



Information and Communication Technology Integration in an International High School:  
The Influence of Leadership

By

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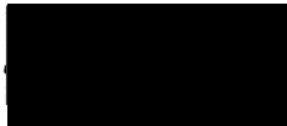
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## Declaration

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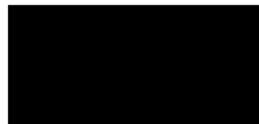
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## **Abstract**

Information and communication technology (ICT) integration in teaching and learning has become an imperative worldwide. However, this remains problematic due to various factors in different contexts. Often, the extent and success of ICT integration depends on the school leadership hence this study explored ICT integration in an international high school with a focus on the influence of leadership. A qualitative case study was done with 13 participants from one international high school. Data were generated through interviews and document analysis to understand how ICT integration was enacted, the leadership influence and why the school enacted ICT integration in the way it did. The qualitative data were analysed through open coding followed by axial coding to identify salient themes. The theories of technology organisation environment and transformational leadership were used as a lens to make sense of the findings. The results show that the school's ICT vision and policy informed resource provision and integration in various sectors of the school life. ICT integration was a driver for active learning, information management and school communication. There was decentralisation of responsibilities, strategic ICT resourcing, and regular professional development activities to upskill staff. ICT integration was enacted in response to different stakeholder expectations and to sustain effectiveness and efficiency in school operations. Based on the findings of this study, a needs-based approach to ICT integration leadership is proposed. The needs stem from the curriculum, people, school functionality, and the educational context. Empirical research to test this approach is necessary to develop a better understanding of ICT integration leadership.

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I am grateful to my wife Queen, for the love, support and understanding whilst I did this study. To my daughter Panashe, your time for a PhD will come. Gratitude is extended to my brothers and sisters Christopher, Stan, Mildred, and Lethiwe for their encouragement.

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## **Dedication**

This PhD thesis is dedicated to my mother whose vision I found astounding.

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# CHAPTER 1

## ORIENTATION TO THE STUDY

### 1.1 Introduction

Information and communication technology (ICT) has influenced how people communicate, work, manage finances, trade and keep abreast of the ever-changing social networks (Vandeyar, 2020). Consequently, schools and the education sector cannot afford to lag in ICT adoption and integration in their functioning (Bariu, 2020). International schools do not necessarily have different ICT needs from other schools. However, these schools are usually characterised by higher access to expensive resources and run at exorbitant fees (Hughes, 2020). They are purported to offer a credible, internationally accepted alternative (to the national curricula in the countries in which they operate) and expedite access to renowned global universities (Lee et al., 2012). Thus, ICT integration at an international school is bound to be higher than in public schools, thereby increasing the chances of meeting the objectives of this study.

ICT is used to manage the smooth flow of information, decision making, data processing and storage, resource management, improving the quality of teaching and learning and in general school management and administration (Antonio & Lorenzo, 2019; Lawrence & Tar, 2018; Mwadulo & Odoyo, 2020; Nurjanah et al., 2017). ICT's functions make it an indispensable tool that an efficient school cannot do without. In running international schools, there is a vast amount of student and staff information that ranges from records of student performance, their progression, accounts, staff details, their mobility, and performance. The sensitivity of this information requires well-established and maintained computerised systems of record-keeping (Mwadulo & Odoyo, 2020). The availability of ICT tools is a critical factor for ICT integration (Singhavi & Basargekar, 2020), and ICT integration leadership is required so that the suitable ICT is invested in schools and the users of the technology are fittingly equipped and skilled to use it (Mirzajani et al., 2016). Thus school leadership is responsible for making decisions about ICT tools acquisition, their eventual use and overall functionality around ICT (Ghavifekr et al., 2016). Therefore, this study investigates ICT integration for school operations and the influence of leadership in an

international high school. This study was a qualitative case study of a single high school in Eswatini. Two complementary theoretical perspectives guided the study: technology organisation environment theory and transformational leadership theory. The school's suitability came from two advantages that made data gathering possible. The major advantages were that it is one of the ICT-resourced schools in the country and the school offered various curricula that are aligned to ICT integration. Students engaged in activities that involved ICT and so a rich account of ICT integration was possible.

In line with the aim of this study, this introductory chapter presents the background to the study, a problem statement of what needed to be researched, the research objectives, and research questions. The purpose and rationale of this study are presented before defining the concepts used in this thesis. The chapter concludes by making a synopsis of each of the ensuing chapters.

## **1.2 Background to the Study**

Schools have the challenge of producing technology-suffused environments in an atmosphere with dynamism in appropriate technology, relevant skills and keeping up with change (Dexter, 2018; Hero, 2020). Rapid and pervading technologies like mobile phones, computers, the internet, and closed-circuit television (CCTV) cameras, which people worldwide use to create, store and communicate information, have seemingly complicated the education sector (Antonio & Lorenzo, 2019). The same authors argue that complications arise from diverse cultural contexts of ICT integration, attitudes, language barriers, and the rate of ICT integration. In some contexts, ICT integration in education poses challenges and is bothersome (Samarakoon et al., 2017). Implementation requires extra time, the necessary skills are challenging to learn and can be avoided or partially done when people have a choice (Antonio & Lorenzo, 2019). In other contexts, ICT integration is the current thing and the only way to forge forward as the advantages of using and having ICT outweigh the disadvantages (Zakaria & Khalid, 2016).

Nevertheless, there is an amplified pressure and expectation on education to be responsive to a technology-driven society and integrate ICT, especially, in the curriculum (Shahid et al., 2019). As a result, examination bodies attempt to prevent schools from training students in yesterday's skills and ICTs that might neither be effective nor fit tomorrow's world (Mikre, 2011).



There is also a growing interest in how ICT can best be used to improve efficiency and effectiveness in school operations (Estremera, 2019; Ghavifekr & Rosdy, 2015; Mikre, 2011).

ICT integration in teaching has risen because of the high demand for student capacity and knowledge in times of universal integration and education (Maharaj-Sharma & Sharma, 2017; Tran et al., 2020). As a result, there is a lot of research about ICT integration in schools, specifically dealing with classroom interactions and teaching and learning (Arkorful et al., 2021; Birisci & Kul, 2019; Ngeze, 2017; Ojo & Adu, 2018). ICT management of daily tasks, inventory, communication and inventory are mentioned in passing. ICT plays an increasingly important role in the quality of education in the classroom, online instruction, administration and other school activities (Lawrence & Tar, 2018; Mwadulo & Odoyo, 2020).

School functions like budgeting, planning, teaching, managing, supervision and general communication in a modern school rest on solid ICT provision and usage (Senthilkumar et al., 2014; Sulaiman et al., 2017). Antonio and Lorenzo (2019) argue that the more ICT is acquired and utilised in schools, the more benefits staff and students get from it. ICT revolutionises school management, enhances organisational structures, creates links with communities, empowers teachers and students, and enables sundry benefits like creating school websites that catalyse access to information, ease student registration, and acquire results (Mwadulo & Odoyo, 2020). ICT advances increasingly develop changes intended to deliver improvements in education and offer a new prototype of how education is provided globally (Lawrence & Tar, 2018). Moreover, ICT has become progressively crucial since the COVID-19 pandemic ravaged the world by the end of 2019 (Manco-Chavez et al., 2020). Furthermore, the COVID-19 pandemic brought much discourse around ICT integration with it serving as a lever for change, and opening up new ways for teaching, learning and assessment (Hall et al., 2021).

Leadership is essential in driving technological endeavours in a school. Dexter (2018) posits that without effective leadership, school leaders fail to adopt intentional approaches to ICT integration, miss prospects to leverage the value of ICT and ultimately fail to steward the significant investments made in hardware and software. The Organization for Economic Cooperation and Development OECD (2016) reports that in some cases, massive investments in ICT in schools have not resulted in the desired transformation of educational practices because of

poor leadership. In this case, the superseding emphasis on hardware and internet connectivity has overshadowed strategies for increasing staff ICT skills, professional development, producing appropriate software and reforming pedagogies. Thus, the provision of hardware and software without professional training and development decreases the readiness for ICT integration (Singhavi & Basargekar, 2020; Strigel et al., 2008). Teachers, for example, can find it arduous to integrate ICT applications because of insufficient skills, experiences, and a lack of basic computer skills resulting in the absence of technology in their daily teaching (Tran et al., 2020). The overarching concern is whether principals as ICT leaders can precisely lead through five ICT integration leadership dimensions; visionary leadership, excellence in professional practice, systemic improvement of a digital age learning culture, and digital citizenship (Gulpan & Baja, 2020). If they cannot, Anderson and Dexter (2005) suggest that leadership should be extended to other school members with the vision and capability of ICT integration.

School leadership should influence ICT integration. Leadership plays a crucial role in creating a mission and vision that support ICT integration, creating enabling environments and providing administrative support (Afshari et al., 2008; Singhavi & Basargekar, 2020). School leaders should go beyond being change makers and be active learning leaders by demonstrating the use of ICT. In this way, they persuade old and reluctant staff members to integrate ICT and establish school-wide communication in ICT matters (Singhavi & Basargekar, 2020). Principals are the official leaders in schools. Several authors (Abraham et al., 2019; Anderson & Dexter, 2005; Banoğlu, 2011; Bush & Glover, 2016; Mathipa & Mukhari, 2014), argue that ICT integration leadership is a collective action that goes beyond what the principal can do. It involves other players because principals may not be fully competent, yet ICT integration leadership must be provided.

Studies by (Akcil et al., 2017; Apsorn et al., 2019; Celep & Tülübaş, 2014; Ndiritu et al., 2018; Okeke, 2019; Uğur & Koç, 2019) focus on principals as ICT integration leaders who are responsible for developing administrative plans and a vision for ICT use. They establish strategies that promote teachers' and students' use of technology, develop plans for staff technological skills, manage ICT resources, and create opportunities for an ICT culture in schools. These studies leave out the potential that other school stakeholders can contribute to ICT integration leadership. Other

studies (Anderson, 2004; Buza & Mula, 2017; Moreira et al., 2019; Raman & Shariff, 2017; Woo, 2020) recognise an insufficiency that principals could bring to the ICT integration process and focus on how leadership can be extended to teachers and ICT coordinators. This insufficiency rises from the fact principals may not have the skills to lead ICT integration (Anderson & Dexter, 2005). In these later studies, the researchers recognise the importance of principals but focus on a distributed form of leadership that validates staff members, students, ICT teams and ICT coordinators as ICT integration leaders. The current study advances the notion that ICT integration leadership should be a shared activity.

The studies highlighted in the previous paragraph all focus on ICT integration leadership in teaching and learning. Other studies also focus on how ICT assists in the management of schools (Farid, 2014; Kamalizeni & Naidoo, 2018; Mutisya & Mwanja, 2017). There is a lack of studies that focus on ICT integration in other school operations rather than just focussing on teaching and learning. Besides this lack, the most critical deficiency also emanates from the context of ICT integration leadership itself. Principals (or any other school leaders) in Eswatini are never described as ICT leaders, and there is no description of ICT integration leadership in schools. In this case, ICT integration leadership is not viewed as a separate entity in a school context. Therefore, there is a possibility that a lack of its description leads to a haphazard way of leading in ICT integration matters. ICT integration leadership occurs in most schools at different levels involving different stakeholders but is neither investigated nor documented. As stated earlier, most literature recognises principals as ICT integration leaders. The current study goes beyond this and exposes the significant gap in the collectivism requisite in ICT integration leadership. In literature, there has been little focus on ICT integration in international schools and implementing international curricula. In Eswatini, literature is scant on studies that focus on the combination of ICT integration and school leadership as well.

### **1.3 Problem Statement**

The overarching problem is ICT integration leadership itself in terms of how it is provided and who provides it. Then gauging if ICT integration has been promoted is problematic if a fuller understanding of ICT integration is not taken into consideration. ICT integration is not just about the tool use, but systematic planning that inculcates skill development in students. In many

instances, schools have ICT tools that are used for school processes, and teaching and learning. However, the teaching and learning incorporates methods that include ICT use but not fully meeting ICT integration indicators that are in line with the 21st-century skills. These skills include competencies in technological literacy, critical thinking, creativity, problem solving, meta-cognition and communication to name a few (Kim et al., 2019). The concept of ICT integration leadership is not exhausted in most studies.

International schools need to justify their existence and are constantly challenged by a need to produce graduates who have 21st-century skills (Heinrichs, 2016; Hughes, 2020; Joynes et al., 2019). In response to challenges and expectations, the human approach usually calls upon designated leadership to create solutions. Sometimes, there are calls from interested parties to transform the leadership styles (Mazurkiewicz, 2021). Little is documented about how they are prepared for their roles (Bailey & Gibson, 2020; Lee et al., 2012). ICT poses pedagogical, and leadership challenges as teachers try to keep up with new technology and integrate it into their teaching and other operations (Gawande, 2020). School leaders provide guidance in areas they might not be well acquainted with (Flanagan & Jacobsen, 2003; Ghavifekr et al., 2016). This is especially in ensuring that ICT integration translates into the desired skills-set in their students. ICT integration in other school operations is also complex and challenging because of the costs, knowledge, and skills required.

In most schools (international schools included), leadership is piled onto the principals who are expected and believed to be capable of leading schools and meeting set goals. This expectation comes from all spheres like parents, the general public, the Ministry of Education, curriculum leaders, teachers and students. Despite the probability that they lack the relevant knowledge skills to lead in technological matters, principals have other leadership roles they must perform that can fail to give ICT integration leadership the attention it requires. Nonetheless, there could be among the staff members, people capable of coming up with ideas, vision, techniques, and implementation strategies in ICT integration to help principals and schools run smoothly. This collectiveness is lacking in many schools and robs schools of the potential to successfully implement ICT goals in education. If capable people are selected to help lead in ICT integration matters, the right resources

are purchased and effectively utilised, ICT can become more embedded in the curriculum, and all users are empowered and developed to be capable users of technology.

If principals are not fully capable, they should elect others and share or delegate the ICT integration leadership process to meet school technological needs. In some contexts, ICT integration leadership extends school leadership (Flanagan & Jacobsen, 2003; Polizzi, 2011; Qureshi, 2013). In other contexts, principals can allow other school stakeholders to actively participate in ICT integration leadership (Okeke, 2019; Ottestad, 2013). Therefore, definitions and descriptions of ICT integration leadership must be sought depending on the context (Mazurkiewicz, 2021).

#### **1.4 Rationale for the Study**

Most times, people blame the school leadership for anything that goes wrong. They offer no solutions nor become part of the solution. Having taught in five schools, I have experienced different types of school leadership. I became a seasoned teacher of the International General Certificate of Secondary Education (IGCSE) curriculum. I got older, gained more experience in teaching, and the curriculum offered more support and professional development opportunities. After teaching IGCSE Biology for ten years, I noticed that the syllabus put emphasis on ICT integration.

