potential innovative uses of data that could emerge from teaches having broader access.

At School Three the data manager described a process of exporting and compiling the data from marksheets into an Excel spreadsheet that was then emailed to teachers. Although the data manager believed that teachers were able to use this spreadsheet to access data for the students in their classes, a teacher participant explained that they could not easily use the spreadsheet because it contained all the students in the year group and could not quickly be filtered to only show students in their classes. Therefore, although the teacher could view the data, they did not use it because it was not in an accessible format. A discussion with the data manager participant about the rationale for this process highlighted that the data manager did not initially understand that it was possible to allow teachers to access these data in an appropriate format through SIMS. However, even after I explained that this could be done in SIMS, the data manager did not believe that teachers would want or need access to these data. This example illustrates a significant disconnect between the perceptions of data managers and the actual needs of teachers. The assumption that teachers do not need or want access to certain data can lead to missed opportunities for data-driven decision-making at the classroom level. Schools that have good

functioning information management systems and access to relevant data are more likely to show increased levels of data use (Schildkamp, Karbautzki & Vanhoof, 2014) and a lack of access has been identified as a barrier to data use (Cho & Wayman, 2013; Coburn & Turner, 2011). However, this example shows that the existence of a management information system in a school is not enough to promote data use.

One of the participants at School One described wanting access to all data in marksheets including data relating to students they did not teach. They explained that they previously worked at a school where they had this level of access and although they used another management information system, they understood that it was possible using SIMS. Selwyn, Henderson and Chao (2015) use the notion of 'open data' principles to describe this type of expanded access to access within schools. They argue that there are many potential educational benefits of open data. These include open innovation (Boudreau, 2010 in Selwyn, Henderson & Chao, 2017), increased efficiency and productivity and a general democratisation of decision-making (Yoo, Boland, Lyytinen & Majchrzak, 2012). Furthermore, Selwyn et al.'s (2016) participatory design research in two Australian schools successfully developed open data applications to use data to address 'real world' problems and allow a range of stakeholders within schools to collaborate and engage in determining alternative uses of data to support decision-making.

However, Selwyn et al. (2017) acknowledge that their open data projects were only partially successful due to 'the poor quality and limited scope of the data sets that were being produced within both schools' (2017:18). The school data that were collected reflected the school related values of 'performance' and 'progression'. The data collected in SIMS marksheets in the case study schools appeared to be significantly shaped by broader accountability policies and therefore the focus of data collection and analysis at the case study schools are GCSE grades. These are the grades used to assess secondary school performance at Key Stage 4. Although other qualifications are included in some performance measures, such as BTECs, the focus was on GCSE grades and other

qualifications were only mentioned briefly by some participants. Examples of other 'system-wide' data practices being re-enacted in schools by the school leadership has been reported by Selwyn (2016) in their study two Australian secondary schools.

Although a broad range of data can theoretically be collected and analysed in schools, Farrell and Marsh (2016) found that teachers narrowly defined data and only considered formal assessment data to be included in their definition. A similar narrow definition of data was found at the case study schools. Although any type of data could be collected and stored in SIMS marksheets, the marksheets at each of the case study schools are primarily used to collect data for student reports with a strong focus on the predicted or current GCSE grade for each student. These are the grades that are used for all data analysis described by the data managers. The layout of the marksheets is determined by senior leadership team and implemented by the data manager at each school and therefore teachers are restricted, within SIMS, as to the data they can collect. Within SIMS marksheets the focus on GCSE grades represents one of the misconceptions about data-based decision-making in education that data equal test results (Mandinach & Schildkamp, 2020). Student learning cannot be captured in a single test result. Furthermore, by only collecting one grade it is more difficult to transform the data into information or knowledge because it does not reflect the cause of the performance and therefore which instructional strategies to use (Mandinach & Schildkamp, 2020).

In addition, because actual GCSE grades are only available after students have finished their courses and advanced to the next year, the data are less relevant and therefore act as an inhibitor to data use to support teaching and learning (Park & Datnow, 2009). A teacher participant at School Three described that they only had access to student data in other subjects after results day when they were required to complete their analysis of the data. By only allowing access to these data after the students have left the purpose of the analysis is to provide an account of teaching that has already happened rather than to support the development of teachers and teaching that will happen in the

future. Fawns, Aitken and Jones (2021) argue that the emphasis of evaluation should focus on improving future quality. Throughout the GCSE course, and sometimes the whole of Key Stage 3 too, schools rely on teacher predicted GCSE grade data to measure student progress. These data are either predictions of the grade teachers think the students will achieve or the grade they are currently working at. Teacher predictions have been shown to be inaccurate when teachers make the predictions at the end of a course (Murphy & Wyness, 2020). At each of the case study schools teachers were required to make predictions throughout the GCSE course, from the beginning of Year 9 in School Three. A teacher participant at School Three described purposely inflating the grades they recorded for students in their class to meet expectations and prevent additional observations of their teaching. This finding shows that even if teachers are able to accurately predict grades, they may choose to record inaccurate, inflated data due to the pressures of accountability (Braga, Paccagnella & Pellizzari, 2014). Finn (2015) found that the data culture within the school affects whether teachers feel pressured to inflate grades. In Finn's (2015) study although teachers explained that they had experienced feeling pressured to inflate grades in previous schools they did not feel the same pressures in their current school because of the trust between teachers and the headteacher.

Although within SIMS marksheets teachers were only able to input student data they were told to, there was evidence that some teachers at School One and School Three were collecting other types of data in Excel 'trackers'. Although the exact nature of the data collected and stored in trackers is unknown, teachers have chosen to collect these data rather than being directly forced to. The use of data can be roughly classified according to their intent, either for accountability purposes or to support learning (Dam, Janssen & Driel, 2020). SIMS is used to store data for accountability purposes and Excel may be used to collect and store data to support teaching and learning. In the hierarchy of data within the case study schools, data for accountability purposes that is recorded in SIMS is given a more privileged position than data stored in trackers. I know that these data are privileged because in each of the schools these are the only data that teachers are required to

collect, and these are the data regularly referred to by all of the participants. Again, this reflects the narrow definition of data as assessment data or GCSE grades by senior leaders and the data manager in each of the case study schools. This categorisation of data aligns with the notion that power dynamics influence what counts as knowledge (Flyvbjerg, 1998), shaping the types of data collected and prioritised within schools what is deemed as knowledge within schools. In the case study schools, the emphasis on accountability data stored in SIMS reflects a narrow definition of knowledge upheld by senor leaders and the data manager. This prioritisation of certain types of data over others can have significant implications for school accountability practices and the dominance of accountability data may overshadow other valuable forms of knowledge that could inform teaching and learning practices (West, 2017).

There may be practical advantages to storing the data stored in Excel spreadsheets in SIMS marksheets. For example, when a student changes class this is automatically updated in SIMS and when contextual data such as pupil premium or attendance data is updated in elsewhere in SIMS this is automatically reflected in SIMS marksheets. Despite the advantages of storing these data in SIMSs, the data managers did not routinely use SIMS to create trackers. Adam (DM1) did not want to create and manage more marksheets due to the increase in their workload. Therefore, because the data manager is the only member of staff who can create marksheets SIMS is not used for 'trackers'. At School Three the data manager did use SIMS to create trackers but only when requested by teachers rather than promoting this use of SIMS. The use of SIMS as a centralised database for the collection of a narrowly defined type of data reflects how the implementation of management information systems can help enable a discourse of accountability to be instilled in the school's culture (Selwyn, 2011).

5.3.4 Data manager: data expert versus data facilitator

The data managers at each of the case study schools viewed themselves as the data and SIMS expert rather than a data and SIMS facilitator. Furthermore, the data managers believed that the majority

of data analysis was their responsibility and constituted a large part of their role. Teachers also view

the data manager as the data expert. For example, at School One the data manager is referred to as

the SIMS 'guru'. Their knowledge and experience of SIMS positions the data manager as powerful

within the school. Not only are they able to use SIMS to restrict access to data but their analysis of

the data can influence decisions within the school. The difference between data managers' access

compared with teachers' access echoes Manovich's (2011) hierarchy of 'data classes' associated with

the increased use of digital data in society. Within each school the data managers may be

considered part of the 'data rich' class because they are able to interpret and analyse data and they

exert power over the 'data poor' class who cannot. However, when data are only accessible by a

few then the use of data may become descriptive rather than strategic (Nagy & Henderson, 2016).

In my experience as a data manager, I found that my analysis of school data could only provide a

descriptive, simple evaluation that led to surface level discussions only about the general patterns in

the data (Abdul-Hamid, 2017; Farley-Ripple, Jennings & Buttram, 2019) because I did not have the

expertise to use the data for strategic purposes within the classroom. In order to use data to

improve teaching and learning, both data literacy and pedagogical content knowledge are required

(Mandinach, 2012; Schildkamp & Poortman, 2015). As a data manager, I did not have the

pedagogical content knowledge to use the data to inform meaningful action and therefore data use

to support teaching and learning remained limited.

In School One the headteacher does not want to 'overcomplicate' data use for teachers and

therefore limits access to data through SIMS. Within each of the case study schools, teachers are

not encouraged to access data directly, instead data access is mediated through the data manager

who can be seen as the data 'guru' or a 'go-to' individual on data (Lachat & Smith, 2005) for data

analysis. This overreliance on data managers as the data expert may result in teachers viewing data

as something that somebody else does for accountability purposes rather than to inform teaching

and learning (Lachat & Smith, 2005) and discourage independent data use (Wayman et al., 2004).

Although the headteachers in School One and School Three believe that it is easier for teachers to be

given data rather than being able to access data directly, teachers in these schools want more access to data through SIMS specifically wanting to view student grades in other subjects.

5.3.5 Pre-digested data-bytes versus undigested data sets

A consequence of teachers being given limited access to SIMS is that they are then given data analysed by the data manger or 'pre-digested' data. At School Three the data manager provides reports the senior leadership team and at School One and School Two the data manager exports selected data to excel to conduct analysis. A result of this approach is that data analysis depends on the expertise of the data manager and may result in teacher feeling less satisfied with another interpretation of their data (Irving & Gan, 2012). The analysis of the data manager may lead to overly simplified interpretations that may be misleading (Kahneman & Klein, 2009; Wayman et al., 2010). The teacher participant at School Three is not satisfied with another interpretation of their data and therefore manipulates the data until they know that the interpretation of the data will be positive. In addition, when data are collected for someone else's purposes, for example for whole school accountability purposes, teachers may be unable to see how data could be used to inform teaching and learning (Lachat & Smith, 2005).