With the demands of ICT integration in the curriculum, some of my colleagues took the initiative to use ICT resources like projectors at school. I have seen colleagues going to principals to request a data projector (donated years earlier) and students getting excited with visuals projected on the walls. I noticed that teachers do not just need to wait for the principal to give them resources or use ICT. I then bought a laptop computer, started bothering the IT teachers at my school to refresh my basic ICT skills, got more information from YouTube and began to use a data projector in my teaching.

The rationale for this study is connected to the fact that leadership determines how successful a school becomes in meeting its objectives. ICT integration leadership is more poised towards one area of school leadership. Leadership is critical in a school because it is connected to

how decisions and actions related to technology are taken. ICT integration leadership is a contemporary issue whose knowledge school leaders cannot do without it (Flanagan & Jacobsen, 2003).

One of the critical functions of leadership is solving problems (Kerns, 2016). Administration can obtain lasting solutions to problems through collective involvement in leadership. In most schools, leadership remains greatly hierarchical. However, the outcome of this study suggests that ICT integration leadership needs to find identity in shared and distributed responsibility. Effective ICT integration leadership in schools could conceptualise school practice in dealing with ICT matters. Principals and other school leaders could understand that members of staff and students influence ICT impact and knowledge creation in school activities. Actions must comply with the school's mission and not always be determined by formal authority but by individuals with the ability to influence peers at a given time (Lindahl, 2008). ICT integration leadership outcomes emphasise the importance of training, school support, resource provision, autonomy and collaboration in decision-making. They address change and align school vision to change, all of which can be adopted by schools wishing to have successful ICT integration. Many universities have developed teacher leadership graduate programmes to equip teachers with leadership skills (Lindahl, 2008; Shinsky & Stevens, 2011). Therefore, the outcomes of this research could support teacher-training institutions to link teacher leadership with ICT integration.

By focussing on ICT integration in an international high school, an opportunity was created to learn more about leadership influence. As mentioned in earlier sections, the school had curriculum expectations with ICT integration, different groups of people (with varying needs of ICT) and the presence of various ICT resources. These factors facilitated that evidence of ICT integration could be obtained together with how ICT integration leadership was enacted. In some studies, ICT integration is investigated but focuses on how schools lack ICT tools (Harrell & Bynum, 2018; Muslem et al., 2018; Salam et al., 2018). In these studies, a total impact of ICT integration is not realised. Other studies were done in schools that had ICT resources, but other concerns that could have been solved by ICT integration leadership were presented (Daudi & Nzilano, 2019; Dele-Ajayi et al., 2021; Vongkulluksn et al., 2018). Thus, the present study differs

in that the school was equipped with ICT tools. ICT leadership was directed towards maximising the gains of technology use in a school.

Theorisation in this study is based on the influence of leadership. Whilst the findings exposed how the school leadership influenced ICT integration, further interpretation of the data revealed an understanding that ICT integration leadership was a needs-based approach. All participants had a part to play in the process that applied to the whole school as a unit. Four needs were addressed with ICT integration; curriculum-based, people-based, school-functionality and change-based needs.

The curriculum demanded that ICT be incorporated into student learning. Different levels of ICT integration (both negative and positive) were discovered. However, the school made efforts to provide the ICT tools and give support in the learning. The school community was empowered through training, resource provision, and given opportunities to have responsibilities in ICT matters. They could make decisions that best suited their efficiency and effectiveness in performing school operations. The school operated from a technological point of view and ICT met functionality-needs. In this regard, the school leadership had technological expectations in terms of acceptable ways of communication as well as information management. This study was mostly done during the COVID-19 pandemic and adaptability to change was seen through online teaching and the confidence to continue it without re-opening the school for the rest of the year 2020. The presence of existing ICT tools, desire to change and collective efforts from the participants made this possible. A discussion of these needs in the last chapter gives meaning to and frameworks what ICT integration leadership should be in a school.

### **1.5 Purpose and Focus of the Study**

The purpose of this case study was to investigate ICT integration in school operations in an international high school with a focus on the influence of leadership. The study purposed to explore the different ways in which ICT was integrated. The influence of leadership was investigated to find out how the school leaders facilitated the way ICT was integrated and how it impacted why the school enacted ICT integration in the way that it did. A total of 13 participants comprising a principal and his deputy, HODs, teachers, an ICT coordinator and students, provided data that

helped me get data from the school to answer the research questions and in theory development. In this theorisation, ICT integration leadership was a needs-based approach that fittingly described how the school functioned with ICT.

## **1.6 Research Objectives and Questions**

Three objectives were central to the study:

- To explore how an international high school enacts ICT integration in school operations.
- To investigate how leadership influences ICT integration in school operations in an international high school.
- To investigate why an international high school enacts ICT integration in the way it does.

Based on the objectives above, the research purposed to answer the following questions:

1. How does an international high school enact ICT integration in school operations?
2. How does leadership influence ICT integration in school operations in an international high school?
3. Why does an international high school enact ICT integration in school operations in the way it does?

## **1.7 Key Concepts**

The key concepts used in this study include international high school, ICT tools, ICT integration, leadership, ICT integration leadership and leadership influence. This section discusses the contextual meaning of terms.

### **1.7.1 International High School**

International high schools are broadly described as international by the curriculum they offer (Schippling, 2018) and because they are composed of both students and staff from all over



the world (Hill, 2012). Hayden and Thompson (1995) describe an international education philosophy as an instrument that prepares young people to adapt to life in an increasingly interdependent and sophisticated world system. Students from such schools become cosmopolitans who quickly establish a home base and link with the local community and local support services (Bailey & Gibson, 2020; Hayden & Thompson, 1995). The purpose of international education is influenced by people with a pragmatic approach in that international education provides academic qualifications that are internationally accepted (Bates, 2011; Cambridge & Thompson, 2004; Yagiz et al., 2016).

Therefore, these schools are characterised by a high level of access by all school stakeholders to a wide variety of ICT tools and by a high skill level in the educational uses of ICT (Garganté et al., 2015). The global character of contemporary education is the backbone of the schools' policy and discourse and is evident in the practice of teaching, general functions and education for sustainable development (O'Flaherty & Liddy, 2018). The description of an international high school in this study encapsulates a school characterised by autonomy in terms of the curriculum offered, hired staff and a collection of students from different parts of the world.

### **1.7.2 ICT Tools**

The term information and communication technology is a merging of information technology (IT) and communication technology (CT) (Kingsley, 2017). Put together like this, information and communication technologies refer to a diverse set of tools and resources used to communicate, access, gather, distribute, create, store, retrieve, and manage information (Chirwa, 2018; Jagadesh, 2017). From this definition, ICT is thus an umbrella term that includes communication devices, software or applications that encompass: television, radio, tablets, cellular phones, computers, projectors, digital recording and data logging equipment, satellite systems, network hardware and software, as well as services associated, such as distance learning and videoconferencing (Beena & Mathur, 2012; Srivastava, 2016). These devices are referred to as ICT tools or resources in the current work. The word 'technology' is used concurrently with ICT.

ICT tools (such as computers, electronic pads and smartphones, together with the internet and interactive Web 2.0 technologies, among others) are increasingly supplementing and

replacing traditional paper-based books (Akbar, 2016; Fu, 2013; Kwok & Yang, 2017). Computers and the internet facilitate better approaches for teaching, other school operations and adaptation to changing educational interfaces (Sharma, 2020). Such tools are invaluable for solving various problems (like understanding concepts and research) and can be used to provide learning situations that permit exploration and experimentation (Gawande, 2020). Hence, ICT tools are groundbreaking instruments that can elevate focus and motivation (Sharma, 2020).

### **1.7.3 ICT Integration**

ICT integration is the use of computer-based communication and interaction that fit into the daily teaching and learning process to enhance remembering, understanding, applying, evaluating and creation of knowledge (Bada et al., 2010; Ghavifekr & Rosdy, 2015; Meyer & Gent, 2016). Whilst this definition is specific to teaching and learning, Scheuermann and Pedró (2009) define it as the process that secures and improves access, enhances a wide range of educational and managerial uses and monitors the development of technology-related competencies. When teachers, students and other staff members have ICT knowledge, ICT integration in a school is expressed as the correct use of ICT to achieve educational goals (Doğan, 2018). ICT integration in the classroom represents a perfect convergence of content knowledge, pedagogical knowledge and technological knowledge (Padayachee, 2017). In teaching and learning, ICT integration focus should be placed on how ICT promotes learning and the curriculum, not the ICT itself (Christensen et al., 2018). The functional definition in this study is a combination of ICT usage in performing school operations and usage to promote student-centred and constructive learning.

### **1.7.4 Leadership**

The essence of leadership is seen through the fact that without it, a group of people quickly degenerates into disarrays, conflicts and arguments because everyone has a different approach to problems, challenges and solutions (Liphadzi et al., 2017). Continuing, they affirm that leadership functions as a process that gives people direction and aligns them to attaining set goals. However, leadership is difficult to define because it is multidimensional, and different scholars approach it from many angles (Algahtani, 2014; Northouse, 2018). Notably, scholars in leadership disagree

on a standard definition of leadership but, in his case, Northouse (2018) defines leadership as a process whereby an individual influences a group of individuals to achieve a common goal.

Sandmann and Vandenberg (1995) assert that leadership in the 21-st century must involve a change in individual practice, thinking and how organisations operate to find solutions to problems. Basit et al. (2020) explain that since the 1950s, leadership has been considered a hierarchy model but has changed to focus on interactions and relationships amongst people. Some authors define leadership in terms of power relationships, as a transformational process or from a skills perspective (Northouse, 2018). Mozhgan et al. (2011) argue that leadership is a skill and is thus learnable. Leadership as a process implies that it cannot be a characteristic found in a leader but a relational transaction that occurs between a leader and followers (Hilliard, 2010; Northouse, 2018). The understanding of leadership in this study took an approach where a leader has an authoritative stance from an administrative position and also that of an act of influence on others to direct them in a specific direction regardless of position of authority. With more transparency, leadership is going to mean influence whilst school leadership refers to people in authority (and their actions). This distinction is important because in certain circumstances (for example) it is only a principal who has the power to use school finances to purchase an ICT resource. On the other hand, a teacher can utilise a certain ICT resource and promote its school-wide adoption.

### **1.7.5 ICT Integration Leadership**

ICT integration leadership is a facet of an administrator's role that involves planning and implementing activities related to ICT integration in the school (Hamzah, Juraime, et al., 2016). This leadership provides school staff with an appropriate vision for ICT change in response to changing times (Weng & Tang, 2014). ICT integration leadership is essential for successfully implementing ICT in schools (Mingaine, 2013b). Brown et al. (2016) comment that ICT integration leadership must be grounded in the leaders practising what they seek to foster in others. Therefore, school leaders must be ICT integration leaders who model ICT integration so that they can be able to render importance to the use of ICT in school processes. They significantly influence and support its integration and help staff members gain the necessary competencies (Doğan, 2018). Tan (2010) describes this leadership as a predictor of the level of ICT use in schools because it determines the cultural and structural characteristics of schools in terms of ICT use. ICT

integration leadership is also human-centred and thus can be decentralised in a school so that decisions and practices are centred on the needs and expectations of the school members (Celep & Tülübaş, 2014). Teachers, students and ICT coordinators can increasingly foster ICT integration leadership.

### **1.7.6 Leadership Influence**

Forsyth (2014) declares that leaders must be competent in managing complex tasks so that every stakeholder is integrated into the organisational undertakings. They are obliged to identify group interpersonal needs and take steps that ensure relative satisfaction of their followers (Kotter, 2006; Kurtessis et al., 2017). However, as they create conducive working conditions, they influence others and usually ensure compliance by imposing directly their will to achieve organisational goals (Forsyth, 2014). Nikoloski (2015) defines influence as a force an individual exerts on others to induce a change in behaviour, opinions, values, attitudes, needs, approach to targets and general ability to affect behaviour in a particular direction. Exercising influence on others is a first principle of leadership, and formal leaders have the legitimate right to influence others because of their hierarchical position (Vasilescu, 2019). Each leader must know the influence they have on others. A value system of qualities like knowledge, courage, pragmatism, wisdom, love, and skill make leaders successful at influencing the people they lead (Vu & Gill, 2019).

Nikoloski (2015) outlines dichotomies to influence as hard and soft, direct and indirect. Hard influence is employed in crisis or change moments when speed is of essence that leaders impose or are authoritarian. Soft influence is done by a skilled leader who gradually pulls people towards goals by persuasion and enquiry. Direct influence involves managing subordinates through communicating, asking, consultation and persuasion through face-to-face meetings and other means of communication. Indirect influence is achieved through scheduled meetings that put forward a leader's vision and are open to altering existing structures.

Influence involves different tactics which have varying effectiveness. Tactics like pressure, assertiveness, coalition, and legitimating are low impact tactics, while inspirational appeals and consultation yield higher impact (Nikoloski, 2015). In this case, passionate appeals involve arousing enthusiasm by the leader by appealing to subordinates' values and ideals and

boosting their confidence in doing tasks. Consultation involves leader behaviour that seeks subordinates' participation in decision planning and how proposed strategies and policies can be implemented. To sum it up, leadership influence in this work refers to all actions done by leadership to have an impact on ICT integration.

## **1.8 Organisation of the Thesis**

This thesis is organised into seven chapters that were put together to discuss ICT integration and the influence of school leadership. In Chapter 2, I present literature related to the topic and the research questions. The chapter has distinct sections that outline ICT integration in different functions, the purpose and significance of school leadership in ICT integration, and the indispensable nature of ICT integration in a school system.

The theoretical framework is presented in Chapter 3. A discussion of two theories that framed the study: Technology, Organisation Environment theory and Transformational leadership is made. An interplay of the components of the first theory gives an evaluation of the extent of ICT integration. The second theory was suitable for framing the leadership components of the study. The chapter thus justifies the need to have the two theories and their relevance in instrumentation and data analysis.

Chapter 4 details the methodology followed from grounding the research in a constructivist paradigm and a qualitative approach. The case study design and the justifications for using interviews and documents as data generation instruments are presented. In addition, the chapter outlines the steps that were involved in getting credible research data and its analysis.

In Chapter 5, I present the data gathered from the field. In this chapter there is theme development based on keywords mentioned by participants. Documents support interview data. The themes are organised to answer the research questions in their sequence. The chapter starts with a contextual outlook of the school and then profiles the participants before data presentation.

Chapter 6 is a combination of findings and discussion. The findings of the study are first presented before they are compared and contrasted with literature and the theoretical framework.

In this chapter, meaning of the findings is presented. Chapter 7 summarises the research findings by looking at the answers generated for each research question. It is also a summary of the whole project, and further highlights the contribution made by the study, in the context of ICT integration leadership. Lastly, the limitations of the study, recommendations for future research and conclusion are presented.