5.3.6 Need to control versus need to support

One of the features within SIMS marksheets allows formulas to be added to automatically colour a cell based on its contents. At School Three, a formula, decided by Senior Leaders, has been added to the marksheet by the data manager that will automatically change the colour of the cell. The teacher does not know the formula but understands that the cell should not be red and therefore enters an inaccurate, inflated grade to ensure the cell is not red. The teacher participant understands that their teaching will be judged by senior leaders based on the grades they enter on the marksheet and therefore feels under pressure to create the impression of having taught effectively and so misrepresents and inflates the students 'current grade' to maximise the

appearance of success. When data are used primarily for accountability purposes and are used to judge teachers, as shown at each of the case study schools, it can result in teachers feeling vulnerable and insecure in their role with limited feelings of autonomy (Lasater et al., 2020). When teachers have less autonomy and feel less ownership over their work, they tend not to see data as valuable in informing their practice (Moriarty, 2013). The teacher cannot use the data to record accurately what is really happening in their classroom because they see data as a way of validating their teaching (Lewis & Hollaway, 2019) to represent themselves as an effective teacher (Sellar, 2015) rather than viewing data as a tool to improve teaching and learning. By using SIMS marksheets to collect GCSE grades and using the tools within SIMS to summarise the data using colour, data use is oversimplified within the school and is used to judge teachers rather than helping to provide instructional steps for teachers (Penuel & Shepard, 2016).

Although Selwyn (2011) argues that the use of management information systems may empower teachers by helping them to develop a sense of ownership for their work, the use of SIMS in School Three may be considered a 'panoptic process' (Perryman, 2006). When the teacher participant at School Three uses SIMS they have internalised the panoptic gaze (Hope, 2010) and feel that they have to enter inflated grades. Perelman (2014) found similar results in his study on the relationship between teacher's engagement with management information systems and their sense of accountability in an Israeli secondary school using MASHOV, an Israeli-developed MIS. Several teachers in his study reported that the use of MASHOV intensified the pressure to deliver strong results and therefore to avoid criticism they often manipulated their data and gave students higher marks. Finn's (2015) research on the use of data in one school in the northeast of England provides further examples of teachers inflating grades in order to meet expectations and to try and persuade students to take their subject at GCSE. Although in Finn's research the teachers explained that they did not feel the pressure to inflate grades at their current school because they trusted the Headteacher not to hold them account for things that were unreasonable and therefore limits to

accountability helped ensure the validity of the data. However, at School Three the use of data represents limited levels of trust between the teacher participant and leadership.

When data are used in relation to their job performance, people may engage in activities to make the data appear as favourable as possible (Nichols & Berliner, 2007). Although the grade will be reported to the student and parents / carers, the teacher participant fears the negative repercussions on themselves, such as increased scrutiny through lesson observations, and therefore engages in unethical practices. Educators are less likely to participate honestly in data practices if their sole motivation is to avoid losing their job (West, 2017). The SIMS marksheet is used by the senior leaders and the data manager to control teachers and therefore becomes the location for the performance of performance (Ball, 2003).

Although, it could be argued that the process of using one data output to summarise students is also a feature of unethical data use because ethical data use requires educators to use multiple data sources (Mandinach & Schildkamp, 2020). A single test score or grade cannot capture student learning and therefore students cannot and should not be summarised using one data source. More effective data practices involve triangulating with multiple sources of data, including contextual data, to inform how they can support each student (Wayman, Cho & Richards, 2010).

5.3.7 Prevented from exploring further versus encouraged to explore further

Within each of the case study schools, teachers are viewed primarily as data inputters and therefore their use of SIMS is restricted to inputting, and they are prevented from exploring further. Teachers are expected to use SIMS to input data, for example to complete registers, input behaviour data such as rewards or sanctions or to record GCSE grades for reports whereas analysis is conducted by the data manager. At School Three the data manager does not view encouraging teachers to use SIMS as an aspect of their role as a data manager. Teachers do not know the capabilities of SIMS and therefore use Excel to create trackers. Although the data manager will create these when

asked, they do not promote the use of SIMS within the school. This means SIMS is only offered as an alternative solution for trackers when there are problems with using Excel. At School One, the data manager's workload prevents them from creating trackers in SIMS. In addition, teacher workload is shown to be a barrier preventing teachers from exploring data use in SIMS themselves because they do not have the time.

There is a culture of fear around data use that prevents users from exploring the capabilities of SIMS and other management information systems. The culture of fear around data used is seen at various organisational levels within the schools. Participants described the limitations of SIMS but did not want to change to another provider because although other management information systems are available, they do not believe they are able to change MIS due to the risk to whole school operations (Ylaya, 2020). At School Three individual teachers are prevented from exploring further by the data manager because they believe teachers are scared of data and therefore using SIMS because they do not know how to access it or use it. However, teacher participants all described wanting to use data and SIMS more and they believed that a lack of training and knowledge about the capabilities of SIMS prevents further exploration. Users do not know what SIMS is capable of and therefore do not know how to use SIMS more even though they want to.

5.3.8 Colleagues de-skilled versus colleagues up skilled

Although there is a proliferation of data within schools, teachers have not received the training required to use SIMS to begin to analyse these data to inform decision-making and often cannot even access these data. If teachers do not have the skills to user data for student and school improvements and therefore the potential benefits of data use cannot be realised. (Murray, 2013; Schildkamp et al., 2017; Forrester, 2019). By limiting teachers' data use to inputting a narrow range of data and focusing data use on one type of data (GCSE grades), school data use becomes centred on accountability rather than investigating how to improve teaching and learning (Lachat & Smith, 2005; Schildkamp & Kuiper, 2010). The training session at School One focused on using SIMS

marksheets to analyse GCSE grades for individual classes. Although most of the participants of the training (7/8) were 'very satisfied' that the training session would improve their teaching, only one teacher was able to explain how and their response indicated that the training had helped them to identify students for interventions rather than how to make instructional changes. However, this training session highlighted the tools within the SIMS marksheets that could be used to support data analysis that could theoretically be used on any data. Some participants identified this and began to ask if they could use these marksheets for other data indicating that their understanding of data was much broader than the narrow view of data used by the data manager and school leaders.

5.3.9 Stilted self-evaluation versus wide-ranging self-evaluation

The analysis conducted by data managers is in the form of calculating predicted P8 scores. These estimates are then used to assess teaching with the assistance of predetermined formulas to show 'expected progress'. This process shows that summative high stakes assessment is being conducted both by non-experts (data managers) and by formulas in SIMS (Stevenson, 2017). Although at School Two the data manager explains that the data are 'not the only thing' and are used in conjunction with other sources of evidence in teacher evaluations it is clear that at each of the case study schools these data are used inappropriately to evaluate teacher effectiveness (Mandinach & Schildkamp, 2020). Furthermore, Stephanie (DM2) describes being asked to manipulate the data to ensure the school is presented positively in their press release on GCSE results day. The school's self-evaluation is limited to GCSE results and therefore the data manager feels like she is being asked to act like a 'spin doctor' and manipulate these data to represent and market the school in a particular way. The described stilted self-valuation process at School Two involving data manipulation and a narrow focus on GCSE results, reflects the marketisation of schools critiqued by Sahlberg (2023). This practice aligns the Global Education Reform Movement (GERM) which emphasises competition and accountability through high stakes testing. Sahlberg (2023) highlights that such reforms often lead to inappropriate evaluations of teacher effectiveness and a reduction in

educational quality and equity. The manipulation of data to market schools positively is indicative of the negative consequences of adopting market-based education policies.

5.4 Data culture

The discussion illustrates that although data use through SIMS has been embedded within each school's daily practice, this alone is insufficient in creating a data democracy or a positive data culture. Furthermore, the current use of SIMS at each of the schools hinders the development of a data democracy as teachers and other users of SIMS engage in practices promoting a data dictatorship.

A data culture focused on accountability where data are used to monitor compliance, identify problems and raise assessment scores are more prevalent in low performing schools (Diamond & Cooper, 2007; Firestone & González, 2007). However, the findings from this thesis show that even within schools that are not considered 'low performing' (see Table 3.2), a data culture focused on accountability dominates. This finding may reflect the dominant data culture within education in England. When school examination data are used as a key indicator of school quality, testing data become a central focus for schools. Therefore, schools feel pressured to collect and track student data which is then used to audit student, teacher and school performance (Stevenson, 2017) and ultimately passed down from headteachers through the senior leaders onto teachers in the classroom. Furthermore, the use of data as 'governing knowledge' has become a key focus of educational policy within England and at a global scale (Williamson, 2015). The datafication of education requires an unthinking engagement from teachers (Selwyn, Nemorin & Johnson, 2017). Within each of the case study schools teachers are required to enter GCSE grades for students in their classes. However, teachers are not required to use the data to help inform decisions and most of the decision-making was conducted either by somebody else, like the data manager or conducted using formulas embedded into SIMS, like expected progress or target grades. Often these decisions are hidden from teachers or are very opaque (Hartong, 2018). For example, teachers do not know

how GCSE targets are decided for students as these are hidden within SIMS and are judged in relation to these targets.

The use of SIMS in each of the case study schools reflects the intent of data use in schools. By design teachers are not meant to use these data for their own purposes. These data are used to account for the 'unaccountable' teacher (Thompson & Cook, 2014) and therefore teachers are used by the data rather than use the data (Kerr, Marsh, Ikemoto, Darikej & Barney, 2006). According to Selwyn (2015), it is essential to make the social construction of education data visible. This visibility ensures that the micro-politics of its artefacts are understood as politics rather than neutral facts or engineering design.