## **1.9 Chapter Summary**

This chapter introduced the thesis by initially outlining the study's background, problem, rationale and purpose. From a relevance and significance point of view, ICT is an appropriate tool for 21-st century work, organisation, communication, skill-set development and effective teaching and learning. However, ICT integration needs school leadership to prepare their followers for optimal functioning, and they must provide the necessary tools, support, empowerment and training. Thus, this chapter introduced ICT integration leadership as a critical factor in how ICT is integrated into international high schools. The study's objectives outlined the purposes of exploring, how ICT integration was enacted, how leadership influenced the process and why it was done in the way it was. This chapter also described key terms to bring into perspective how they were used in this study. A summary of all the chapters that make up the thesis was presented. The next chapter reviews known literature to build up an understanding of ICT integration and school leadership.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter recognises that past studies, theories, ideas, and various forms of literature have a critical bearing on research. This chapter reviews concepts and debates from different sources and perspectives on ICT integration and school leadership. The review was done to build a deeper understanding of ICT integration for school operations and the influence of leadership. The chapter begins by discussing ICT integration in terms of how it is conceptualised and its implementation for school operations in an international high school. Leadership is then presented initially, focusing on its typologies. More focus is then directed toward ICT integration leadership and how different school stakeholders help enact it. Lastly, the chapter presents some justifications for enacting ICT integration in schools.

#### 2.2 Conceptualising ICT Integration

ICT integration is considered to potentially improve the quality of education so that many countries focus on approaches to integrating various forms of technology in their educational systems (Johnson et al., 2016; Kundu, 2018). With all the benefits that technology brings, smooth and effective ICT integration poses challenges from the acquisition of new equipment to their adaptation and use (Dhital, 2018). As governments and schools make ICT tools available, the ultimate responsibility for using the technology lies with individuals who when given the ICT tools must decide whether they want to integrate it or not (Johnson et al., 2016).

Davies and West (2014) explain that describing and critiquing the current use of ICT in schools must recognise that there is no standard description of technology. Again, the meaning of technology integration can mean many things to different people. To support this assertion, they say that 'ICT' is associated with computer equipment, various software, and electronic devices. At the same time 'integration' translates to having and using these resources in the classroom or office. However, Davies and West (2014) claim that these definitions are narrow because

interpreting ICT integration as having access to computers leads to a false satisfaction that having devices solves all technical problems and automatically technology can be useful to everyone. Again, simply defining ICT as computers and other electronic devices can put an unjustified focus on using digital technologies in schools without evaluating whether they are beneficial (Bingimlas, 2009). A definition of ICT integration must establish the effective implementation of ICT tools to accomplish the envisioned outcomes (Davies & West, 2014; Hew & Tan, 2016). Kundu (2018) add that most studies investigate the issue of ICT integration in education, and fall short in making an impact assessment of the ICT, especially in teaching and learning. Like Vandeyar (2020), this current study's standpoint is that sheer access to ICT does not translate into people changing their practice or successful ICT integration and when they use the ICT, it must be understood "what is meant by *use*?" In this case, ICT integration is connected to the word 'use' in educational operations (Hew & Brush, 2007; Vandeyar, 2020), and it also translates to engaging ICT through familiarisation, utilisation; reorientation and evolution of work methods (Wherton et al., 2020).

Teachers that exhibited a low-level of ICT integration could have complications in combining pedagogical approaches and technological provision (Vandeyar, 2020).

ICT integration thus occurs when the users make a series of decisions that emanate from examining the outcomes of comparisons of advantages and disadvantages that derive from using particular technologies (Kumar & Daniel, 2016). It is this decision-making and finding what works that this current study wished to expose. Teaching with ICT, for example, brings further complications to the classroom as teachers are expected to surpass their traditional pedagogical approaches in favour of technology provision (Vandeyar, 2020). It is imperative, therefore, that ICT integration in teaching depends on a classroom context that advocates for teachers to acquire subject matter; teaching strategies; learning theories; lesson planning and classroom management (Pittas & Adeyemi, 2019; Vandeyar, 2020).

### **2.3 ICT Integration at an International High School**

This section is divided into three areas that cover how ICT is used in an international school. Although there are many areas where ICT can be used, the focus is on ICT integration in communication; information and school management and teaching and learning.



### **2.3.1 ICT Integration in School Communication**

A lot of communication happens in schools daily, and technology has for a long time had a significant impact on how people communicate and change communication expectations (Natale & Lubniewski, 2018). These fast and short digital information exchanges have gradually replaced traditional communication methods such as writing notes and sending home printed letters to students (Heath et al., 2015). According to Palts and Kalmus (2015), digitisation and the development of the Internet have, over time, increased the significance of digital channels like e-mail; text and instant messages; social media and other online platforms in the communication that occurs in the schools and between parties connected with schools like sponsors, parents, Ministry personnel and other stakeholders. An advantage that comes with these methods of communication is the fast passage and getting of feedback that create an expectancy of efficiency (Kuusimäki et al., 2019a; Palts & Kalmus, 2015). With these channels, school-home communication does not need to depend on physical location and allows timing of long dialogues (Palts & Kalmus, 2015).

Heath et al. (2015) argue that in today's mobile lifestyle, many parents expect to find messages regarding their children's school activities on smartphones or online (marginalising traditional communicative approaches). However, gaps remain in areas of access and versatility with technology. School websites are critical in communication and resource-sharing. Schools can use them for public advocacy and information sharing in school and to existing and prospective/potential parents and other stakeholders that include community organisations, suppliers and business partners (Gu, 2017). As a result of having multiple ways through which technology is used in communication, schools must choose appropriate communications technology to maximize within-school communication (school staff, students, and different teams), as well as communication with other stakeholders connected to the school (Heath et al., 2015).

### **2.3.2 ICT Integration in Information and School Management**

ICT is helpful in management operations (Kamalizeni & Naidoo, 2018; Miraz et al., 2016; Sharma & Jain, 2018). ICT tools help schools modernise school processes, observe performance, and keep educational records on students' and teacher assessments, physical infrastructure and

budgeting, amongst others (Kamalizeni & Naidoo, 2018; Makewa et al., 2013). Schools have processes and procedures that are akin to business or industry that involve admissions, data processing and reports generation (Grepon et al., 2021). A centralised system in the form of a School Management Information System (SIMS) stores, processes and retrieves data and makes these processes possible (Grepon et al., 2021). Other uses of ICT include providing up-to-date information to parents, easy search for records, easy updating of documents and the usefulness of ICT in printing or photocopying material related to teaching and learning and school management (Kamalizeni & Naidoo, 2018; Miraz et al., 2016). ICT usage in school management involves using technology for better planning, setting and maintaining standards; for human resources, school resources, student, financial and general management resource management (Miraz et al., 2016; Mutisya & Mwanja, 2017). Without a doubt, ICT tools play a vital role in improving data collection in schools and also make the data more widely available to school staff, students, parents, and the public (Mutisya & Mwanja, 2017). ICT aids instructional supervision by enhancing the decision-making process, organising, communicating, coordinating and evaluating (Mutisya & Mwanja, 2017). Whilst the benefits of ICT are widespread, the worldwide use of ICT in school management has not been as extensive as found in fields like business or engineering (Mutisya & Mwanja, 2017).

Mutisya and Mwanja (2017) investigated the extent of ICT integration in 58 public secondary school management in Kenya through a descriptive survey and a mixed-method approach. All the school principals, 58 senior teachers and 266 associate teachers, made up the participant sample. The study found that 78% of principals, 60% of teachers and 59% of assistant teachers used ICT in school management. Principals mostly used ICT for internal exams, in school management, and communication with their teachers, parents and school suppliers. School management included aspects like management of school records in accounting, personnel management, students' registration records, timetabling, records of physical materials and library records. Teachers used ICT primarily for keeping records on books and facilities in classrooms, laboratories, kitchens and for sports. This study recommended the need for training in ICT use to facilitate all-round ICT integration.

### **2.3.3 ICT Integration in Teaching and Learning**

While most public schools in Eswatini offer the local Eswatini General Certificate of Secondary Education (EGCSE) curriculum in high school, some schools provide international curricula like IGCSE and International Baccalaureate (IB). IB and IGCSE are challenging, adaptive, flexible, and global in approach and still culturally sensitive to develop informed and curious students who gain vital skills for university and future careers (Cambridge Assessment International Education, 2020a; International Baccalaureate Organisation, 2017). Effectively using ICT resources is an essential skill that all students must develop; consequently, over the past decade, the use of ICT in classrooms has expanded (Cambridge Assessment International Education, 2020). Although access and skills to the use of ICT tools and activities in teaching, can be challenging, it is essential for today's age of students to use ICT resources in accessing, processing, evaluating and communicating information and data (Cambridge Assessment International Education, 2020).

Rapid growth in ICT has made the world knowledge-driven (Buabeng-Andoh & Issifu, 2015) and ICT is the only way to expand knowledge access (OECD, 2015). ICT tools such as computers, word processors, laptops, tablets, iPads, and the Internet have entered the classroom space and altered teaching and learning (Alhumaid, 2019). Computers and the internet facilitate better approaches for teaching and adaptation to changing educational interfaces (Sharma, 2020). Such tools are invaluable for solving various problems (like understanding concepts and research) and can be used to provide learning situations that permit exploration and experimentation (Gawande, 2020). Videos and images through computer screens, interactive whiteboards (IWBs) or projectors allow more discussion in classes and encourage students to express themselves more (Pham et al., 2019). Moreover, students without access to ICT and fail to navigate through the digital landscape will not be able to fully participate in the social, economic and cultural life around them (OECD, 2015).

With all the advantages that ICT brings, some challenges are involved. Schools allow the usage of all types of ICT and fear it may negatively impact students' performance (Alhumaid, 2019). Schools are confronted with challenges ranging from information overload to plagiarism, protecting children from online dangers such as online bullying, violating privacy and setting

ample media data for everyone (OECD, 2015). Furthermore, information has its problems. For example, the information on the internet is not all reliable and accurate, and teachers need to help their students discern this to identify quality information (Delgado et al., 2015; Musgrove et al., 2018). Research has confirmed that ICT could badly change education by dehumanizing educational learning environments, deteriorating students' competencies in reading and writing (Delgado et al., 2015). They add that it interferes with social interactions between students and teachers and isolates individuals when they use it.

An argument regarding ICT is that where computers are used in teaching and learning, their impact does not always result in high student performance (OECD, 2015). For example, in a European study, the OECD (2015) found that students with moderate access to ICT had better learning outcomes than students who rarely used computers. But students who used computers frequently at school did a lot worse in most learning outcomes. An interpretation of this was that educational practitioners have not yet perfected the kind of pedagogies that utilise the best of ICT technology. What was happening was adding 21st-century technologies to 20th-century teaching methods and diluting the effectiveness of teaching. The connections among students, computers and learning are not simple to determine, and the fundamental contributions ICT can make are yet to be fully realised and exploited (OECD, 2015). Problems also arise when teachers lack competence, confidence and knowledge in ICT integration and lack adequate ICT facilities and technical and moral support (Buabeng-Andoh & Issifu, 2015; Pham et al., 2019). The current study agrees with the assertion that schools must find ways to optimise technology in teaching and learning (Sargent & Casey, 2020). A large body of quantitative research on ICT integration is undertaken in developed country settings (Buabeng-Andoh & Issifu, 2015); hence, more qualitative studies (particularly in developing nations) are necessary.

## **2.4 Leadership Typologies**

The outlook of ICT integration leadership is essential in this study. The stance taken in this study is that leadership in a school is centred on how principals' style can permit leadership diversions or extensions which pervade to others. Still, before presenting its tenets, it is important to discuss the leadership typologies relevant to ICT integration in a school. There are many

leadership typologies, but this work examines transactional, adaptive, distributed, and innovative leadership. From these typologies, an understanding of ICT integration leadership is synthesised.

### **2.4.1 Transactional Leadership**

Transactional leadership refers to an extrinsic exchange relationship between a leader and followers where tangible rewards are given to followers for effort (Dartey-Baah, 2016; Kabeyi, 2018; Lipesa et al., 2018; McCleskey, 2014; Nazim, 2016). This type of leadership focuses on supervision, positive organisational performance and efficiency that subordinates are given clear instructions to follow, and leaders use negotiation to attain goals (Amanchukwu et al., 2015; Kabeyi, 2018; McCleskey, 2014; Nazim, 2016). The leader offers something of economic value (like a pay raise), psychological value (like a good performance review), or the desired change in duties (like promotion and new responsibilities) (Bass & Bass, 2009; Gougas & Malinova, 2021; Kabeyi, 2018; Whittington et al., 2009). These exchanges occur when a leader identifies performance requirements and clarifies the conditions for getting the rewards after meeting the needs (Whittington et al., 2009). If they do not produce results according to the set standards, there can be punishments and negative consequences (Nazim, 2016). Nonetheless, there is a limit to the exchanges that can occur in a school situation. Principals might want to reward their subordinates for a task well done but do not control the finances, or the school may neither have a policy nor the resources to reward staff. Consequently, in some instances staff members may be given tasks which they do to their best capabilities but receive minimal recognition for them.

Transactional leadership is divided into contingent reward and management-by-exception (Bass, 1985). In the contingent reward, the leader clarifies the expectations and predetermined standards so that followers understand what their chores are and what to do to receive rewards (Whittington et al., 2009). Whittington et al. (2009) explain that management-by-exception is less active because followers are aware of job expectations. Still, the leader does not get involved with the follower unless there are signs that the follower's performance deviates significantly from the expectations. Smith and Squires (2016) outline two dimensions of the management-by-exception, which are active and passive. The active leaders correct mistakes by tracking follower performance, while the passive leader waits for the advent of errors before they make corrections (Smith & Squires, 2016).

Transactional leadership's perceived usefulness in ICT integration is seen if a leader clearly states the benefits of technology, for example, by indicating that using the system is the only way to reach specified targets (Schepers et al., 2005). In ICT integration, this transactional leadership style has a cost-effectiveness focus which could potentially reveal the usefulness of a technology given that technologies are often introduced out of cost reduction considerations (Whittington et al., 2009). Nonetheless, the leader must be technologically aware to be able to lead in this manner.

One negative associated with transactional leadership is that followers do not partake in the decision-making process (Avolio & Bass, 2001; Bass & Bass, 2009; Nazim, 2016). This leadership does not bind the leader and follower together in a collective and ongoing quest for a greater purpose (Whittington et al., 2009). The leaders generally accept organisational culture goals and structure without seeking change or innovation (Gougas & Malinova, 2021; McCleskey, 2014). It is typical in education where schools can receive instructions and directives from their Ministry of Education or the education department. Literature suggests that when principals concisely spell out job responsibilities and performance goals and involve teachers in significant decision-making, job satisfaction is then often realised (Gençer & Samur, 2016; Jangsiriwattana, 2019).

#### **2.4.2 Distributed Leadership**

A distributed leadership approach is what many researchers consider as gaining cognisance and is more appropriate for 21st-century leadership (Chikoko, 2018; Naicker & Mestry, 2013; Torrance, 2013). The most modern-day interpretation of distributed leadership theory was developed by Spillane (Harris, 2008; Ho et al., 2016). This theory is linked to the transformational theory (Harris, 2008; Ho et al., 2016; O'Donovan, 2015; Spillane et al., 2004; Spillane et al., 2015; Unterrainer et al., 2017). According to Harris (2008), distributed leadership theory recognises that many people can have the potential to exercise leadership in a school. Still, success can be realised by checking how their leadership is facilitated, supported and orchestrated. Central to the theory of distributed leadership is the notion that leadership practices must have a lateral structure rather than a vertical one, and a singular leader must gradually be replaced by competent teams (Harris, 2015). For that reason, successful ICT integration leadership in the school must be a collective action through distributed leadership.

Akdemir and Ayik (2017) idealise that tasks and responsibilities in an organisation should be shared, and decision-making becomes collaborative. Taking the lead depends on volunteering and positive interactions influence leadership. Numerous perspectives and know-how are sought for problem-solving, improvement, and change (Kezar & Holcombe, 2017). The tenets of this leadership apply to this study because principals and other leaders might have limited knowledge or experience in leading ICT integration. Thus, they need the consultation and guidance of other staff members who may be more knowledgeable.

Spillane et al. (2004) developed their distributed leadership perspective around four central ideas: leadership tasks and functions, task enactment, social distribution of task enactment, and situational distribution of task enactment. In the exposition, they bring to attention that leadership tasks and functions are an analysis of specific actions. In contrast, task enactment involves understanding how the leaders define and carry out their tasks. The social distribution of task enactment is an outlook on how leadership practices are distributed among positional and informal leaders and their followers. Situational distribution of task enactment acknowledges the mutuality of individuals and their environment. Spillane et al. (2004) postulate that the distributed perspective is not just concerned about the division of labour for leadership functions, the nature of school leaders, and the resources available. These authors regard a school situation as influencing leadership and are considered an integral component of leadership practice. Thus the leadership practice can be distributed over leaders (principals), followers (teachers and students) who must function in their school's prevailing and underlying conditions (Spillane et al., 2004). Therefore, leadership is not about the principal, individual or group action or knowledge but the activities that all leaders engage in, as they interact with others, in certain contexts around specific tasks (Botha & Triegaardt, 2014; Spillane et al., 2004).

To fully comprehend the idea behind ICT integration leadership, the distributed leadership theory can be used to extend an understanding that leadership is not only confined to the position but to influence (Harris & DeFlaminis, 2016; Shava & Tlou, 2018). Liang and Sandmann (2015) explain that a school locates, aligns and harmonises tasks, practices and resources along the lines of people expertise and not necessarily aligning with organisational lines of command.

Harris (2015) underscores that distributed leadership is getting increased support and interest from practitioners and research communities for three main reasons. Firstly, distributed leadership has an explanatory power that encapsulates the forms of leadership practice implicit in school organisations. Secondly, it has the symbolic capacity, in that the structure of an organisation is changing, and the basis of schooling is changing to fit the requirements of changing times. Thirdly, it has normative power reflecting current leadership practice and how the evolving leadership model encompasses multiple sources of guidance and influence. The writer believes that distributed only functions in certain areas of leadership, such as ICT integration leadership, and needs differentiation of roles. An ICT leader can thus not be involved with other areas of school leadership. There is still delegation from top management as they seek the most suitable person for a given role. Nevertheless, that person may not perform at the best level if the recognition does not come with incentives. And without complete control as the principals, other ICT leaders may not be as influential.

A lack of empirical evidence on its effectiveness in increasing student achievement, instructional improvement and public school leadership is one of the weaknesses that distributed leadership is associated with (Lumby, 2016; Shava & Tlou, 2018). The conception of distributed leadership overlays with other theories such as shared leadership, democratic leadership, collaborative leadership and participative leadership. It is regarded as a vague concept despite its widespread use in educational leadership studies (Shava & Tlou, 2018). The same authors claim that it has different definitions and interpretations that result in both theoretical overlaps and conceptual confusion, leading to different operationalisation and measurement. As seen in O'Donovan (2015)'s investigation of challenges and opportunities that emanate when developing distributed leadership practice in secondary schools in Ireland, it can bring up misconceptions. The researcher aimed to find: (1) how school leaders (re)constructed leadership that suited their needs of the current reality, by examining their leadership and management styles; (2) how school conditions were created that supported distributed leadership; (3) the challenges distributed leadership posed and how they could be overcome. O'Donovan (2015) clarified that school leadership went beyond the scope of what the principal alone did. However, while there was extensive support for a distributed model of leadership, the concept was not explicitly displayed



to clearly demarcate different roles played by different stakeholders surmised by confusion and at times duplication of roles.

Another weakness is seen in people getting overworked. As tasks and duties are shared, distributed leadership can be viewed as exploitative leadership that makes teachers and other staff members do more work in an attractive mechanism that still delivers top-down policies in exploitative leadership (Harris & DeFlaminis, 2016). Harris (2008) comments that distributed leadership becomes riskier where many people are involved. The argument is that it can lead to greater distribution of incompetence and has been associated with inefficiencies that stemmed from many leaders and resultant disagreements over aims and priorities. Its execution can be a difficult feat because it poses a significant challenge of distributing responsibilities and authority so that it should not be a misguided delegation (Shava & Tlou, 2018). For example, to assess the practices and challenges that distributed leadership posed in four elementary schools in an Ethiopian town, Mesfin (2017) carried out a case study with four school principals, eight teachers and four members of the parents and teachers' association. While distributed leadership is written in literature to be advantageous to school and teacher development, Mesfin (2017) discovered that achieving it was far from easy. Its implementation failed due to teachers lacking a sense of belonging, responsibility, trust, confidence, smooth relationships and a supportive culture.

### **2.4.3 Innovation Leadership**

Innovation leadership is central to creating and implementing something new that adds organisational value by redirecting focus, alignment, commitment and setting direction (Alsolami et al., 2016). Innovation leadership is a philosophy that was popularised by Gliddon (2006) (Gliddon & Rothwell, 2018). It was formulated by combining different leadership styles (including path-goal and leader-member exchange leadership). Still, an innovation leader is a significant player who influences subordinates and other stakeholders to produce creative ideas and services (Gliddon & Rothwell, 2018). The same authors present another dimension to leadership. It suggests that an individual in an organisation, a group within, the organisation itself, and even a community can be considered an innovation leader.

New technologies and processes cause organisations to think innovatively in the changing conditions to ensure continued success and to adapt to new changes (Gliddon & Rothwell, 2018). So, innovation leadership represents a shift from traditional views of organisational practices, which did not support innovative employee behaviours, to a more modern stance that values creative thinking as empowering influence on organisational performance (Gliddon & Rothwell, 2018; Kremer et al., 2019). In his extensive work, Gliddon developed the competency model that includes four primary stages that innovation leaders and schools could follow: (a) support for idea generation, (b) identify innovations, (c) evaluate the innovations, and (d) implementation of the innovations (Gliddon & Rothwell, 2018). He categorised innovations into two types: (a) exploratory innovation, where brand new ideas are generated, and (b) value-added innovation, which involves transforming and renewing existing ideas. In education, innovation can be a new pedagogic theory, an institutional structure, a teaching technique, a learning process, a methodological approach, or an instructional tool whose implementation produces a noteworthy change in learning, raise productivity, efficiency and improves the quality of education (Serdyukov, 2017).

The significant challenge with this type of leadership is that it requires principals at the top of their technical understanding to fully lead or delegate (Shaikh & O'Connor, 2020). The writer surmises that principals without ICT knowledge should be willing to upgrade themselves, consult and delegate tasks to members of staff who can lead in ICT issues. With the focus on innovations has come a tendency to adopt the language of markets and business. Still, the existing organisational and managerial knowledge base on innovations and ICT has remained largely unengaged and ineffectual innovation leadership (Seelos & Mair, 2012). Innovation leadership can thus be viewed as more applicable to business establishments.

#### **2.4.4 Adaptive Leadership**

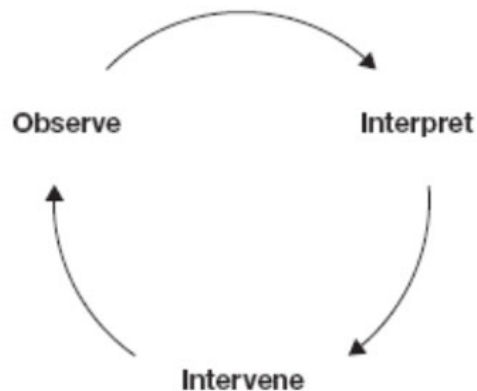
Adaptive leadership deals with how leaders encourage people to adapt and better face problems, challenges, and changes that eventually happen (Northouse, 2018). It stresses leader activities concerning their followers' work in the environments and contexts in which they find themselves (Northouse, 2018). The concept of adaptive leadership was theorised by Heifetz (1994) and is defined as "the practice of mobilising people to tackle tough challenges and thrive" (Heifetz

et al., 2009, p. 30). Adaptive leadership is suitable for making progress and decisions on fundamental challenges (Heifetz et al., 2009). Khan (2017) explains that adaptive leadership still focuses on leader-follower relationships but allows institutions to carefully plan for change and other factors that affect the leadership relationship. This leadership is important because it is not individually centred but a process set into effect by key stakeholders and the crucial process for initiating change, maintaining it and becoming suitable for changing conditions (Obolensky, 2014; Randall & Coakley, 2007). Mobilising people is central to adaptive leadership because it enables the school to face ongoing adaptive challenges and be ready for new pressures, realities and opportunities (Heifetz et al., 2009).

Leadership in education translates into mobilising schools, communities, and families to deal with problems and issues that schools always face (Heifetz & Linsky, 2004). One category of these problems is referred to as technical problems (Heifetz et al., 2009). In ICT use in a school, these are easy-fix issues like replacing toners, fixing faulty gadgets or those problems that require buying or upgrading software. Other problems are novel and require collective actions through experiments, discoveries, and adjustments. Heifetz et al. (2009) described these problems as adaptive problems which demand major transformation through the school as an entity.

Adaptive leadership is an iterative process composed of three critical activities as shown in Figure 2.1: (1) observing what is happening around (the what); (2) interpreting the observations by developing hypotheses of what is happening (the why), and (3) designing appropriate adaptive interventions founded on the observations and interpretations (the *what next*) (Heifetz et al., 2009).

**Figure 2.1** *The Adaptive Leadership Process* (Heifetz et al., 2009, p. 54)



According to Heifetz et al. (2009), each activity builds upon the preceding one, and the process is iterative because there is a continuous need to refine observations, interpretations and interventions. Through observations, leaders can get a perspective of what is happening in their school. Principals for instance, know what kind of resources the school has and the capabilities of their staff. As they interpret the situation, they research to understand how things are and how they should be. Intervention then calls upon their experience in leadership and management skills. Consultation with internal and external stakeholders helps refine and define the intervention made (Khan, 2017).

Five critical features are associated with adaptive leadership (Heifetz et al., 2009). Firstly, adaptive leadership is about change that enables an institution to thrive through stakeholder ideation. New ideas are constantly needed in an institution and require leaders to grapple with questions of value and purpose. Secondly, the success of the adaptive changes is built on past experiences preserving essential processes and discarding the expendable. The leader engages people in making the distinction. Thirdly, organisational adaptation occurs through leader experimentation to discover what works. The fourth point mentions that transformation heavily relies on a culture that promotes diversity of ideas and relies less on the ideas that are centrally planned. The last feature illumines that new adaptations can in significant ways displace and rearrange the known methods of doing things. Here principals and other leaders need to develop a mechanism to reduce staff and students' resistance to change that comes with the adaptation.

Despite the positives, adaptive leadership has its weaknesses. Northouse (2018) highlights its four significant weaknesses. The major flaw is its lack of empirical research to test its claims, even though the theory was developed more than 20 years ago. And because it is based on ideas and assumptions, its concepts and principles should be viewed cautiously. Secondly, the conceptualisation of its process needs further refinement. Adaptive leadership was designed as a practical approach and comprised a series of suggestive solutions about what leaders should do to facilitate adaptation. However, the significant factors involved in the adaptive process and how these factors relate to one another are not delineated, and the theory becomes vague as a manual of change. Thirdly, the theory is criticised for being too broad and abstract. Northouse (2018) elaborates that the approach uses terms and stages for leaders like “identify your loyalties,” “mobilise the system,” “protect leadership voices from below,” “anchor yourself,” and “hold steady,” which can be problematic in interpreting and establishing their relationship and implementing them in practice. Lastly, adaptive leadership proposes that people’s evolution leads to the development of values for a greater common good but fails to explain how the evolution of these value leads to a greater common good.

## **2.5 ICT Integration Leadership**

Many descriptions of ICT integration leadership have come up in the literature. The current study views ICT integration leadership as connected to the typologies discussed in the previous section. Many authors consider it as a process that facilitates and positions the provision of infrastructure; equipment; time for learning; rewards for application of ICT; support for ICT risks; and generally enables the individualised learning process that is enriched by today’s information society (Avolio et al., 2014; Cortellazzo et al., 2019; Januszewski & Molenda, 2013; Schoeny, 2002; Torre & Sarti, 2020). ICT integration leadership is being redesigned to hasten ICT integration in schools to develop and sustain relevant skills in producing a skilled workforce (Raman & Thannimalai, 2019). Anderson and Dexter (2000) describe it as ICT-related activities, particular tasks, behaviours, and attributes principals and technology coordinators do in their schools. Aurangzeb (2020) regards it as ICT-mediated organisational communication, which includes comprehensive and synchronised integration of ICT tools to meet personal and corporate efficiency and productivity. Mishra et al. (2016) identify ICT integration leadership as managing the relationship and alignment between a school’s social, technical, and external environment.

Torre and Sarti (2020) describe ICT integration leadership further. The first description regards it as a practice of leadership that effectively and adaptively manages ICT tools. The second defines it as a multidimensional concept characterised by individual and organisational intentions and the capability to focus on general vision and technology details.

A standard definition of ICT integration leadership is consequently difficult to come up with. Mishra et al. (2016) argue that this leadership idea is contextually linked to the types of organisations and people under discussion. For instance, some integration decisions only involve a part of a few departments of the same organisation (Van Wart et al., 2017). Moreover, the ICT integration goals in the corporate world differ from those in non-profit entities and education, and the leadership will appear differently (Mishra et al., 2016).