5.4.1 Importance of leadership

School leaders influence all aspects of data use in schools (Lasater et al., 2020). For example, school leaders are responsible for creating goals and expectations for data use (Levin & Datnow, 2012) and therefore what data are used in a school and for which purposes, supporting teachers in the use of data by providing them with time and training (Gerzon, 2015) and determining which data teachers have access to (Schildkamp, Karbautzki & Vanhoof, 2014). Therefore, as school leaders play a critical role in creating and developing data practices, they must consider how data practices influence school data cultures (Coburn &Turner, 2011; Gerzon, 2015).

School leaders have the ability to create data cultures focused away from accountability by trying to mitigate the pressure passed down to teachers by creating trusting collaborative environments for data use (Lasater et al., 2020). Wayman and Stringfield (2006) found that principal leadership was a key factor in promoting the widespread use of data systems and as a major factor in the success of data initiatives. The principals in Wayman, Midgley and Stringfield's (2006) ensured that data were used in a nonthreatening manner ensuring that teachers felt they were supported to use data rather than be used by data.

5.5 Modifying the DeLone and McLean Information System Success Model

Within other areas of information systems research, studies have shown that organisational culture can affect information system success (Leidner & Kayworth, 2006). Although many studies state the importance of organisational culture, only Mardiana, Tjakraatmadja and Aprianingsih (2018) have proposed integrating organisational culture into the DeLone and McLean Information System Success Model. The findings from this thesis show that the dominant data culture at each of the case study schools, which is influenced by the dominant data culture within the education system in England, impact every dimension of the DeLone and McLean Information System Success Model and therefore could be added as shown in Figure 5.1. Furthermore, how SIMS is used within each school has been shown to reproduce and reinforce the dominant data culture.

The addition of data culture provides a novel theoretical advancement by highlighting the cyclical relationship where data culture not only influences but is also influenced by the practical use of information systems. This insight underscores the importance of recognising the dynamic interplay between cultural, technical, and organisational factors shaping MIS success. Specifically, this study demonstrates that data culture mediates:

- **System quality**: a supportive data culture foster the optimisation of MIS functionalities, promoting user engagement and system improvement. conversely, restrictive data cultures may inhibit innovation and adaptability within the system.
- **Information quality**: the way data is interpreted and used reflects the prevailing data culture, influencing the accuracy, relevance and reliability of information produced by the MIS.
- **User satisfaction**: a collaborative and transparent data culture enhances user satisfaction by empowering stakeholders to effectively use MIS tools. In contrast, hierarchical cultures can create frustrations, limiting the perceived utility of the system.

- **System use**: data culture drive the extent and nature of MIS use. For instance, schools with a 'data democracy' encourage broader and more meaningful system use, whereas 'data dictatorships' restrict access and limit functionality to compliance purposes.

By introducing the concept of bidirectional influence between data culture and these dimensions, this research provides an enriched framework that captures the socio-technical complexities of MIS use in educational contexts. The inclusion of data culture as an integral component of the DeLone and McLean model extends its applicability beyond technical domains, offering a lend through which educational institutions can assess and enhance their MIS practices.

This expanded model offers a comprehensive framework that contextualises information system success within the unique dynamics of educational settings, emphasising that MIS outcomes are deeply embedded in the cultural and structural practices of institutions. By integrating data culture, the model accounts for factors that influence user satisfaction, system use, and organisational practices, which were previously underrepresented in existing iterations. Moreover, this study illustrates how the enhanced model can inform practical interventions, such as targeted training and leadership strategies, to foster supportive data cultures that maximise MIS effectiveness.
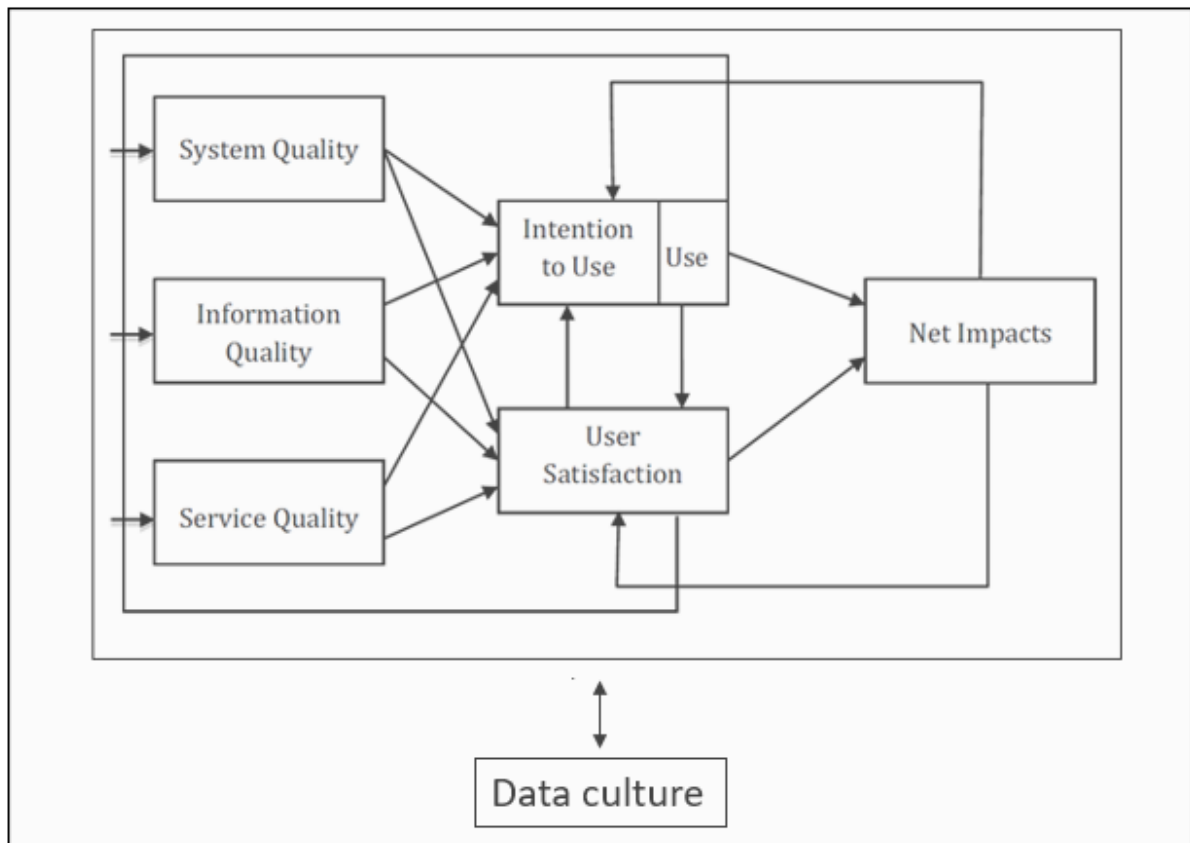
Figure 5.1: Addition of data culture to the DeLone and McLean Information System Success Model (adapted from Mardiana, Tjakraatmadja & Aprianingsih, 2018).

5.6 Research aim two: to devise internal training programmes to understand how to support the use of SIMS.

The second aim of this thesis focused on how internal training can be used to support the use of SIMS. The findings show that the participants were very satisfied with the training session.

5.6.1 Features of training

The questionnaire and interview findings indicated many participants wanted to attend practical training on SIMS. Furthermore, the use of management information systems is contingent on suitable user training that is practically relevant to each educator (Wayman, Cho & Richards, 2010). Therefore, in collaboration with the data manager I devised a training session where trainees would use their own classes throughout the session to practice the skills, they had learnt thus making the

session immediately relevant to them. The findings from the questionnaire show that the participants found the session relevant, and one participant commented found that being able to use their own classes was the most useful aspect of the training session.

At School One, the training session was developed to encourage teachers to access SIMS marksheets themselves and use the tools embedded within the marksheets to begin to analyse their data. The findings presented in Chapter 4 show that this training had a positive influence on the participant's 'intention to use' SIMS. Therefore, these findings show the importance of internal training as an element of service quality.

5.6.2 Importance of leadership

Mandinach and Gummer (2016) advise that leaders in schools should not just be promoters of technology but be seen as users too. Adam (DM1) acknowledged the importance of the senior member of staff with responsibility for data attending the training session 'because he's the one that can move it forward' (DM1: Adam). However, Adam (DM1) views this senior leader as an enabler or facilitator of data use through SIMS and a data user.

The role of leadership fundamentally shapes the culture of data use within a school. In School One, the headteacher does not want to 'overcomplicate' data use for teachers and therefore limits access to data through SIMS. Within each of the case study schools, teachers are not encouraged to access data directly; instead, data access is mediated through the data manager, who is seen as the data 'guru' or a 'go-to' individual for data analysis (Lachat & Smith, 2005). This overreliance on data managers may result in teachers viewing data as something that somebody else does for accountability purposes rather than to inform teaching and learning (Lachat & Smith, 2005) and discourage independent data use (Wayman et al., 2004).

Although the headteachers in School One and School Three believe it is easier for teachers to be given data rather than accessing it directly, teachers in these schools expressed a desire for more

access to data through SIMS, specifically wanting to view student grades in other subjects. In contrast, in School Two, the leadership team's regular review of data reports to inform policies and teaching strategies highlighted their commitment to data-driven decision-making. Teachers observed that the headteacher's engagement with SIMS during staff meetings boosted their confidence and willingness to use the system effectively.

These examples from the case study schools demonstrate that leadership not only influences the practical implementation of data use but also the overall data culture. Effective leadership transforms SIMS from an administrative tool into a catalyst for school-wide improvement, underscoring the importance of supportive and engaged leadership in fostering meaningful educational outcomes.

5.6.3 Data Literacy

The use of an information system is contingent upon adequate training to acquire the skills to navigate the system and access or manipulate relevant data (Fulmer, 1996; Visscher et al., 1999; Visscher & Bloemen, 2001). Therefore, the training implemented in this study adopted an instrumental approach to support the use of SIMS. Following the training, teachers were able to identify the students or groups of students requiring more support based on the data in their SIMS marksheet. However, most of the teachers were unable to transform the data into instructional action to inform teaching. This process is called pedagogical data literacy (Mandinach, 2012) and combines an understanding of data with curricular and pedagogical knowledge (Mandinach & Gummer, 2016). Pedagogical data literacy involves examining data to identify a student learning problem, verifying the problem and then generating, implementing and monitoring solutions strategies (Love, Stiles, Mundry & DiRanna, 2008).