ICT integration leadership recognises that an ICT leader is one (with or without official recognition) who can influence and promote how ICT is utilised in an institution (Raman & Thannimalai, 2019). However, most literature regards principals as ICT integration leaders (Quidasol, 2020; Raman & Thannimalai, 2019; Raman et al., 2019; Salleh & Laxman, 2014). The onus of ICT integration leadership falls on them because, unlike other stakeholders, they control school finances, manage resources, are responsible for staffing and supervise others (Wagithunu et al., 2014). Any ICT leadership team or task is then done under the guidance of the principal (Flanagan & Jacobsen, 2003; Fullan, 2018; Hew & Brush, 2007).

ICT integration leadership presents challenges to schools, especially the leadership that needs to provide vision and direction for ICT integration for many reasons like competence, ICT tools' choice, computer anxiety, skills, lack of time and technical problems (Razak et al., 2018). For schools to overcome the challenge of ICT integration leadership, all stakeholders must be invited to make sense of the challenges faced and participate in the various levels of leadership (Torre & Sarti, 2020). Blau and Shamir-Inbal (2017) explain that it is challenging to describe criteria that define successful ICT integration leadership. Due to organisational differences, essential predictors include seven core factors: readiness, integration strategies, ICT practices, support, culture, overcoming obstacles, and motivating and directing school stakeholders (Al Sharija & Qablan, 2012; Chua & Chua, 2017). Botha and Herselman (2018) discuss a concept called co-creation in which staff and students as the users of ICT participate in the creativity and

development of solutions. Because of their involvement in the daily teaching, teachers bring to the principal and HODs experiences, information, knowledge, skills and resources. These authors comment that, as a consequence, the resultant outcomes in innovation processes are bound to be more relevant to the teachers who act as co-producers of knowledge. Leadership that allows all stakeholders to co-create solutions to problems is the leadership that works as leadership is prominently contextual and seeks solutions (Heystek, 2016).

Preston and Barnes (2017) regard principals as change agents who can spearhead successful ICT integration leadership. Nikolaros (2015) observes that a critical leadership skill in decision making is accommodative of all school stakeholders as assistance in the process and teamwork to solve problems. The principals cannot successfully do all of these tasks single-handedly; hence, they need the support of the school management teams (SMT) in a distributed manner. The principals' encouragement and stimulation of ICT integration result in a change to teaching practices to make them more ICT-related (Al Sharija & Qablan, 2012).

Nikolaros (2015) believes in a group decision-making model, a component of distributive leadership based on decision-making by collaboration. In this model, staff members are placed in small communities and groups that inspire them to express their ideas freely. The collaborative engagement of the group should be the foremost priority for principals. Then they assess the quality of attention by everyone as well as determine how they can supervise and support the groups. Doe et al. (2017, p. 46) extend that principals and SMTs thus need to provide opportunities and create the conditions to allow teachers and other staff to design and implement their purpose-fit research. Asset mapping and mobilisation are considered useful leadership methods in teaching (Myende, 2015), where teachers with knowledge areas provide expertise to help others adopt or conform through teacher leadership.

Heystek (2016) and Akcil et al. (2017) mention that implementing any change requires leading people in implementing policy and good leadership must imply followership and good relationships that solve problems. Effective leadership is where there is a willingness to change and school members are motivated, respected and trusted (Akcil et al., 2017). Hatlevik and Arnseth (2012) posit that leadership can promote the base for ICT integration by creating a foundation for good working conditions, quality infrastructure and a clear vision for what needs to transpire. This

leadership requires principals to be more open about the school departments, how ICT resources are being managed and how the ICT vision is enacted (Akciil et al., 2017). Table 2.1 shows a summary of ICT integration leadership based on significant components and the leadership typology aspects involved.

**Table 2.1** *ICT Integration Leadership Components*

<b>ICT Integration leadership component</b>	<b>Description of component</b>	<b>Leadership typology involved</b>
ICT vision and goal setting	- providing direction and guidance for individual and organisational intentions	Transactional Distributed Innovation Adaptive
Development of ICT skills	- empowerment in ICT systems knowledge and individualised learning	Transactional Distributed Innovation Adaptive
Emergent sources of leadership	- other school stakeholders can influence and lead ICT integration	Distributed Innovation Adaptive
Support for ICT integration	- providing moral and technical support	Transactional Distributed Innovation Adaptive
Rewards for ICT integration	- followers get rewards in return for enacting ICT integration in a given way	Transactional
ICT decision making	- developing novel, problem-solving ideas and implementing them	Distributed Innovation Adaptive
Evaluation and impact assessment	- periodical evaluation and assessment of ICT integration and resource utilisation	Innovative Adaptive Innovation Transactional
Change oriented	- recognition of a change in ICT integration approach and commensurate response	Innovative Adaptive Innovation Transactional

## **2.6 Enactment of ICT Integration Leadership**

In this section, the focus is placed on the leadership influence that different school stakeholders can make. These stakeholders are principals, heads of departments (HODs), teachers, ICT coordinators and students. ICT integration leadership requires that leaders promote ICT



support systems, encourage stakeholders to work collectively in ICT aspects, and promote training and competence in ICT use. These aspects fall under discussion in this section.

### **2.6.1 Principals' ICT Integration Leadership**

The 21st-century school principal must become a learner and a visionary leader. They should promote the digital age learning culture, be excellent in their professional practice leading to school improvement (Abraham et al., 2019). They should become digital citizens to incorporate ICT into a daily routine that gives a steady and positive leadership in the school (Abraham et al., 2019; Mingaine, 2013a; Uğur & Koç, 2019). The writer ponders that some staff members may not be willing to integrate ICT if they never see their principal incorporating it into their duties. Any vision for ICT integration must start with a rich understanding of the interdependent and complex characteristics of the new technology-filled environments that schools become. The principal's role is crucial in leading several departments to initiate and manage positive reforms that ensure learning and other functions (Alam, 2017). The principal's primary responsibility is to create school climate, culture and other environmental characteristics that denote students' learning and staff's work (McLeod & Richardson, 2013).

Several authors agree that principals are responsible for setting ICT goals and vision plans for others to follow (Adu & Olatundun, 2013; Gerard et al., 2008; Machado & Chung, 2015; McLeod & Richardson, 2013; Shen et al., 2010). The writer thus supports the notion that principals provide support through positive leadership and encouragement and ensure a good working environment that motivates subordinates to experiment with ICT in their classrooms and other school functions.

Thannimalai and Raman (2018) investigated how principals' technological leadership and professional development influenced teachers' integration of technology in secondary schools. The study aimed to ascertain the level of principals' technology leadership benchmarking with five constructs: visionary leadership, excellence in professional practice, digital age learning culture, digital citizenship and systemic improvement in schools. The findings showed a significant relationship between principals' technology leadership and teachers' technology integration. The level of principal technology leadership was found to be high in all five categories. Teachers were

found to be generally utilising technology in their lesson deliveries. The findings confirmed that principals are the predictors of technological competency, which has a knock-on effect on supporting school integration.

Gerard et al. (2008) believe that the principal creates a vision that either supports or discourages teachers from implementing an ICT-based, inquiry-oriented approach to teaching. Some principals are incapable of providing ICT integration leadership. For example, Uğur and Koç (2019) traced how principals' leadership roles have changed over time. They found them apprehensive about using social media in the classroom and had problems comprehending ICT integration because they had little experience with ICT. A significant finding was that principals who did not understand how to use various forms of ICT could not correctly evaluate its use by teachers and other staff members. Many school principals received their professional degrees when ICT integration was not as popular as nowadays (Richardson et al., 2013). Such principals cannot correctly lead to ICT integration (Kannan et al., 2013) if they do not improve their ICT knowledge. The principals may not fully comprehend their roles and expectations for successful ICT integration in their schools as they practise only some ICT integration leadership skills or let staff members do what seems appropriate (Kannan et al., 2013; Uğur & Koç, 2019).

### **2.6.2 Heads of Departments' ICT Integration Leadership**

Being a head of a department (HOD) is a formal leadership position that extends the SMT (Tapala et al., 2020; Tay, 2016). Raising the learning standards is an essential priority in education, and HODs must facilitate any changes and monitor and motivate teachers in the education process (Tam, 2010). HODs provide departmental motivation and act as role models for teachers by establishing good interpersonal and working relationships (Bipath & Nkabinde, 2018). Tay (2016) reveals that HODs provide leadership by setting directions for the subjects in their departments, and their leadership involves planning, implementing and evaluating the pedagogical aspects. HODs are expected to perform curriculum-leadership responsibilities that maintain and advance the school curriculum, including ICT development (Albashiry et al., 2016). HODs also ensure and uphold quality in teaching and learning by checking the teaching and assessment processes (Tay, 2016). Besides monitoring student and teacher performance, HODs are tasked with the managerial tasks of seeing to the provision of teaching resources, including ICT materials (Tay, 2016). They

can get things done by challenging the process and system; and inspiring a shared ICT vision (Kouzes & Posner 1995; Tapala et al., 2020).

According to Tam (2010), problems arise when HODs are not knowledgeable about leadership in technological areas that they are not familiar with and lack professional support to adjust accordingly. Tapala et al. (2020) declare that, unlike the situation in the developing countries, third world countries (citing South Africa) typically have HODs appointed based on knowledge of the subject and experience in teaching it. They can then fail to promote ICT integration because they lack ICT tools, experience and relevant skills to lead in ICT knowledge and functioning. The same authors argue that HODs can feel underutilised by their principals by simply endorsing principal decisions and desires without making significant contributions. HODs can have ICT integration leadership skills but can sometimes be left to deal with challenges in their departments alone without the backing and support of their principal in critical areas. However, principals can doubt their HODs and fear giving them tasks and duties they can mess up or fail to meet deadlines (Leithwood, 2016).

### **2.6.3 Teachers' ICT Integration Leadership**

There is growing widespread awareness that the pedagogical and technical expertise of the teacher and their genuine efforts are critical in ICT integration (Jogezai et al., 2018; Singh & Chan, 2014). Successful ICT integration in teaching and learning is dependent on teachers being prepared enough because they are the ones who use the educational ICTs (Pedro et al., 2018; Singh & Chan, 2014). Teachers can have many leadership roles depending on their capabilities. In ICT integration, teachers can function as facilitators, ICT coordinators, collaborators, peer coaches and peer mentors. These roles are associated with the concepts and domains of teacher leadership (Hamzah, Noor, et al., 2016; Hunzicker, 2017; Killion et al., 2016; Padzil, 2016). Teacher leadership is viewed as the capacity development for teachers who, through professional development, can serve their schools as instructional coaches, mentors and facilitators (Lumpkin et al., 2014). This kind of leadership has teachers assuming ICT leadership roles without necessarily becoming administrators (Killion et al., 2016).

Teacher collaborators promote teacher cooperation so that they all keep on developing professionally (Ostovar-Nameghi & Sheikahmadi, 2016). Ostovar-Nameghi and Sheikahmadi (2016) further assert that teachers must not wait for organised crash teacher training courses to get methods and techniques but rather reciprocally collaborate and learn from other teachers' experiences. Coaching involves an expert teacher training and drilling one or more colleagues (Mizell, 2010). Through peer coaching, teachers can share their knowledge and provide each other with feedback, support, and assistance (Ostovar-Nameghi & Sheikahmadi, 2016, p. 199). Teachers can be mentors to students and other teachers. Ostovar-Nameghi and Sheikahmadi (2016, p. 201) describe mentoring as guidance, support and advice offered by the experienced mentor (teacher) to the less experienced mentee to develop their educational or academic career. Mentoring is related to concepts such as coaching or counselling to give requisite assistance (Jamissen & Phelps, 2006). So, Jamissen and Phelps (2006) define mentoring as focusing more on providing support, building self-confidence and competencies in others and improving working relationships.

Although rarely defined, teacher leadership could help teachers because it focuses on roles beyond the classroom (Wenner & Campbell, 2017). Anderson (2004) asserts that as schools become more sophisticated because of ICT evolution, teachers are urged to adopt new roles and better understand leadership, especially how they can enact leadership in their dealings. In this case, teachers would take a more prominent role in decision-making and other appropriate opportunities where teachers can show leadership (Anderson, 2004). Khlaif and Farid (2018) found that when school administrators and teachers were willing to share responsibility, teachers became creative leaders in ICT integration leadership. Two kinds of teachers resultantly emanated; innovative and instrumental teachers who spearheaded ICT integration leadership through promoting learning by acquiring the suitable ICT, setting targets and goals in ICT use, team teaching with ICT and other forms of collaborations.

Teacher leadership needs the support of the school leadership. According to Killion et al. (2016), for teacher leadership to be fully realized, leaders within the school must shift their own beliefs and responsibilities, especially in valuing teacher expertise in leadership and trust that they contribute to problem-solving. However, some principals might feel threatened when they

relinquish some of their power to subordinates (Hermann, 2016). Alegado (2018) investigated the challenges that occurred in teacher leadership in Philippines schools. This study exposed a traditional ‘principal-oriented’ type of leadership where decisions were principal-centred. A lack of relevant leadership training left teachers feeling inadequate and lacking incentives and motivation to become leaders. As a result, teacher leadership was minimal.

Teachers can receive pre-service and in-service training, enabling them to use ICT and probably lead in its integration (Chao, 2015). However, in most schools, the rate of ICT integration has remained slower than the rate at which it is being developed for education (Akbar, 2016). Teachers go through many pieces of training that educate them on computer literacy but do not empower them to integrate ICT in daily activities and use that as a base to lead in ICT integration leadership (Chao, 2015).

#### **2.6.4 Students’ ICT Integration Leadership**

Leadership is a skill that can be learned, and students can develop skills in leadership that benefit classroom and school interactions (Mozhgan et al., 2011). Student leadership can be seen in different forms ranging from class practices that empower other students to the leadership of the school and community-level activism (Göker, 2019). Thus, student leadership should lead the developmental process in today’s society because schools should develop wholesome individuals (Basit et al., 2020; Mozhgan, 2012; Mozhgan et al., 2011). At the high school age, students must demonstrate the ability to set goals, help develop leadership skills in others, be involved in community programmes and build positive relationships with others (Hilliard, 2010). Furthermore, Hilliard (2010) adds that it is essential to get students involved early in leadership to build opportunities for volunteer services, collaborative activities and engagement in group projects.

In terms of ICT integration and ICT integration leadership, students have grown up with technology and typically have more day-to-day interactions with technology which means that as leaders, they can bring valued experience and perspective to the classroom and the school as a whole (Ahlquist, 2017). Technology advancements bring new challenges for teachers and students in educational settings and can give students new responsibilities to take more ownership of their learning (Göker, 2019). Continuing, the author says that students’ decision-making practices then

help teachers refine their teaching. Student leaders can model the way, broaden organisational change, inspire a shared vision, enable other students to act, and challenge hindering processes and traditions (Göker, 2019; Kass & Grandzol, 2011).

### **2.6.5 ICT Coordinators' ICT Integration Leadership**

An ICT coordinator is a specialist who is a planner, a technician, a budgeter, and an educationalist (Devolder et al., 2010). ICT coordinators have different titles and roles in schools. Still, Woo and Law (2020b) reveal that a school can employ a formal ICT coordinator whose charge is placed on providing specific instructional and technical support (Devolder et al., 2010; Gaible & Burns, 2005; Ghavifekr et al., 2014; Razak et al., 2018; Wasserman & Refaeli, 2018). An ICT coordinator can work with a technician team responsible for supporting the technical aspects of ICT integration (Woo & Law, 2020b). Technical support covers all aspects linked to ICT, such as the software's working, problem-solving and troubleshooting which have nothing to do with specific pedagogic methods (Morueta et al., 2010). Moreira et al. (2019) investigated teacher perceptions of ICT coordinators' leadership. The results showed an increase in ICT coordinators who were becoming more critical in updating and managing ICT resources and supporting teachers in lesson development. ICT coordinators enacted the academic support to incorporate ICT in didactic strategies and integrate diverse teaching methods.

ICT coordinators can have many responsibilities in many fields, that include budgetary framework, promoting the teaching-learning with ICT and leading ICT-infused school projects (Wasserman & Refaeli, 2018). Razak et al. (2018) and Lim and Oakley (2013) believe that ICT coordinators are required to keep schools informed of current ICT developments. They also monitor the web-based system, plan for ICT planning, determine the direction of ICT use, and organise teacher and student training in ICT use. This way, ICT coordinators ensure that the pedagogical and technical aspects are intertwined (Wasserman & Refaeli, 2018).

### **2.6.6 Collaboration in ICT Integration Leadership**

Building a collaborative culture within the school and the external community and allocating resources to develop and maintain such a culture facilitates ICT integration (Dexter,

2018). Collaboration is deemed more relevant in current leadership discussions because of the need to integrate expertise across multiple areas. An influence tactic engenders commitment to work and institutions (Colbry et al., 2014). Collaboration determines the extent to which ICT knowledge can be shared and ICT integration in school operations. Individuals and organisations often use teamwork to achieve shared objectives and outcomes that might be difficult to attain while working alone and in collaborative leadership (Hsieh & Liou, 2016). Leaders do this by agreeing on leadership roles, establishing a culture and identity for collaboration, developing an operational structure that permits it and cultivating a shared vision for cooperation (Bryant et al., 2020). Current literature provides limited guidance on practices leaders can use to build a collaborative culture for ICT. However, it suggests that it is essential to establish a means for people to exchange ideas through a shared cloud-based, web-based collaboration applications or through regular meetings of committees, departments, teams and other decision-making structures (Dexter, 2018).

Collaboration is essential because school stakeholders can identify and resolve common concerns in their school, team or department through formal or informal negotiations. They can develop jointly formulated rules to achieve goals (Hauge & Norenes, 2015). According to Valverde-Berrocoso et al. (2021), collaboration contributes to meaningful learning and offers different opportunities to evaluate one's practices from others' experiences. Students can benefit from collaboration through ICT activities like building a shared database, where a class or group adds its part, carry out a project, collect data, write a final report and shares results with others (Blau & Shamir-Inbal, 2017).

Drossel et al. (2017) investigated teachers' collaborative use of ICT across six European educational systems. Teachers' attitudes and competencies, school and class variables, and variables that concerned teachers' background were investigated and were found to influence how teachers collaborated. Competent teachers had a positive attitude towards ICT and were willing to help others who were less competent. Hauge and Norenes (2015) investigated three schools' collaborative leadership development with ICT. Data was collected from school leaders (using interviews) and analysed from school documents and websites. The study showed that knowledge of Web 2.0 tools promoted open collaborative practices, across all three schools and the leadership

functioned as a distributed and team-based activity. The overall conclusion was that ICT tool-mediated activities become a routine through teamwork.

### **2.6.7 Training and Competence in ICT Integration**

One major limitation connected to ICT integration and education is that teachers and other staff members lack ICT training and skills (Tedla, 2012; Tondeur et al., 2015; Tondeur et al., 2008; Vidanagama & Karunathilake, 2021). The amassed use of ICT tools at work has raised the demand for new skills, and for schools to grasp the new opportunities that ICT opens in many areas. Therefore, the right skills have to be developed by the school staff and students (Mynaříková & Novotný, 2021; OECD, 2016b). Several authors (Buabeng-Andoh, 2019; Cakir, 2012; Chigona et al., 2014; Çoklar & Yurdakul, 2017; Rabah, 2015) spotlight training in ICT use as a crucial determiner in both fruitful ICT integration and ICT integration leadership in education. Leaders must support staff in professional development but sometimes lack good guidance on how it must be done (Dexter, 2018).

ICT training enables staff to develop the essential ICT competencies to develop relevant skills, including digital competencies for work and life (UNESCO, 2018). Mirete et al. (2020) posit that in the last two decades, the word ‘competence’ has gained a distinct relevance in the education field and is used to imply the notion of permanent but evolving characteristics directly related to successfully doing an activity. As contemporary societies are based on information and knowledge and the pervasiveness of ICT, there is a great need to build workforces that possess ICT skills and are creative; reflective and adroit at problem-solving in given areas (UNESCO, 2018).

Since technology occupies an important place in today’s lives, schools have a responsibility to educate staff and students who can use it effectively (Cakir, 2012). All school community members should have professional development to get training for adequate competencies with educational or work uses of ICT (Bhasin, 2012). For teachers, the activity must foster skills that help create and utilise technology-integrated lesson materials that focus on pedagogy and not just technology issues (Ahmadi & Reza, 2018).



Peled and Perzon (2021) investigated the factors that influenced Israeli teachers' ICT integration. These teachers participated in a national three-year ICT integration programme that awarded a laptop to every teacher. In total, 52 teachers participated in the study, and the findings showed that training helped them develop skills to integrate ICT into their teaching. It was ascertained by comparing their integration before and after the training.

In another study, Valverde-Berrocso et al. (2021) revealed that training is critical in school functions. The survey was about finding the readiness of 251 Spanish teachers in ICT integration in pre-COVID-19 time. The results showed that while digital technologies were commonly used, there were deficiencies in the training model adopted and teacher competence in ICT. The study established that training was not a one-time task, and more teacher training models were required to encourage learning anywhere and anytime.

### **2.6.8 School ICT Support Systems**

Closely related to training is the concept of support that teachers, principals and students must have so that ICT use is fluid. How school leaders provide this support influences the nature and frequency of ICT integration (Dexter, 2018). ICT changes rapidly, creating opportunities to support integration, which is a mechanism of continuously helping staff develop, evaluate and update new technological skills (Hu, 2017). Support should be constant, of good quality and meet the staff and students exactly where they need help (Eristi et al., 2012). Studies have consistently shown that ICT integration must be nurtured with ongoing support and continuous learning opportunities to strengthen beliefs and skills (Dexter, 2018). School-level support is essential for ICT success. It encompasses leadership practices that set direction and develop the institution (Petko et al., 2018). Technological innovations and integration need a planned support structure that can be achieved through policy formulation that caters for human, technical and organisational support (Barakabitze et al., 2019; Voogt et al., 2013).

School leaders have vital roles in developing an ICT culture that facilitates providing financial support and maintaining and updating ICT resources (Ibrahim et al., 2013). This support should go beyond the organisation of training sessions and develop school members' understanding of why ICT is being integrated (Ashiono et al., 2018). According to Eristi et al.

(2012), school leaders should not just support ICT integration but also lead their followers in accepting the technology and leading by example for others to make the required changes. It happens optimally if the leader is competent to lead by example. However, an interactive leader together with staff create a relationship where they can support one another in decision making and solving issues (Anderson, 2004). In a study on the impact of leadership on meaningful ICT use, Qureshi (2013) found that teachers went to their principals for guidance in ICT integration in their teaching, and the principals offered extended support and motivation whenever required.

In some instances, support is not just about what principals do but what is provided by technology leaders, IT teachers and ICT teams (Cakir, 2012; Ottestad, 2013). ICT coordinators and facilitators, with the support of school principals, promote school ICT initiatives and provide much-needed ICT support to colleagues (Blau & Shamir-Inbal, 2017). ICT coordinators must know a range of ICT tools, and their value in schools is primarily seen in teaching and learning, where they give sound advice, proffer training in pedagogical matters and lead change in teaching methods (Avidov-Ungar & Shamir-Inbal, 2017).

In a study that investigated ICT integration support levels for in-service teachers, Williams (2017) used a qualitative phenomenological survey. He interviewed teachers to discuss how they applied aspects they were taught during in-service training in content areas. The study focused on how schools facilitated that teachers got the help they needed to integrate ICT in teaching. The findings showed school-based concerns that arose from inadequate web-based interconnectivity and proper acclimation of ICT tools when they were on their own. The lack of computer resources to implement technological innovations in the classrooms was another challenge.

In a Kenyan case study that interviewed and observed 18 teachers and 30 students in learning processes, Kisirkoi (2015) based support on professional development and working conditions that were relaxed and friendly the principal provided. The findings showed that professional development improved ICT skills, and flexible working conditions encouraged collegiality and innovation.

## **2.7 Justifications for Schools Enacting ICT Integration**

The previous sections focused on ICT integration and school leadership. The discussion continues by examining some justifications for why schools enact ICT integration in the way they do. As brought up in earlier sections, ICT integration is not an easy feat. It comes with financial and workforce implications that schools must prepare. Schools that acquire and use ICT tools have their reasons and justifications. The writer acknowledges that there are many justifications. In this instance, the focus is on the following: ICT helps create modern societies in schools; ICT integration helps achieve curriculum goals; ICT fosters a broad school curriculum, and it represents school stakeholders' influence.

### **2.7.1 ICT Integration Helps Create Modern Societies in Schools**

Schools are places of interaction for teenagers and adults. As extensions of societies, they must not be dissociated from the technology people constantly use in their daily lives (Almurashi, 2016). Schools fulfil the vital purpose of educational knowledge acquisition but also satisfy the young people's socialisation needs that incorporate different forms of ICT (Colao et al., 2020). Society progressively extends and redefines the requirements that its members demand, and the use of ICT is a necessary venture in various areas (López, 2011). Technology is socially embedded and is directly linked to other developments and processes that occur in society (Cloete, 2017; Dlodlu, 2020). In the last decades, rapid developments in ICT, a groundswell of interest in computers and the daily presence of the world wide web in everyday life have brought important implications for education as well so that ICT could be harnessed to improve effectiveness in educational provision and processes (Al-Ansi et al., 2019; Alkan & Meinck, 2016; Alsalhi et al., 2019; Khattak & Jan, 2015).

Consequently, current times have witnessed ICT use shifting and realigning traditional teaching methods by enabling teaching and learning in novel ways. Technological changes have continuously altered how teachers and students approach teaching and learning (Al-Ansi et al., 2019). Global changes pressure all groups, including schools to constantly acquire and apply new ICT tools and skills (Khattak & Jan, 2015). ICT use by school staff members and students has expanded to the internet, online searching for educational materials, programming, spreadsheet, e-

mail, chats, graphics, and different online interactions (López, 2011). People can communicate in real-time across spatial distances using voice over IP, instant messaging, social networks and video conferencing (Khattak & Jan, 2015). All these aspects are commonplace in the world in which we live. Schools today thus face ever-increasing demands to ensure that students become well-equipped to enter and navigate a complex world centred on computer technology (Infante-Moro et al., 2019; Roschelle et al., 2000).

OECD (2016) comments that innovation requires openness and interactions between systems and their environments. Schools should not be left alone to make the challenging transformation process but should be supported through favourable government policies and strategies from the wider community and other stakeholders. The connection to societal goals is important for a school because it forms the external structure and creates a basis for resource acquisition for schools. Still, the responsibility for improving a school usually rests on the principal and the teachers (Ilomäki & Lakkala, 2018). Gaps in the digital skills of both teachers and students make it difficult to get high-quality digital learning resources. The indistinct learning goals and inadequate pedagogical preparation on meaningful ICT integration in teaching drive a wedge between expectations of modernity and the reality in schools (Harris et al., 2016; OECD, 2016).

Mąkosa (2013) explains that the plan behind ICT integration in schools can be misleading from the standpoint that it should not be used to impress rather than to meet the real educational needs. The argument is that young people and schools do not need the most sophisticated devices and software, which are slightly better than their previous editions. Releasing a new device (on the market), an operating system or an application causes a large group of customers. Therefore schools must avoid digitisation as a matter of fashion and the fascination with electronic devices but a need to fulfil operational and pedagogical needs (Mąkosa, 2013). The introduction of ICTs in schools requires inspirational leadership, and (as mentioned in earlier sections) this is not just a commitment of principals but rather is reflective of a need for all parties involved to understand the repercussions of the adopted changes and to positively contribute to the process (Unwin, 2005).

### 2.7.2 ICT Integration and the Curriculum

Aligning ICT integration to the curriculum helps teachers identify relevant teaching and learning experiences before the actual teaching begins (Lincoln, 2009). As discussed earlier, modern students have access to a variety of ICT gadgets that are very different from 30 years ago; hence, this should impact curriculum guidelines (Matos et al., 2019). IGCSE and IB curricula have been discussed in earlier chapters to constantly change their content and focus on making their syllabi trendy and more contemporary. Schools and teachers who use them must recognise this fact, especially regarding how they incorporate ICT into syllabi objectives and aims (Hennessy et al., 2010; Rabah, 2015). The teachers must interpret the syllabi guidelines and turn them into relevant activities (Matos et al., 2019). With ICT, teachers and students can reach the levels stipulated by the syllabi.

IGCSE and IB curricula are popular international qualifications with high global standards for international education and are regarded as ‘international passports’ to leading universities (United World Colleges, 2020a). Besides offering varying subjects to cover high school learning, both curricula have vital aspects and attributes their graduates should attain. Cambridge students should become confident, engaged, reflective, responsible, and innovative (Cambridge Assessment International Education, 2018). On the other hand, IB students must become knowledgeable, confident, inquirers, thinkers, communicators and reflective, among other attributes (International Baccalaureate Organisation, 2017). For students to fully develop these attributes, ICT plays a significant role in internet searches, knowledge formulation and general student development.