Although data literacy may be considered a skill set to be learned and implemented, Raffaghelli and Stewart (2020) propose an alternative framework for data literacy following a systematic literature

review on educators' data literacy. They found that most approaches to educators' data literacy focus on technical abilities or specific skills with less emphasis on critical approaches to datafication in education or a more holistic idea of data literacy. A critical approach to data requires an understanding and awareness of the cultural and political nature of data in its context (Raffaghelli & Stewart, 2020). This approach would allow educators and students to interrogate the claims accompanying the use of data and associated systems in education (Williamson, Bayne & Shay, 2020). Therefore, although the training implemented in this study showed participants how to use specific tools within SIMS marksheets to analyse data, the training did not require participants to critically assess this type of data use. Furthermore, the training required participants to analyse data they were required to input rather than data they had chosen to collect. After I reflected on the training, I considered whether this type of SIMS training may contribute to a data dictatorship as it promotes a narrow view of data use and does not require the participants to critically assess how the data were being used.

Summary

This chapter analysed the research findings in relation to the research questions, focusing on the use of SIMS, user opinions, the relationship between training and SIMS use, and the effectiveness of internal training programs. The study reveals significant insights into the practical applications, challenges, and training needs associated with SIMS within secondary schools.

The findings indicate that SIMS is primarily used for data collection rather than data analysis, with users preferring other software like 4Matrix or Microsoft Excel for more sophisticated data manipulation. This preference is due to SIMS's perceived complexity and outdated user interface. These findings align with Visscher et al. (2003), who similarly noted limited use of SIMS for analytical purposes, highlighting a persistent gap between the intended and actual use of the system.

While the overall satisfaction with SIMS was moderately positive in surveys, detailed feedback from interviews and focus groups revealed substantial frustrations. Users found the system complicated,

with a poor user interface and inadequate training. These issues affected the perceived quality and usability of SIMS, echoing Schildkamp et al. (2014), who identified similar barriers in educational data use. Training emerged as a critical factor influencing SIMS use. Practical, hands-on training sessions significantly enhanced user proficiency and confidence. However, there was a notable gap in training provision, with many users feeling inadequately prepared to utilise SIMS effectively. Internal training programs developed through this research were successful in increasing user satisfaction and improving navigational and usage skills, supporting the assertions by Wayman, Cho, and Richards (2010) on the importance of user training for effective management information systems use.

A significant contribution of this study is the innovative application of the DeLone and McLean Information System Success Model (2003). The study proposes integrating data culture as a crucial dimension influencing system quality, information quality, user satisfaction, and overall system use. The dominant data culture within schools, which often emphasises accountability, greatly impacts how SIMS is perceived and used. By introducing a bidirectional relationship between data culture and these dimensions, this study demonstrates how cultural dynamics not only shape but are also shaped by MIS usage, providing a novel theoretical advancement. This integration provides a more comprehensive understanding of information system success in educational settings, acknowledging that organisational culture and data practices shape the effectiveness of information systems.

The role of data managers was pivotal, as they controlled access to and knowledge of SIMS, reinforcing hierarchical power dynamics within schools. This control often led to a narrow use of SIMS, focused more on data input and accountability rather than meaningful data analysis for instructional improvement. The concept of 'knowledge of the powerful' and 'powerful knowledge' (Young, 2007) was evident, with data managers' expertise and control shaping the educational provision and opportunities for students. However, this study also highlights the potential for

leadership and training to foster a 'data democracy', where broader access and collaboration can maximise the impact of MIS on teaching and learning.

To improve SIMS usage in secondary schools, it is essential to address system quality issues, provide comprehensive, role-specific training, and foster a positive data culture. These findings support the development of practical interventions, such as leadership strategies that model data use and promote data literacy among all stakeholders. The innovative application of the DeLone and McLean Information System Success Model underscores the need to consider data culture as an integral component of information system success. By addressing these factors, schools can bridge the gap between SIMS's intended functionality and its practical application, supporting more effective data-informed decision-making. This comprehensive approach aligns with the broader literature on information systems success and highlights the importance of contextual and cultural factors in determining the effectiveness of information systems in educational settings.

Chapter 6 Conclusions and Recommendations

6.1 Introduction

The aim of this thesis was to explore the ways management information systems, specifically SIMS, are used in secondary schools in England and to devise tailored training programmes to support their use. The research findings indicate there is a complex relationship between data culture, user training, and the use of MISs in secondary schools. Building on the expanded DeLone and McLean Information System Success Model developed in Chapter 5, this chapter emphasises the critical role of data culture as a bidirectional influence shaping MIS success and its practical applications in schools. The final section outlines further research for the future development of MISs to support data use in schools.

6.2 Summary of findings and revisiting the research questions

The aim of this research was to explore how management information systems are currently used in secondary schools and to devise training programmes to improve their use by different members of school staff. Using the DeLone and McLean Information System Success Model as a theoretical framework, I explored how SIMS is used and the factors influencing this use.

It is important to acknowledge the limitations of this thesis to provide context for the findings. The research was conducted within a specific geographical area, focusing on a limited number of secondary schools in England. This scope may restrict the generalisability of the results to other regions or educational contexts. Additionally, the study relied heavily on qualitative methods, which, while providing depth and insight, may be influenced by the subjective interpretations of the participants and the researcher. Despite these limitations, the findings offer valuable insights into the relationship between data culture, user training, and the effective use of MISs, specifically SIMS, in secondary schools.

The study applied the DeLone and McLean Information System Success Model (DeLone & McLean, 2003) in a secondary school context, providing insights into the factors affecting MIS success in schools. The research highlighted the importance of data culture and leadership in influencing the effectiveness of MIS implementation. By integrating these elements into the DeLone and McLean model, the study offers a more comprehensive framework for understanding MIS success in educational settings. The study's proposed enhancement of the DeLone and McLean model integrates data culture as a crucial dimension affecting all aspects of MIS success. This contribution expands the theoretical framework by introducing a bidirectional relationship between data culture and system dimensions such as system quality, information quality, user satisfaction, and system use. These insights provide a deeper understanding of the socio-technical complexities involved in MIS use within secondary schools and offer actionable recommendations for fostering supportive data cultures to enhance educational outcomes.

The findings and recommendations outlined in this chapter are illustrated in the following diagram to clarify the interconnected nature of findings and recommendations (Figure 6.1). This visual representation underscores the need for fostering a collaborative data culture, aligning leadership strategies with actionable goals, providing tailored training, and empowering data managers. Each recommendation is directly linked to a specific key finding, demonstrating a pathway for enhancing MIS use in schools.
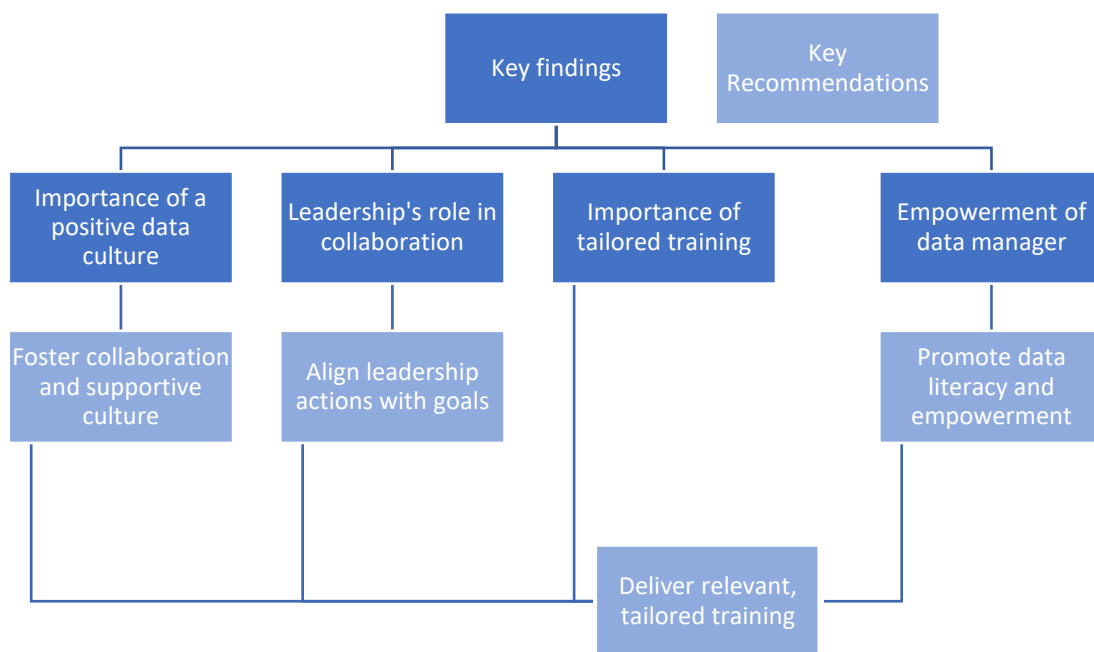
Figure 6.2: A visual summary of key findings and recommendations for enhancing the use of MISs in secondary schools.

The practical contributions of this study include evidence-based recommendations for enhancing MIS training programs and strategies for improving the usability of SIMS. The findings suggest that targeted, hands-on training sessions, developed in collaboration with data managers and tailored to the specific needs of different user groups, can significantly enhance user proficiency and satisfaction. Additionally, improving the user interface and usability of SIMS can help bridge the gap between intended and actual use, enabling schools to leverage the system more effectively for data-informed decision-making.

The research revealed a significant gap between the intended and actual use of SIMS in secondary schools. While SIMS is primarily intended to support data-informed decision-making to support school improvement, its actual use is largely limited to data collection and storage rather than analysis and application. Many users find the system's analysis tools complex and unfriendly, often resorting to alternative software like Microsoft Excel for data analysis. This mismatch between intended and actual use highlights a gap in the system's usability and the need for more user-friendly features.