IB and IGCSE curricula give guidelines to schools and teachers on how to best approach the teaching aspects. For example, schools are advised to develop schemes of work that work for them, matching available resources, nature of students, experiences and consideration of local requirements (International Baccalaureate Chemistry guide, 2016). Schools, thus, need guidance from the examination bodies in the form of downloadable curricular documents. The Physics, Biology and Chemistry IB syllabi have specific sub-sections that encourage teachers to use ICT in practical planning and lesson planning (International Baccalaureate Biology guide, 2016; International Baccalaureate Chemistry guide, 2016; International Baccalaureate Physics guide,

2016). Teachers are advised to use the ICT pages of the teacher support materials on the website. For all the subjects, the syllabi, past examination papers, mark schemes, additional materials such as specimen papers, teacher support materials, grade descriptors and subject reports are all found on the online curriculum centre of the IB website (International Baccalaureate Biology guide, 2016; International Baccalaureate French guide, 2016; International Baccalaureate Geography Guide, 2017; International Baccalaureate History guide, 2017).

Teachers can provide the IBO with recommendations of valuable resources like books, websites, teaching ideas and videos (International Baccalaureate Organisation, 2017). Schools send formative assessment files, portfolios and marks for external assessment to IBO (International Baccalaureate Organisation, 2020a). Therefore, if schools need to offer an IB curriculum, they must invest in ICT (especially computers and the internet) so that teaching becomes guided by the curriculum planners to become effective. Some IB subjects specifically mention specific ICT tools that need to be used for certain topics or areas. For example, the International Baccalaureate Biology guide (2016) proposes using ICT in the molecular visualisation of biological structures such as carbohydrates, fats and proteins for better content understanding. The International Baccalaureate Mathematics guide (2016) encourages students to use fitting ICT tools such as graphing, drawing and word-processing software, graphic display calculators, screenshots, databases and spreadsheets to enrich mathematical communication.

The Cambridge curriculum is ICT-oriented, starting with a website that offers a lot of information, including how to become a Cambridge school, the curriculum details, and teaching and learning resource materials. Like the IB set-up, the Cambridge website is password-protected, and schools must be affiliated with it as a Cambridge school. Cambridge online support includes teaching resources through a school support hub which has syllabi, schemes of work, discussion forums, student guides, endorsed textbooks and digital resources, examination question papers, mark scheme, example candidate responses from past examinations, and examiner reports teachers can use to improve their teaching (Cambridge IGCSE Biology Syllabus (0610), 2020; Cambridge IGCSE Chemistry (0620), 2017; Cambridge IGCSE French (0520), 2017; Cambridge IGCSE Music (0410), 2017; Cambridge IGCSE Physical Science syllabus (0652), 2016). The Cambridge curriculum centre supports schools by training through face-to-face workshops, professional

development, online self-study and tutor-led training (Cambridge Assessment International Education, 2020b). Cambridge has also created a community through which schools can find information and share ideas and experiences with other schools on their community forums and social media platforms (Cambridge Assessment International Education, 2020b).

Specific ICT tools are indispensable in teaching and learning in the Cambridge curriculum. For example, audio players for language subjects like French, Germany and Greek- to name a few (Cambridge IGCSE French (0520), 2017) and music notation programmes or sequencers (Cambridge IGCSE Music (0410), 2017). ICT use by students can include data collection using sensors linked to data-loggers, computers, using spreadsheets to process data, simulations and animations to visualise scientific ideas (Cambridge IGCSE Biology Syllabus (0610), 2020; Cambridge IGCSE Chemistry (0620), 2017). Subjects that involve designing are not very practical without ICT use because of digital methods that include post-processing, editing software, manipulation of images and sound through film-based and lens-based media (Cambridge International Level 3 Pre-U Certificate in Art & Design (9837), 2016).

A 21st-century school curriculum needs to be focused on students constructing knowledge and information that has value to them in developing innovation skills, blending thinking, incorporating ICT literateness and relating to real-life experiences (Alismail & McGuire, 2015). Therefore, a broad curriculum in a school responds to the fact that every society is dynamic and that schools should equip students with variant skills and knowledge (Kpee & Gbinu, 2017; Pangrazi & Beighle, 2019). In broadening the curriculum, schools thus blend the academic subjects and co-curricular aspects to complement learning experiences. According to El-Haggag et al. (2019), co-curricular activities are events and learning skills that happen alongside academic subjects and are meant to develop specific skills through interacting individually or collectively. The same authors give activities like educational workshops, orientation sessions, seminars, simulated experiences, site visits, field trips for hands-on experiences to name a few as examples. They outline extracurricular activities as those that involve sports, clubs and societies. Whichever way one looks at the school ICT is pivotal in curriculum provision. The internet, for example, helps find resources that support teaching, extend students learning, help enrich activities, find things out, develop ideas, exchange information, review, modify and evaluate work in progress

(Ohuruogu et al., 2019). ICT lets users earn knowledge and provides feedback that enables teachers to assess programmes and help them connect and communicate with the rest of the world (Gogoi, 2019; Ohuruogu et al., 2019). Although informal education is regarded as good and valuable in schools, the formal curriculum is still considered the main component of low income countries' educational systems (Verma & Amila, 2021).

An essential characteristic of international schools is the concept of community service programmes that students must get involved in as a requirement for university admission (Afzal & Hussain, 2020). Community service connotes activities such as participation in different communal youth programmes, tutoring and mentoring children, visiting the elderly or disadvantaged groups, fundraising, volunteer work, involvement in community projects, involvement in the arts and culture and environmental projects (Henderson et al., 2007; Riedel, 2002). Community service becomes an essential aspect of a school's co-curriculum that can be enhanced through ICT like other school programmes. Proponents of community service programmes claim that these programmes educate the youth to be more socially responsible citizens, encourage public spiritedness, improve students' skills as they serve and enrich their social consciousness (Afzal & Hussain, 2020; Henderson et al., 2007; Riedel, 2002). Riedel (2002) argues that community service is important because traditional communal instruction sometimes falls short and students lack the moral experience. But then again, it is still unclear if all service programmes succeed in the envisioned citizenship qualities.

In these modern times, ICT has brought revolutions in innovation and effectiveness in the teaching and training of sports and physical education (Gogoi, 2019). ICT is instrumental in teaching dance, music and other activities (Ohuruogu et al., 2019). Various ICT tools are not available in sport. These include pedometers for counting steps and for measuring physical activity; heart rate monitors; digital video cameras and visual analysis software for research, teaching and data collection; simulation and games to provide opportunities for physical activity and enjoyment and the internet for providing the capacity for communication, sharing ideas and accessing information and resources (Ohuruogu et al., 2019). However, the use of such tools has its challenges. The most common challenges include a lack of trained teachers to handle the



equipment and a lack of funds to buy and maintain the required ICT equipment (Ohuruogu et al., 2019).

### **2.7.3 ICT Integration and Stakeholder Influence**

Schools face challenges in providing appropriate and sufficient ICT tools and infrastructure (Bariu, 2020; Dhital, 2018). Establishing ICT systems in schools is an expensive process that requires funding for hardware acquisition, planning expertise and capacity-building work (Owen et al., 2020). Hardware and software become obsolete, and additional concerns such as connectivity and the internet mean that ICT integration is an expensive ordeal for most schools. School committees and parents worldwide typically use their own resources to provide their children with access to computers and the Internet (Gaible et al., 2011). By enabling their children to attend international schools, parents wish to give them an advantage of technological provision and international education that offers them outstanding education and better chances of getting into top international universities (Schippling, 2018). Parents' fees and other contributions are essential and must be justified in addressing resource gaps and contributing to Programmes and activities that raise school status (Hedges et al., 2020).

Several actors are interested in school development and can make ICT integration at a school successful. Valued contributions can be made by local and international organisations, that include private-sector, Non-Governmental Organisations (NGOs), technology companies, donor agencies, government agencies, charitable foundations and ministries of education (Gaible et al., 2011; Lim et al., 2020; Owen et al., 2020). These stakeholders are relevant to ICT integration and decisions by providing financial aid or the existing ICT resources. Funding is one of the aspects that schools must consider in their technology plans (Anderson & Dexter, 2000). Successful ICT integration initiatives must include continuing funding support to meet and maintain ICT infrastructure expenses in software, hardware, maintenance expenses, technology support personnel, and general training (Ritzhaupt et al., 2008). So, a school integrates ICT in a particular way because ICT tools or funds have been sourced from stakeholders who must expect to see them and utilised by students.

In an investigation on the state of ICT integration and the level of expertise attained by 20 Indian schools, Kundu and Bej (2021) found out that debilitating factors like a lack of ICT resources and infrastructure, poor internet connectivity and general dysfunction of ICT tools to be related to a lack of funds. Donor agencies have played a significant role in providing ICT resources in developing countries, and some have played an important role in country ICT policy formulation (Hennessy et al., 2010). However, relying on support from donors and other agencies for ICT tools may leave many schools without ICT tools (Njoroge et al., 2017) because no one knows when the donation will come. ICT development programmes suffer from sustainability issues because some start well and falter. Projects initiated by third-party donors like international aid agencies suffer from continuity once the donor exits (Ogbomo, 2011).

Kong (2017) investigated parents' understanding, support and concerns about e-learning in Hong Kong schools, including nine secondary schools. From these schools, a recommended number of parent representatives (mostly from parent-teacher associations) took part in semi-structured focus group interviews and questionnaire surveys. The results suggested positive parents' perception of the effects of e-learning, and parents believed that it was important for their children to practise e-learning. Hence, they supported them with desktop computers, e-book readers, smartphones, tablets, printers and Wi-Fi connectivity at home. However, they also participated in fundraising activities to add to school ICT infrastructure, like different computers and Wi-Fi networks. The fundraising activities included walkathons which parent-teacher associations organised. Practical home policies to monitor personal activities and encourage active, interactive learning were recommended to parents. Schools were advised to formulate a holistic approach to address parents' concerns and proactively gain support. Schools were encouraged to improve parents' academic understanding of e-learning. This study proved the worth of parents as essential stakeholders but was not focused on investigating teacher and student activities in e-learning.

A multiple case study of successful ICT integration in Malaysian public schools (Razak et al., 2018) collected data through in-depth interviews and documents from primary and secondary school principals, teachers and ICT coordinators. The findings from the secondary school revealed that successful ICT integration came from the types of ICT tools found in the school, rules and

regulations that shaped the ICT culture and the division of labour in the school. However, apart from the immediate school context, successful ICT integration became apparent in the socio-cultural context of Parent-School Associations. These associations helped the school raise funds in support of ICT projects. The principal addressed budget limits by sourcing income from the school alumni, Parents-Teachers Association (PTA), and public and local businesses. The income was used to install a School Management System and Wi-Fi, which the government did not provide.

#### **2.7.4 Effectiveness and Efficiency in Performing School Operations**

Traditional methods of managing schools, teaching and learning are no longer effective in a technological world (Nyambane & Nzuki, 2019; Ojo & Adu, 2018; Yeop et al., 2019). Therefore operations at school level are considered to be effective, efficient and sustainable if they are connected to ICT use and competence acquisition (Eickelmann et al., 2017). Effectiveness with ICT leads to schools being able to successfully meet their objectives with ICT as enablers (Jita & Munje, 2020; Nyambane & Nzuki, 2019). On the other hand, efficiency refers to the accomplishment of objectives in a timely and less costly manner (Nyambane & Nzuki, 2019). For instance, the advances in ICT have progressively reduced school costs of managing information, enable fast undertaking of information-related tasks and introducing processes and school structures (Thakral, 2015). The introduction of ICT in educational systems and processes modernizes school operations (Nyambane & Nzuki, 2019). This has led both governments and schools to experience technology related pressure so as to improve organisational performance (Falabella, 2020; Nyambane & Nzuki, 2019).

According to (Nyambane & Nzuki, 2019) effectiveness and efficiency in ICT integration are connected to how administrators, teachers and students use ICT. For administrators, ICT facilitates administration processes like data storage, decision making and knowledge management. For teachers, ICT meets needs in lesson preparation and presentations; collection and analysis of test scores, monitoring student progress in scholastic achievements; reporting outcomes to parents, and sharing information amongst teachers amongst others. Students' point of view encompasses how they could use it under teacher guidance to meet educational outcomes.

ICT integration in schools is dependent on availability and accessibility of hardware, software (Nyambane & Nzuki, 2019). ICT tools like video cameras, projectors, scanners, photocopy machines to name a few appeal to students' senses and feeling and help teachers communicate effectively in a way that facilitates understanding (Ojo & Adu, 2018). On the contrary, it is unfitting to assume that ICT availability certainly improves efficiency and effectiveness in school processes without putting certain measures in place (Nyambane & Nzuki, 2019).

School ICT strategies on effectiveness and efficiency are related to effective school leadership (Sun & Gao, 2019). One of them is ICT training because it is helpful and time-saving as teachers spend less time exploring ICT resources by themselves (Eickelmann et al., 2017; Sun & Gao, 2019). Schools then need to set up a well-regulated system of both technical and didactic support for effective ICT integration to foster students' learning (Lorenz et al., 2019). It is imperative that school leaders need an understanding and enact school reforms that include how to build a shared vision; focus on technology appropriate pedagogy; support mentorship and provide ICT infrastructure and policies (Christensen et al., 2018). Teachers are hesitant to change if they do not see benefits like increased efficiency in doing tasks or an improvement in students' understanding of their subjects (Ziphorah, 2014). Thus, schools must acquire suitable technology and set systems that reduce this hesitancy.

Whilst, the use of ICT is considered as a crucial predictor of school effectiveness and efficiency, most studies done focus on effectiveness and efficiency in teaching and learning (Drossel et al., 2017; Fu, 2013; Junaidi et al., 2020; Ratheeswari, 2018). Kuusimäki et al. (2019b) investigated digital school-home communication in relation to teacher well-being. In their study, the specific role of digital communication in creating parent-teacher partnerships were investigated through generating data from 400 Finnish parents and 80 teachers. Experiences of digital communication, the matters discussed, and how they thought student feedback should be expressed were sought. The data was content-analysed to determine the effectiveness of communicating digitally. Three categories related to digital communication content were identified: learning and study-related matters; student behavioural issues, and sensitive issues. Expectations of how student feedback should be conveyed fell into three categories as well: a

balance between encouraging and corrective feedback, more of encouraging feedback, and more emphasis on the student's weaknesses. However, this was obtained from participants who were predominantly inclined to digital communication and could have led to bias. More parents participated in the study than teachers which removed the aspect of balance and the aspect of teacher well-being was not fully exploited.

Flogie et al. (2018) explored the ICT influence on student development in psychosocial and cognitive competences. The investigation aimed to define and adapt methods of innovative teaching, at paradigmatic and strategic levels. The results were obtained from longitudinal research using various surveys. The major scope was to verify if a positive psychosocial and cognitive bearing could be detected, whilst using innovative pedagogic teaching methods supported by ICT. The control group was comprised of 1,356 students from Slovenia who were exposed to classic work methods. The experimental group consisted of 86 students who filled in the questionnaires to do with innovative classrooms and had exposure to tablets, e-content and e-services for at least two school years. Students from the innovative classes were found more competent (in skills like using social media and internet effectively and critical of web information). They also exhibited a higher positive psychosocial impact than students in regular classes. It was confirmed that innovative pedagogic teaching approaches, supported by ICT, contributed greatly to attaining better taxonomic and cognitive competences. It was proven that using innovative teaching approaches kept pace with today's and tomorrow's needs for digital societies. However, the study needed more substantive and delineating information on psychosocial skills.