These findings align with earlier studies, such as Visscher et al. (2003), who observed that many of SIMS' intended analytical modules were underutilised. This research builds on that foundation by showing that, despite advancements, the core issues of usability and effective data application remain unresolved. The reliance on external tools for data analysis emphasises the need for improved training and more intuitive interfaces within SIMS to maximise its potential as a comprehensive MIS.

While a majority of users expressed overall satisfaction with SIMS, deeper insights revealed significant frustrations related to the system's complexity, outdated user interface, and inadequate training. Users appreciated the comprehensive nature of SIMS but feel that its complexity often outweighed its benefits. The outdated user interface was particularly problematic, as it made navigation and data retrieval cumbersome. Additionally, the lack of training emerged as a significant barrier, preventing users from fully exploiting the system's capabilities. These findings suggest that improvements in user interface design and training could substantially enhance user satisfaction and ultimately use of SIMS.

These frustrations echo the findings of previous research, such as Enomoto and Conley (2007), who noted challenges in accessing and manipulating student data within new MIS implementations. The recurring issue of inadequate training highlighted in this study reinforces earlier observations by Visscher et al. (2003), emphasising the ongoing need for enhanced training programs. Addressing these usability and training concerns could significantly improve user satisfaction and the overall effectiveness of SIMS.

Effective training emerged as a crucial factor in enhancing the use of SIMS. The research highlighted that practical, hands-on training sessions, where users could work with their own data, were particularly effective. However, there was a notable gap in training provision, with many users feeling inadequately trained. This lack of training not only affected their ability to utilise SIMS fully but also contributed to the perception of the system as complex and difficult to use.

These findings support and expand upon the work of Shah (2014), who identified training as a critical component in the successful implementation of MISs in educational settings. The emphasis on practical, context-specific training aligns with the recommendations of Mandinach and Gummer (2016), who advocate for ongoing, targeted professional development to enhance data literacy among educators. The gap in training provision highlighted by this research underscores the necessity for continuous, tailored training initiatives to improve the effective use of SIMS in secondary schools.

The impact of data culture

The research highlighted the significant impact of the dominant data culture within schools on the success of MIS implementation. The data culture, influenced by broader educational policies and accountability measures in England, affects all dimensions of the DeLone and McLean Information System Success Model (DeLone & McLean, 2003). Schools with a supportive data culture, where data is used to inform teaching and learning, saw more effective use of SIMS. In contrast, schools with a compliance-driven data culture, focused on meeting external accountability requirements, struggled to integrate SIMS effectively into their practices. This underscores the need for a supportive environment for data use, facilitated by effective leadership and a shared vision for data-informed decision-making (Datnow & Park, 2014).

The findings discussed here show the 'messy realities' of technology and education (Selwyn & Facer, 2013) and the importance of gaining a deeper understanding into the use of technology in education, such as management information systems like SIMS, beyond simply how they are used.

6.3 Contribution and implications of the study

This study has contributed to the wider knowledge base in relation to the use of management information systems within schools in England and, after scoping the relevant literature in this field, presents the first in-depth analysis of the use of SIMS in secondary schools. Furthermore, this

research is the first to consider how the data culture within secondary schools and education in England influences and is influenced by the use of SIMS.

A significant theoretical contribution is the expansion of the DeLone and McLean Information System Succes model through the integration of data culture, as developed in Chapter 5. By emphasising its bidirectional relationship with MIS dimension, the study presents a comprehensive framework that highlights the importance of leadership, training and collaboration in shaping positive data cultures. This model not only extends the theoretical understanding of MIS success but also provides practical pathways for improving the use of SIMS in schools through targeted training, leadership strategies, and user-centric design improvements.

This research shows how a significant contribution to knowledge can be gained using a mixed method approach. Although most previous research on information systems has been conducted using quantitative methods, the priority in this research was the use of qualitative methods to explore and discuss in detail user experiences of SIMS. A significant contribution to knowledge was gained from my unique perspective as an insider researcher (Fleming, 2018). In particular, my insider perspective as an experienced data manager and SIMS user was vital in understanding how SIMS is used in schools. My knowledge of SIMS increased the trustworthiness of the data collected, as participants were able to trust me and answer my questions openly and honestly. Participants often used phrases like 'you and I know that' and 'to the likes of you and I', indicating their comfort in discussing technical aspects of SIMS with someone they perceived as knowledgeable. The openness of their responses suggests that my background helped to establish a positive research relationship quickly, making participants more likely to be candid in their feedback. This aligns with Brannick and Coghlan's (2007) assertion that insider researchers can gain deeper insights due to their familiarity with the context and the trust they build with participants.

6.4 Recommendations for practice

System and interface improvements

Improving the user interface of SIMS to make it more intuitive and user-friendly can significantly enhance its usability. Findings from this research highlighted that many participants found SIMS to be 'clunky' and 'difficult to use', which discouraged effective use and led to frustration among users. Users often compared SIMS unfavourably to other software that is 'quicker, clearer, easier, and more accessible'.

Additional findings from my research also revealed that the current system's lack of flexibility and the excessive time required for data entry were significant pain points for users. By addressing these usability issues and focusing on efficiency improvements, the potential for increased adoption and satisfaction among users could be significantly enhanced. Another key finding was the demand for more integrated help and support features within SIMS, as users often felt unsupported when encountering difficulties. Implementing a more robust support system could further improve user experience and overall effectiveness of SIMS.

To address these issues, incorporating feedback from users into the design and development process is essential. Participants emphasised the need for a more intuitive and visually appealing interface, similar to other modern software they use. User-centred design principles should be applied to ensure that the system meets the needs of all users, from data managers and examinations officers to teachers and school leaders. Enhancements might include simplifying navigation, improving the clarity and accessibility of data visualisations, and integrating more robust data analysis tools directly into the system.

Providing comprehensive user manuals and online tutorials can help users quickly learn how to use new features and functionalities. Regular updates and improvements based on user feedback can ensure that the system remains relevant and effective. Participants expressed a desire for training that was practical, hands-on, and tailored to their specific roles within the school, which would enhance their proficiency and confidence in using SIMS.

However, despite these improvements, there might be significant resistance to change from users who are accustomed to the current interface. The financial cost and time required to implement such changes may be substantial. Additionally, continuously updating the system based on user feedback could lead to instability and frequent changes, which might overwhelm users and reduce overall satisfaction. It is important to balance the need for improvements with the stability of the system to maintain user confidence and satisfaction.

Potential impact for data managers

Data managers should be empowered with ongoing training and professional development opportunities to stay updated with the latest features and best practices related to SIMS. This training should include comprehensive coverage of advanced data analysis techniques, efficient data entry methods, and troubleshooting common issues. Additionally, professional development should focus on the integration of SIMS with other educational tools and platforms, understanding updates and new features as they are released, and best practices for data security and privacy. Practical, hands-on sessions where data managers can apply what they learn using real-world scenarios and data sets from their schools would be particularly beneficial. By equipping data managers with these skills and knowledge, they will be better prepared to maximise the effectiveness of SIMS and support their colleagues in its use.

They should also be involved in the design and delivery of training programmes for other staff, ensuring that the training is practical, relevant and hands-on. Findings from School One demonstrated that practical, hands-on training sessions, where users could work with their own data, significantly enhanced user proficiency and confidence. For example, the training session at School One, which covered the use of marksheets and associated tools, was positively received by participants who appreciated being able to use their own class data during the training. By working closely with school leaders and teachers, data managers can identify specific training needs and develop tailored programmes that address these needs. This collaborative approach not only

ensures that training is relevant and practical but also helps bridge the gap between the technical and pedagogical aspects of data use.

Data managers play a pivotal role in ensuring the accuracy and integrity of the data collected, and their expertise can help bridge the gap between the technical and pedagogical aspects of data use. This aligns with findings by Lachat and Smith (2005), who highlighted the importance of data teams or data coaches in schools to promote the use of data to drive decision-making through MISs. Furthermore, Mandinach and Gummer (2016) emphasised that effective data use in education requires a combination of data literacy and pedagogical content knowledge, underscoring the critical role of data managers in connecting these domains. By working closely with school leaders and teachers, data managers can identify specific training needs and develop tailored programmes that address these needs. They should also facilitate regular data audits and reviews to ensure that data is being used appropriately and ethnically. By fostering a collaborative approach to data management, data managers can help create a positive data culture to support the use of SIMS and data within schools.

However, the increased responsibilities and expectations placed on data managers will require additional support and recognition from school leadership to implement changes and influence the data culture within each school. Evidence from the study highlights that data managers often feel their roles are not clearly defined and lack the necessary support to fully utilise SIMS. For example, data managers like Stephanie (DM2) expressed concerns about not knowing if they were fulfilling their role correctly and felt the need for more guidance and support from leadership. In School Two, the leadership team's regular review of data reports to inform policies and teaching strategies highlighted their commitment to data-driven decision-making. This active involvement significantly boosted staff engagement with SIMS, showing how leadership can positively influence data culture. This suggests that school leaders should model good practices, provide necessary resources, and recognise and reward effective data practices to foster a positive data culture. By offering clear

expectations, resources, and regular training, school leaders can empower data managers, who in turn can support leaders by integrating data use into teaching and decision-making processes, thereby strengthening the school's overall data culture.

Potential impact for teachers

Teachers need access to user-friendly data tools and continuous professional development to use data in their teaching practices. Training programmes should be tailored to teachers' specific needs, helping them to integrate data use into their instructional strategies to enhance student learning outcomes. Professional development should include hands-on training with real world examples, preferably using data from their classes, to illustrate the practical applications of data in the classroom. Teachers should be encouraged to collaborate with their colleagues to develop data use strategies that address the unique needs of their students. Furthermore, ongoing support through coaching and mentoring can help teachers build their data literacy skills and confidence in using data to inform their teaching practices. Developing data literacy involves more than just technical skills; it includes understanding the context of data, the ability to interpret and question data, and the skills to communicate data findings effectively. Teachers should be empowered to question the validity and reliability of data, critically analyse the sources of data, and understand the context in which data is collected and used. This critical perspective on data use can help teachers identify potential biases and limitations in data, leading to more informed and equitable decisions in the classroom. However, the additional training and development required may place a significant burden on teachers' already limited time.

Potential impact for school leaders

School leaders play a critical role in fostering a data culture that supports effective use of MISs. Leadership should prioritise ongoing training and professional development focused on the practical application of data in decision-making processes. By championing a positive data culture, leaders can ensure that data use is aligned with school improvement goals and not just compliance with

external accountability measures. Additionally, school leaders should establish clear policies and procedures for data use that emphasise transparency, ethical considerations and the importance of using data to inform decision-making. Furthermore, school leaders should model data-informed decision-making behaviours and create opportunities for staff to engage in collaborative data analysis. This involves setting clear expectations for data use, providing necessary resources and recognising data practices. Leaders should also advocate for a supportive environment where staff feel comfortable experimenting with new data tools and techniques without fear of punitive measures. By fostering a positive data culture, school leaders can leverage MISs to support improvements in educational outcomes.

Potential impact for Initial Teacher Education providers

Initial Teacher Education (ITE) providers play a critical role in preparing future educators to use management information systems and data in their teaching practices. By incorporating comprehensive training on the use of MIS and data-informed decision-making, they can equip new teachers with the skills and knowledge necessary to leverage data to enhance student learning outcomes. One key area for ITE provides to focus on is integrating data literacy into the curriculum by teaching future educators how to interpret data, understand its implications and use it to inform their teaching practices.

Additionally, it is important to ensure that data literacy training is not only theoretical but also practical. During my PGCE, I was required to complete a 'school-based analysing data task' where I analysed a screenshot from SIMS of a Year 10 science class from an unknown school. This task involved evaluating student attainment against national and school targets, using colour coding to indicate performance levels. Reflecting on this task, it became clear that trainee teachers need to develop the skills to not only read the data but to engage in deeper analysis that can inform instructional practices. For example, understanding why certain students are underperforming and how targeted interventions can support their progress. However, the task was limited in its scope,

primarily focusing on surface-level data interpretation without delving into the nuances of student performance or contextual factors that might influence outcomes. This simplistic approach risks fostering a superficial understanding of data use among trainee teachers.

Furthermore, the findings of this study together with my experience as a PGCE student revealed that ITE providers should emphasise the continuous and iterative nature of data use in teaching. This means training future educators to use data as an ongoing tool to adapt and refine their teaching strategies, rather than as a one-time evaluative measure. For instance, the 'school-based analysing data task' required considering how a head of department might use the data in end of term reviews, reflecting a data culture focused on accountability and compliance (Kelly et al., 2010). However, I was not required to engage in the data in a way that would lead to meaningful instructional changes or to question the underlying assumptions and limitations of the data provided. Ensuring that trainee teachers can recognise and cultivate positive data cultures to ensure data is used ethically and constructively to translate data insights into practical classroom strategies is vital to support data-informed decision-making.

However, integrating comprehensive data literacy training into existing curricula may require additional resources which may not be feasible for all ITE providers. It is important to address these resource constraints by advocating for institutional support and exploring innovative solutions such as collaborative projects with schools, online training modules, and leveraging existing educational technologies. Additionally, ITE programs should incorporate feedback mechanisms to continuously improve data literacy training based on the evolving needs of trainee teachers and the challenges they face in real classroom settings**.**

Potential impact for policy makers

Policy makers play a key role in shaping the framework within which schools operate. Ensuring that policy development is informed by evidence-based research, such as this study, can lead to more effective and supportive policies that enhance the use of MISs in schools. Policy makers should

focus on creating policies that promote continuous professional development, support the integration of user-friendly data systems, and encourage a positive data culture in schools.

6.5 Limitations of the study

Although this thesis has contributed important insights into the use of management information systems in secondary schools in England, it is recognised that as with any research it has limitations. The nature of case study methodology means that generalisations in a statistical sense cannot be made. However, case studies can be used make analytic generalisations (Lincoln & Guba, 2000; Yin, 2012) or to build theoretical premises that can be used to make assertions to similar situations as the case studies. Therefore, although the sample could be considered small as only three schools were chosen as cases, I am able to make claims resulting from my research findings. However, each of the case study schools that participated in this research were similar in terms of size, Ofsted rating and Progress 8 score (Table 3.2). Therefore, although multisite case studies are able to provide better generalisability than single case studies this research (Wikfeldt, 1993), this research is limited by the similar nature of cases chosen.

As with all research, decisions are made to prioritise particular data which renders other data invisible, and many different stories could have been highlighted by emphasising different data. Therefore, it is crucial that I reflect on how my changing positionality from a data manager to a teacher has influenced this research. For example, I must consider how my positionality influenced the interactions I had with participants. Although I did not explicitly explain my knowledge and experience of SIMS to participants, many of them viewed me as an experienced user of SIMS and therefore used the interview to ask me questions about how SIMS can be used. Within the interviews I answered these questions, and this may have influenced participants responses. However, upon reflection of the interviews, I believe that my knowledge of SIMS enhanced participant responses as I was able to ask more in-depth questions about SIMS use within each school that a researcher without such knowledge would not be able to do.

There were aspects of this study that required me to be flexible and review my approach. For example, although I had planned to support the data manager in delivering training sessions at each of the case study schools this was only possible at School One. Furthermore, at School One, Adam (DM1) and I discussed delivering a series of training sessions which would have resulted in more insights into how SIMS use is influenced by training. However, due to the COVID-19 pandemic and the closure of schools shortly after the training session, delivering more training sessions was not possible.

6.6 Reflection on changing positionality

Throughout this study I have been mindful of how my changing positionality has influenced the research. While my background as a data manager allowed for deeper engagement with participants, it may have introduced biases in how data were interpreted (Branniick & Coghland, 2007). My familiarity with SIMS and data management processes might have led to assumptions that influenced my interactions and interpretations, potentially overlooking the perspectives of those less familiar with these systems.

However, as I complete this research, I am now able to consider how the research has influenced me. My journey from a data manager to a teacher provided unique insights into the multifaceted use of MISs in schools. This transition allowed me to appreciate both the technical and practical challenges of using MISs in education. Initially, as a data manager, I focused on the technical aspects of SIMS and its potential to support data-informed decision-making. My technical background meant I often saw data management through the lens of efficiency and accuracy, emphasising the system's capability to streamline administrative tasks and enhance decision-making processes. Now, as a teacher, using an unfamiliar MIS, I have experienced firsthand the frustrations of not knowing how to use system and not receiving the training required to support my MIS use. However, since becoming a teacher, I have become more concerned with how data are used within schools from a critical perspective. Teaching in the classroom has exposed me to the day-to-day realities and

pressures teacher face, shifting my focus from the systemic benefits of MISs to their direct impact in teaching practices and teacher morale. This research has influenced my decision on where to teach and has made me more vigilant in ensuring that data are used to support rather than penalise teachers. It has heightened my awareness of the potential for data to be misused in ways that can undermine teacher autonomy and professional judgement. As a result, I am committed to fostering a data culture that values transparency, ethical use, and constructive feedback, ensuring that data serves as a tool for empowerment and improvement rather than control and compliance. My experience as a data manager, senior leader and a teacher has equipped me with a balanced perspective, recognising both the power and pitfalls of MIS use in education.

6.7 Suggestions for further research

How teachers, data managers and school leaders use data and SIMS is a fertile field for researchers and it is evident that this thesis is just the beginning of exploring how SIMS is used within schools and the influence of data culture on SIMS use. The use of SIMS and the data within SIMS varies from user to user within a school and from school to school. The reasons for these differences are important in further understanding how SIMS and data are used in schools. Further research could expand the scope to include primary schools and schools in different countries. Comparative studies across different educational contexts provide valuable insights into how various factors influence the use and effectiveness of MISs. In particular, further research on how management information systems such as SIMS are used within positive data cultures would provide further insights into the relationship between data culture and information system success.

Another key area that has been under researched and is not included in this study is how students themselves and their parents use SIMS or other management information systems and the data within. Understanding how these stakeholders interact with the system could provide insights into the broader impacts of MISs. Research could explore how students use data to track their own

progress and how parents use MISs to engage with their child's education and how these uses affect student outcomes and parental involvement.

6.8 Summary

This thesis has provided an in-depth exploration of how management information systems, specifically SIMS, are used in secondary schools in England. The research highlights the complexities involved in the intended versus actual use of SIMS, emphasising the need for more user-friendly features and comprehensive training programs to bridge this gap. By applying the DeLone and McLean Information System Success Model (DeLone & McLean, 2003), this study has shown the significant impact of data culture and leadership on the use of MISs. A central contribution of this research is the expanded DeLone and McLean Information System Success Model, integrating data culture as a critical dimension influencing MIS success. This addition addresses a gap in existing literature by demonstrating how cultural and organisational factors interact with technical systems to shape outcomes.

The findings suggest that while SIMS offers a robust system for managing and analysing school data, its full potential can only be realised through positive data cultures and effective training. Schools with a supportive data culture, where data is actively used to inform teaching and learning, enable SIMS users to fully leverage the system's capabilities compared to those driven by compliance and external accountability measures. This context underscores the necessity for a supportive environment facilitated by effective leadership and a shared vision for data-informed decision-making.

Changes in the training and education provided to secondary school teachers are essential to enhance the use and effectiveness of MIS, particularly SIMS. The research argues that a lack of comprehensive training and supportive data cultures limits the potential of these systems, ultimately affecting teachers and students. By ensuring that educators receive adequate training,

have the confidence and autonomy to use these systems effectively, and have the support of their colleagues and leaders, the full potential of SIMS can be unlocked.

My study provides evidence that building effective use of MIS begins with the initial teacher education (ITE) offered to secondary school educators. By integrating comprehensive training on MIS and data-informed decision-making into ITE programs, we can better prepare future teachers to utilise these systems in their practice. This approach not only improves the usability of SIMS but also supports a positive data culture that benefits both teachers and students.

In conclusion, the successful integration of MIS in education requires a combination of user-friendly systems, comprehensive training, and supportive data cultures. By addressing these key areas, schools can transform their data use practices, leading to improved teaching, learning, and overall educational outcomes. This thesis has laid the groundwork for future research and practice, highlighting the role of the use of management information systems to support data use in schools.

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Appendix

Appendix A: Explanation of SIMS modules(https://www.ess-sims.co.uk/)

Attendance SIMS Attendance module allows schools to efficiently track and manage student attendance. It provides tools for recording absences, generating attendance reports, and identifying attendance patterns that may require intervention. This module supports statutory reporting requirements and helps improve overall attendance rates by providing actionable insights.

Assessment The Assessment module in SIMS offers comprehensive tools for tracking student progress and performance. Teachers can input grades, monitor individual student achievements, and generate reports to inform teaching strategies and parent communications. This module supports formative and summative assessment practices and integrates with other SIMS modules to provide a holistic view of student progress.

Behaviour SIMS Behaviour module helps schools manage and monitor student behaviour effectively. It allows for the recording of both positive and negative behaviour incidents, enabling staff to implement behaviour management strategies and interventions. The module supports the creation of behaviour reports and the analysis of trends to improve school climate and student conduct.

Communication The Communication module facilitates effective engagement with parents, students, and staff. It includes tools for sending emails, SMS messages, and letters, ensuring that important information is disseminated quickly and efficiently. This module supports better home-school communication, which is crucial for student success and parental involvement.

Reporting SIMS Reporting module provides powerful tools for generating a wide range of reports essential for school management. From academic performance to attendance and behaviour, the module offers customisable templates and real-time data analysis. It helps school leaders make informed decisions and meet statutory reporting requirements.

Finance The Finance module in SIMS supports the management of school finances, including budgeting, expenditure tracking, and financial reporting. It integrates with other financial systems and provides tools for managing accounts payable and receivable, payroll, and fixed assets. This module ensures financial transparency and accountability.

Resource Allocation SIMS Resource Allocation module helps schools manage their resources effectively, including classrooms, equipment, and teaching materials. It supports the planning and allocation of resources to ensure they are used efficiently and meet the needs of students and staff.

Staff Management The Staff Management module provides tools for managing all aspects of staff employment, including recruitment, contracts, absence management, and professional development. It integrates with other SIMS modules to provide a comprehensive view of staff performance and support strategic HR planning.

Parental and Student Engagement This module includes features like the SIMS Parent and SIMS Student apps, which enhance communication between the school, parents, and students. These tools provide access to student records, attendance, timetables, and school reports, fostering greater engagement and transparency.

Timetabling (Nova T6) Nova T6 is a specialised module for creating and managing school timetables. It offers flexibility and customisation to accommodate the unique scheduling needs of each school, ensuring that classes, rooms, and teachers are optimally allocated.

SIMS Group Analytics SIMS Group Analytics provides detailed reporting and insights for multi-academy trusts (MATs). It allows for the aggregation and analysis of data across multiple schools, helping to identify trends and drive improvements at a larger scale.

Appendix B: Questionnaire

For questions 1-19, the available responses were: Strongly Agree, Agree, Disagree, Strongly Disagree

1. I have the skills to use SIMS.
2. I am confident using SIMS.
3. I am motivated to use SIMS.
4. I am satisfied with SIMS.
5. I can get help to use SIMS.
6. I have received adequate training to use SIMS effectively.
7. The use of SIMS increases my workload.
8. SIMS provides easy access to useful information.
9. SIMS facilitates efficient and quick decisions.
10. SIMS improves the quality of student reports.
11. SIMS is user friendly.
12. SIMS helps me to efficiently record my assessment data.
13. SIMS helps me to use data effectively.
14. SIMS promotes collaborative data use.
15. I would like to use SIMS more.
16. I don't know the full capabilities of SIMS.
17. I don't have the time to use SIMS effectively.
18. I want more training related to SIMS.
19. I provide internal training on SIMS in my school.
20. Which of these SIMS modules have you used / heard of?
    (Choose as many as you like: SIMS Pay (Agora), Discover, Examinations, InTouch, Learning Gateway, Parent App, Personnel, Teach app, None of the above)
21. Within SIMS.net which areas have you used / heard of?
    (Choose as many as you like: Lesson Monitor, Behaviour Management, Chance Analysis, Aspect Analysis, Linked Documents, Reports, Student Lists, Profiles, Marksheet Entry, Group Analysis, Result Set Analysis, Student Details, Groups, Communication Log, Interventions, None of the above)
22. What do you use SIMS for?
    (Choose as many as you like: Completing Registers, Viewing Student Details, Accessing Linked Documents, Completing Student Reports, Viewing graphical data in Discover, Running reports, Adding data to marksheets, Data analysis, Completing / viewing trackers, Making / viewing exam entries)
23. Please provide any other uses.
    (free text)
24. Are there any additional features you would like to see added to SIMS? If yes, please provide details.
    (free text)
25. Approximately, for how long have you used SIMS?
    (Less than 1 year, 1-2 years, 2-3 years, 3-5 years, 5-10 years, more than 10 years)
26. On average, how many hours per week do you use SIMS?
    (free text)
27. Approximately, how many hours of formal SIMS training (internal or external) have you received?
    (free text)
28. Approximately, how many hours of informal SIMS training have you received?
    (free text)

29. Would you attend further training? If yes, please indicate what kind of training you would like to receive. If no, why?
(free text)
30. Please list other systems that you use to collector analyse data at your school.,
(free text)
31. How old are you?
(free text)
32. To which gender do you most identify?
(free text)
33. What is your job title?
(free text)
34. What is your name?
(free text)
35. Would you be willing to participate in a follow up 30-minute focus group?
(Yes, No)
36. If yes, please type your school email below.
(free text)

Appendix C: Participant information sheet and consent form

Information Sheet

Section A: The Research Project

Research Title: How can training support the use of Management Information Systems in secondary schools in England?

Purpose: To better understand the use of management information systems (MISs) in secondary schools in England and to devise training programmes to improve the use of MISs in schools.

Who: Kate Spurling

Programme: EdD in Education at St Mary's University, School of Education, Theology and Leadership

Section B: Your Participation in the Research Project

A selection of schools have been asked to take part in this research. The first part is an online questionnaire that should take approximately 5-10 minutes to complete. The questionnaire includes questions relating to the use of management information systems in your school. You may also be invited for a focus group that will take approximately 30 minutes. You may withdraw at any time either verbally, via email or using the slip provided on the consent form. There are no risks involved and you do not need to take any special precautions before, during or after taking part in this study. Agreement to participate in this research should not compromise your legal rights if something goes wrong. Data collected from you will be anonymised and stored securely. A summary of report findings will be available to you upon completion of this project.

Name of Participant: _____

Title of the project: How can training support the use of Management Information Systems in secondary schools in England?

Main investigator and contact details:
Kate Spurling
145465@live.smuc.ac.uk

Supervisor and contact details:
Christine Edwards-Leis
christine.edwards-leis@stmarys.ac.uk

1.   I agree to take part in the above research. I have read the Participant Information Sheet which is attached to this form. I understand what my role will be in this research, and all my questions have been answered to my satisfaction.
2.   I understand that I am free to withdraw from the research at any time, for any reason and without prejudice.
3.   I have been informed that the confidentiality of the information I provide will be safeguarded.
4.   I am free to ask any questions at any time before and during the study.
5.   I have been provided with a copy of this form and the Participant Information Sheet.

Data Protection: I agree to the University processing personal data which I have supplied. I agree to the processing of such data for any purposes connected with the Research Project as outlined to me.

Name of participant (print)…………………………Signed……………………Date………………

Name of witness (print)……………………………..Signed…………………..Date………………

Would you be willing to take part in a follow-up 30-minute interview?   Yes   /   No

If you wish to withdraw from the research, please complete the form below and return to the main investigator named above.

Title of Project: How can training support the use of Management Information Systems in secondary schools in England?

I WISH TO WITHDRAW FROM THIS STUDY

Name: _____

Signed: _____   Date: _____

Ethics Addendum

SMEC_2017-18_107

Kate Spurling (ETL): 'How can training support the use of Management Information Systems in secondary schools in England?'

Purpose of the study

The purpose of this study is to better understand the use of management information systems (MISs) in secondary schools in England and to devise training programmes to improve the use of MISs in schools. The study will focus on the most widely used management information system in secondary schools (SIMS). The tools used will be an electronically distributed questionnaire and then follow up interviews and focus groups. Following the analysis of these data, a programme of training will be developed with a sample of SIMS users in schools.

This addendum to the original ethics application is to observe a training session that I have developed with the data manager at one of the research schools. I did not include details of this stage of the research in my original ethics application because at that time I did not know how the training would be delivered or how I would collect data from the sessions.

The training session will be delivered by the data manager and the attendees will be members of staff at their school. The training session will take place at the research school, after the end of the school day. I will observe the training session, ask for written feedback at the end of the session and invite participants to take part in a follow-up interview following the training session. I will collect consent from all the people attending the session and the data manager. If anybody attending the session does not want to take part in the research, then I will not observe them. I will not record the training session. I will collect additional consent forms for any follow-up interviews following the training session.

Appendix D: Interview Schedule

Issue/topic	Possible questions	Possible follow-up questions	Probes
Use of SIMS	Can you tell me about how SIMS is used at *school name*? Ideally, how would you like SIMS to be used in your school?	Why has this not been achieved yet? How could this be achieved?	Are you able to tell me more about that…? Can you explain that some more? Oh….? And? And then? Go on.
Opinion of SIMS	Can you tell me about your opinion of SIMS?	Why do you have this opinion? Has your opinion of SIMS changed? Why do you think people might have different opinions of SIMS?	Was this what you expected? What would you like to have happened? Can you define *word used*? *Word used?* What do you mean by that? Why? Can you give me an example?
Data manager	Can you tell me about your role as data manager?	What should a data manager do? What do colleagues think a data manager should do?	Can you say a bit more about that? What makes you say that? Why do you think you feel like that?
Data culture	Can you tell me about how data are used at your school? How do different teachers, subjects, leadership use data?	Why are data used in this way? How does the use and opinion of SIMS relate to the data culture at your school?	Just to make sure I've understood, could you explain exactly why…?
Training	Can you talk about the training you have had on SIMS? Can you talk about the training you have provided for colleagues? What represents the most effective use of SIMS? What does this mean at your school? How can training relate to the use and opinion of SIMS? How can training relate to the data culture?	What kind of training would you like to attend? What kind of training would you like to provide for colleagues?	
Other topics	Is there anything else you would like to say? Debrief		

Focus Group Schedule

Issue/Topic	Possible Questions	Possible Follow-up Questions	Probes
Use of SIMS	Can you tell me about how you use SIMS at *school name*?	What are some examples of tasks you use SIMS for on a daily basis?	Can you say more about that? / How often do you interact with it?
	Ideally, how would you like SIMS to be used in your school?	What would be needed for SIMS to work that way?	Why do you think this hasn't been achieved yet? / Could you give a specific example?
	How has SIMS use changed over time?	What factors contributed to this change?	Was this the outcome you expected? / What would you have liked to happen differently?
Opinion of SIMS	Can you tell me about your opinion of SIMS?	Why do you feel this way?	Has your opinion changed over time? / What makes you say that?
	How do you think SIMS could be improved?	What kinds of changes would make it more effective?	Can you explain that some more? / Could you give an example?
Data Culture	How are data used at *school name*?	How do different departments or leadership teams use data?	Can you say more about that? / What purpose does data serve in each role?
	How does SIMS fit into your school's data culture?	Why do you think data is used in this way?	Is SIMS effective in meeting these needs? / Why or why not?
	What challenges do you face with SIMS regarding data handling?	How have you or others managed these challenges?	Can you give an example? / What would help resolve these issues?
Training	Can you talk about the training you've had on SIMS?	How useful has this training been for your needs?	Could you say a bit more about that? / What could have improved the training?
	Have you provided any training for colleagues on SIMS?	What kinds of questions or challenges do colleagues bring to you?	Can you give an example? / How could training be more effective?
	What kind of training would you like to attend in the future?	How could this training help improve SIMS use or attitudes?	Just to make sure I understand, what would ideal training look like for you? / Why do you think this training would be helpful?
Other Topics	Is there anything else you would like to share about your experience with SIMS? Debrief		

Observation schedule

Issue/Topic	Observation Notes	Questions Raised	Follow-up Actions or Probes
Logging into SIMS and Initial Reactions	15:50 - Logging on to SIMS. 15:51 - Handouts for lates; 7 shaking head at marksheets; 3 and 6 laugh, expressing confusion about instructions. Not everyone logged in; some following instructions closely while others look confused.	Why were multiple participants laughing and appearing confused at initial instructions? What can be done to ensure all participants are logged in promptly?	Observe explanation style; note clarity in instructions. Review whether login support or staggered entry would help participants start together.
Learning SIMS Navigation	3 teaching 6 how to use marksheets; Data manager mentions 'available columns' – some users express confusion over terms. 8 'How are you supposed to know that?' and 'Oh dear' as she opens marksheet. 9 confirms exam numbers with Data Manager to avoid redundant questions.	Are the terms used in SIMS aligned with users' familiarity, and could standardised language help? Could more self-guided learning options help participants find answers on their own?	Identify terms that create obstacles for participants; consider adding a glossary or brief terminology review. Observe who tends to seek confirmation from Data Manager and who learns independently. Document recurring questions.
Peer Learning and Assistance	15:54 - 3 and 6 discuss navigation; 6 also starts helping 8. Data Manager and peers assist with filtering data and adding student columns. 6 'throws hands in air like tada!' after correctly applying filters, showing a sense of achievement.	How effective is peer learning in understanding SIMS functions? Are these informal 'mini-celebrations' reinforcing confidence and retention?	Track pairs or groups where peer learning is strong; could collaborative exercises benefit other sessions? Explore if encouraging brief 'progress check-ins' could maintain motivation.
Use of Filters, Columns, and Marksheet Tools	16:01 - Participants start experimenting with filters and	Would further instruction on the	Identify specific points in filtering where users get stuck;

	marksheets; 3 and 6 struggle with finding marksheets. 7 asks, 'How do I take the filters off?' Data Manager tells group to 'feel free to play,' allowing users to experiment. Some still express confusion; 8 struggles to exit zoom mode on SIMS interface.	marksheet filtering tool be useful? Could providing hands-on practice with exploration time help consolidate learning?	consider repeating these functions in a follow-up session. Follow up on whether practice improved understanding or if additional guidance was necessary.
Problem Solving and Support Requests	16:04 - 6 forgets steps to access all marksheets, tries to recall steps using the handout, demonstrates self-learning. 4 helps Data Manager troubleshoot options. 3 becomes visibly frustrated; 8 sighs, 'Who designed SIMS?' in frustration; Data Manager discusses flaws, limited updates, and feedback challenges.	Are handouts effective as reference materials for troubleshooting? Are there recurring frustrations with SIMS that could be minimised through alternate tools?	Track which tools are used most for troubleshooting and note areas where the handout could be improved. Assess if specific functions can be streamlined or if alternative workflows could alleviate frustration.
Participant Questions and Technical Challenges	16:17 – Data Manager addresses common challenges in SIMS; participants discuss alternative platforms like Go4Schools and SISRA. 16:22 – Data Manager addresses issues around data entry, discussing practical tips for efficiency in SIMS.	Could alternative platforms provide value, or is SIMS adequate with sufficient training? How effective are Data Managers techniques in reducing data entry issues, and are there other approaches?	Record participant preferences for potential alternative solutions to assess compatibility. Probe for more examples or feedback from participants on data entry efficiency and alternatives.
Feedback and Final Comments	16:20-16:32 - Participants make	Is more structured, ongoing support a	Follow up on training schedules and

	closing comments on training improvements; Data Manager acknowledges challenges with SIMS updates and training.	priority for participants?	suggestions for future sessions; assess preferred timing for training.

Appendix E: Post-training Feedback questionnaire

◢ **Course Delivery and Content** *1 = Not Satisfied 2 = Quite Satisfied 3 = Satisfied 4 Very Satisfied*

1.	The presentation methods were easily understood.	1	2	3	4
2.	The pace was appropriate.	1	2	3	4
3.	The content was relevant to your needs	1	2	3	4
4.	The delivery was engaging and interactive	1	2	3	4
5.	The session had useful and engaging resources	1	2	3	4

Please comment if you scored less than 3

....

Impact *1 = Not Satisfied 2 = Quite Satisfied 3 = Satisfied 4 = Very Satisfied*

7.	The objectives of the session were fully met.	1	2	3	4
8.	You were given a clear idea of how to implement what you have learned.	1	2	3	4
9.	You are satisfied that you are able to implement the learning from the session	1	2	3	4
10.	That the session will help improve your teaching.	1	2	3	4

Please comment if you scored less than 3

....

ADDITIONAL INFORMATION

1. Please detail the most useful aspects of the session for you

2. Will you do anything differently in your teaching as a result of today?

3. Is there further CPD that you would identify for yourself arising from this training?

4. Any other comments/recommendations?

Thank you for completing this evaluation form.

22 May 2018   SMEC_2017-18_107

Kate Spurling (ETL): 'How can training support the use of Management Information Systems in secondary schools in England?'

Dear Kate

University Ethics Sub-Committee

Thank you for re-submitting your ethics application for consideration.

I can confirm that all required amendments have been made and that you therefore have

ethical approval to undertake your research.

Yours sincerely

Prof Conor Gissane
Chair, Ethics Sub-Committee

cc Dr Christine Edwards-Leis

Appendix G: Example of coded data

1.	I	Can you tell me about how SIMS is used here?
2.	P	Er currently it's used as our principal MIS and you'd be delighted to know we are increasing its use by teachers.
3.	I	OK.
4.	P	There until a year ago teachers didn't have much access to it all principally because they didn't have access to it their classrooms. So therefore there has been quite a big change in the culture since that inception which is just over a year ago. It's deeply embedded as our MIS and sometimes that's a frustration for all of us because SIMS is not perfect and SIMS sometimes feels like an immovable object like someone wants something erm and approaching Capita is futile. Erm therefore I have to come up with a workaround and I'm reasonably good at those but whenever you are coming up with workarounds you need to see the impact of it in other areas.
5.	I	Yep.
6.	P	Rather than just going 'Yep that'll be fine'. Erm so that's where we are at at the moment.
7.	I	OK erm a few things you said I'd like you to discuss in more detail. So you said that contacting Capita was futile. Where would you go for help?
8.	P	OK soft level support comes from our local provider. It's called 3BM.
9.	I	OK.
10.	P	That, it's called 3BM because that was the three boroughs i.e. bought out that used to be SIMS Capita support and nowadays it's independent. No issue with them although if I'm honest having used SIMS for 15 years now I often know as much as them, if not more.
11.	I	OK.
12.	P	With the greatest respect to them.
13.	I	Yep.
14.	P	As to Capita, the provider. I rarely approach them. When we have approached them erm it's very rarely been been fruitful and the perception of me and most users because I'm in two Facebook groups but but nationally for other users is that erm they just don't move the goalposts.
15.	I	OK.
16.	P	So what to a lay person would seem a really simple thing, erm yeah automated login generation, so that when someone gets added to SIMS the process is really straight forward. Well it just goes on a wish list and never happens.
17.	I	Right.
18.	P	I am the Exams Officer. Capita have been talking about the exams module which is an old-style module erm moving into the modern suite for as long as I've been an Exams Officer, which is six years. Erm so it hasn't happened.
19.	I	OK.
20.	P	They're still talking about trialling it next year. Yet to see anything of value
21.	I	OK.
22.	P	Yeah.
23.	I	You mentioned, did you mention Facebook groups?
24.	P	Yeah.

KS Kate Spurling … ✏ 🖊
2. Use: actual
[Reply]

KS Kate Spurling … ✏ 🖊
4. System quality: access
[Reply]

KS Kate Spurling … ✏ 🖊
4. Data culture: positive change
[Reply]

KS Kate Spurling … ✏ 🖊
4. User satisfaction (-)
[Reply]

KS Kate Spurling … ✏ 🖊
4. System quality: flexibility (-)
[Reply]

KS Kate Spurling … ✏ 🖊
4. Service quality (-)
[Reply]

KS Kate Spurling … ✏ 🖊
4. Use: actual: workaround