Amie-Ogan and Tagbo (2021) explored record keeping practices of Nigerian public secondary school principals for effective school administration. The study was done through a descriptive survey and had a sample size of 268 principals. A self-structured questionnaire was used in data collection. Results of the study showed that principals used computer and cloud storage systems for enhanced administrative effectiveness in their schools. They used these tools to keep information on financial and academic records, assessment of teachers and students; in decision making, in organising school finances and in school inventory amongst other purposes. The advantages highlighted were connected to easy access to records and better organisation. The study recommended teacher training on the use of cloud storage for effectiveness in storing data.

## 2.8 Chapter Summary

This chapter presented major issues about ICT integration and school leadership from various literature. The chapter outlined debates, arguments and different understandings to contextualise the meaning of ICT integration for school operations and the influence of leadership. ICT integration is influenced by school leadership and involves incorporating various ICT tools for multiple functions in a school. The internet and computers are the most crucial ICT tools because they facilitate sharing information even over spatial separation. The school leadership develops an ICT school vision, acquires ICT tools and offers training and support. ICT integration leadership does not always rely on administrative roles but can be regarded as influence and mobilisation that other people can do with or without official positions. The chapter had a compilation of reasons why schools prioritise ICT integration and enact integration in the way they do.

This review of literature has revealed several deficient areas. Studies that investigated ICT integration in school operations are scanty. Many studies focus on curriculum, teaching and learning (Das, 2019; Savec, 2017; Sivakova et al., 2017; Teo, 2019; Yuyun, 2018). Other studies focus on principal leadership in schools and have snippets of how principals offer ICT integration leadership (Abdullah, 2016; Ahmad & Ibrahim, 2017; Ali et al., 2021; García-Martínez et al., 2018; Gonzales, 2020; Zhong, 2017). Then some studies focus on ICT integration leadership from a teacher's perspective or the inclusion of all school stakeholders but then leave out specific details of how each party undertakes the ICT integration leadership (Gonzales, 2020; Grant, 2006; Hamzah, Juraimi, et al., 2016; Hamzah et al., 2014; Hatlevik & Hatlevik, 2018; Jomezai et al., 2016; Kukali et al., 2018). There is a shortage of literature on ICT integration in international curriculum contexts. In the Eswatini context, most ICT-related studies focus on barriers to ICT integration. There is a shortage of literature on ICT integration leadership in Eswatini, and globally there is not much focus on international schools. Thus, in doing this research, the study became important in determining participants' views, actions and responsibilities in the context of ICT integration and the leadership influence. The next chapter is a discussion of the theories that framed this study.

## CHAPTER 3

### THEORETICAL FRAMEWORK

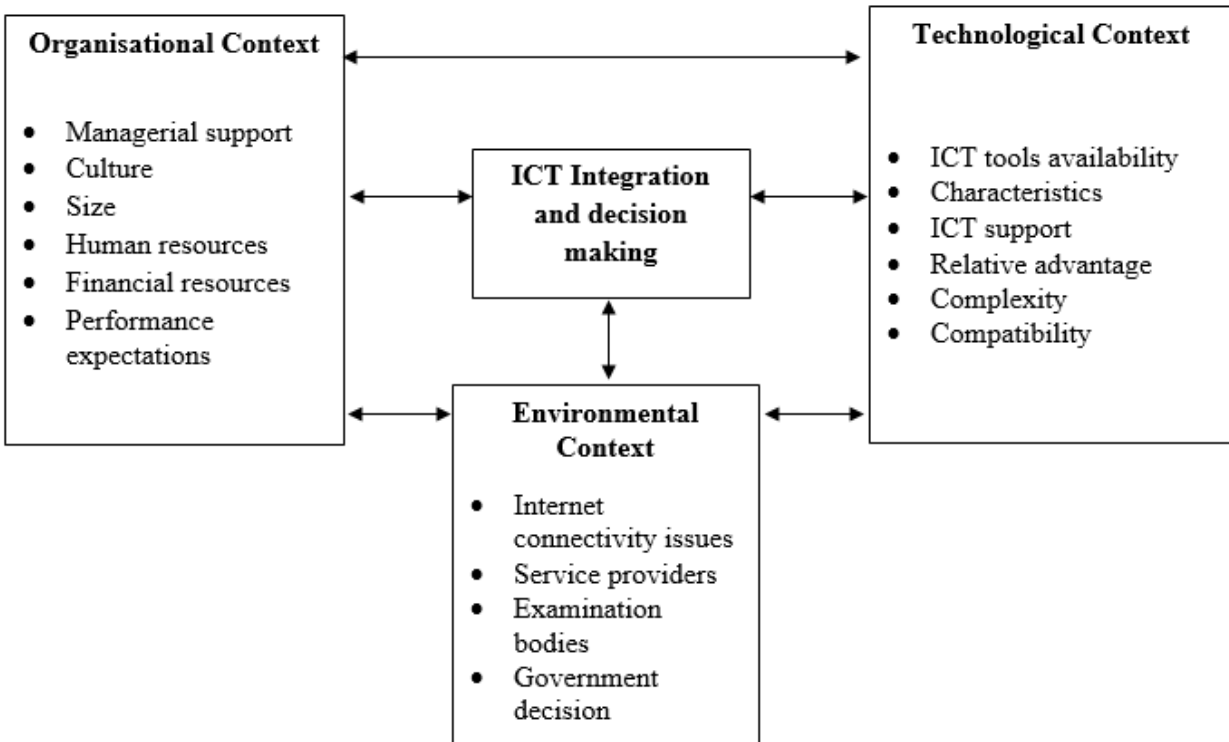
#### 3.1 Introduction

This study sought to understand ICT integration in an international high school focusing on the influence of leadership. ICT integration for school operations and the impact of leadership was the phenomenon. Since qualitative studies are typically grounded on a theoretical framework, two theories were selected for the purpose. The Technology Organisation Environment (TOE) and Transformational leadership (TL) informed this study. This chapter outlines why the study needed a theoretical framework by analysing how and why it was used. This chapter is organised so that the theories are discussed by profiling their components. Their relevance and weaknesses in research generally and specifically in this study are then chronicled. These two theories were considered ideal for grounding ICT integration and ICT integration on separate theories. The justification of this decision will be documented last in the chapter.

#### 3.2 The Technology Organisation Environment Theory

Tornatzky et al. (1990) developed the TOE theory from observations that adoption and implementation of any form of innovation were dependent on the organisation's internal and external technologies, their perceived or experienced usefulness, advantage, characteristics of management as well as the prevailing conditions in which technology was used or attained. Thus technological, organisational, and environmental factors influence ICT integration within a school. These three theory components form the basis of how a school can implement technological innovations to exploit the gains that technology brings forth (Tornatzky et al., 1990). Therefore, they are critical in discussing opportunities or limitations that come with ICT integration. Many frameworks address ICT integration in organisations. However, the TOE is more suitable when a school is regarded as the unit of analysis in research because its components fit into the school structure. Figure 3.1 is an adapted version of the original framework to suit the current study.

**Figure 3.1** *The Technology Organisation Environment Theory*



Adopted from (Luhamy et al., 2017; Mousa et al., 2020; Tornatzky et al., 1990)

### 3.2.1 The Technological Context

The availability of ICT tools may negatively or positively influence ICT integration and decision-making (Namisiko et al., 2014). School members interact with different ICT tools in the process. Hence, the absence of specific hardware and software determines how certain aspects of the curriculum, tasks and functions are handled. However, familiarity with the technology makes school stakeholders see the usefulness and benefits. Hence, factors such as cost, compatibility, reliability, relative advantage and complexity of ICT tools significantly impact the technological context (Luhamy et al., 2017; Namisiko et al., 2014). According to Angeles (2013), technological factors dominate implementation concerns and decision-making; thus, a school must have a detailed technical plan for ICT integration. Technical and system criteria must be developed to



measure integration effectiveness. An inventory can be done to check which ICT tools are present and their purpose. A technology-organisation match, in this case, provides a guide to see that suitable ICT is made available for the different school departments and staff and students can make effective use of it (Angeles, 2013). Such an inventory can help determine how specific departments use the technology. For example, a Music department can have software needs different from a Mathematics or Technical Graphics department in teaching or the school's accounts department.

### **3.2.2 The Organisational Context**

In this dimension, organisational structure plays a critical role in school ICT integration. The organisational context comprises characteristics and resources such as managerial support, culture, and size (Tornatzky et al., 1990). The school organisation can be investigated for factors related to ICT integration like policies in ICT use, goals and priority setting, technical challenges, pedagogical methods, diversifying practices, engaging relevant stakeholders and adapting swiftly to changes in ICT and society (Cha et al., 2020; Nwali & Ugah, 2019). School ICT-integrated learning environments should be designed and developed considering organisational human and financial resources (Cha et al., 2020).

Suitable mechanisms and methodologies must be established to guarantee technology use and support tools for all people (Camelo et al., 2018; Oluoch, 2016). Digital competence is an essential aspect of ICT integration. It can improve teaching and learning, promote lifelong learning pedagogy and give a general indication of ICT integration in the school operations (Blau & Shamir-Inbal, 2017). So, the quality of work is improved by providing a school with access to technological resources and training opportunities (Camelo et al., 2018). As argued earlier, principals cannot do this on their own and need the assistance of teachers, other staff members and technology coordinators to devise measures for effective ICT integration and measurement (Oluoch, 2016). A distributive view of leadership is thus seen as an emergent leadership style that favours ICT integration in schools and further adds to school leadership reforms (Brett, 2019).

The three components of the TOE are drawn (on Figure 3.1) with double arrows to show that they are interlinked and are not investigated in isolation. The school's ICT tools depend on who needs them and the intended purpose. The purpose is derived from organisational orientation,

vision, policy and mission statements. For example, setting data projectors, internet connections, computers, and interactive whiteboards in every classroom could show a school's commitment to providing technological needs to all teachers and students. Different stakeholders in any school have diverse ICT needs, depending on their pedagogical approach and job descriptions. Hence, the ICT tools, and any training and support provided are supposed to be people-specific (Berger & Wolling, 2019). Performance expectations with ICT can be tied to a technological provision in consideration that the standard to meet is created based on what ICT tools are available.

### **3.2.3 The Environmental Context**

The Environmental context involves the arena surrounding the organisation and incorporates factors like market, government regulation and suppliers (Tornatzky et al., 1990). Camelo et al. (2018) assert that ICT integration implies adapting to technological changes, especially connection to high-speed networks and innovations that keep coming on the market. Organisational strategy in ICT integration can work if the environmental context permits (Eze et al., 2020). The internet is one of the essential ICT tools in the digital age. While it has created educational growth opportunities, some online platforms and services have restrictions on certain content or need subscriptions to access (Counted & Arawole, 2015). Thus, not all information is always available when needed, and further costs are incurred. Internet connectivity can be a big challenge in developing countries. Problems usually stem from poorly designed national telecommunications infrastructure and poor service from internet providers that end-users fail to get high-speed internet when they need it (Miazi et al., 2016). Frustrations with internet connectivity can impede ICT integration in any school as people wait for the internet to improve or connect. School internet access and connectivity also rely on prompt responses from service providers in the event of breakdowns.

The curriculum for examination classes in a school comes from examination bodies. These bodies represent an external environment that, through curricular documents, can advise the ICT requirements in a particular programme. The dictates of the curriculum offered then control decisions for ICT integration. Due to the novel COVID-19 pandemic, there was a shift from physical classroom teaching to online teaching due to governments' decisions to close all schools.

So, even if a school has ICT resources, ICT integration needs a new approach as students and teachers do not meet as usual.

The environmental context consideration affects the technological and organisational contexts in that it involves dynamics that may go beyond school control. For example, internet connectivity comes from outside service providers who might have no control over bandwidth and internet speed issues. Internet speed can impact school processes. Examination bodies set examinations, and schools must structure their organisations (in terms of financial and human resource configuration) and ICT provisions to comply with curricular needs.

### **3.3 The Relevance of the TOE**

The TOE theory has been used in different areas of research. For example, technological integration in environmental management (Ibrahim & Jaafar, 2016). Social commerce adoption in technology adoption (Abed, 2020), big data usage intention in organisations (Haleem, 2021), electronic learning adoption in higher institutions (Nyeko & Ogenmungu, 2017), adoption of social media in educational institutions (Pateli et al., 2020) and the integration of cloud computing in educational institutions (Micheni, 2015). The theory's use is tied to people and organisations evaluating and analysing many factors before deciding to operate with and utilising ICT (Amade et al., 2017). Ali et al. (2021) examined a more specific example for education. They investigated the utility of ICT in educational management and planning, focusing on the applicability and use of an educational management information system (EMIS) in Southern Punjab secondary schools. The TOE framework was used as a guideline in developing interview schedules and data analysis to understand how the EMIS enhanced the administrative performance of secondary school principals. It also showed how the provision of the required financial and human resources worked for effective utilization of the EMIS data.

Another example came from Melo et al. (2021), who sought to analyse the determinants, boosters, and barriers of ICT integration within an educational institution. In consideration of the TOE, the results demonstrated that the main determinants of ICT integration were linked to the environmental context; boosting elements arranged in the institutional context; the barriers involved in both the organisational and environmental contexts. The senior management and the

ICT team complemented each other so that they lost much of their influence on others if found in isolation. This research showed that barriers to ICT integration were grouped into high demand for ICT tools, poor communication, lack of integration in daily use and limited budgets.

### **3.4 Justifications of the TOE**

The TOE was designed for technology acceptance at the business and corporate level (Angeles, 2013; Rosli et al., 2016; Saetang et al., 2020). The main reason why the TOE was chosen is because the main determinants of technological adoption are linked to the environmental context; that the boosting elements are arranged in the organisational context; and that the elements that create barriers involve the organisational and environmental contexts (Melo et al., 2021). Schools have processes and procedures that are akin to business or industry that involve admissions, data processing and reports generation (Grepon et al., 2021). The TOE theory is adaptable and allows the freedom to vary measures or factors to suit a research context. Researchers have used either the whole theory or parts of the three components depending on their research focus (Baker, 2012). He explains that prior studies have researched by picking one aspect of the components like ‘financial resources’ or ‘technology compatibility’.

Countable studies on ICT integration in schools have incorporated the (TOE) theory (Batiibwe & Bakkabulindi, 2016; Kiarie et al., 2018). ICT integration is a collective action involving the whole school community (Ghavifekr et al., 2016). For a school to have ICT integration, it must have the technology to use, positive organisational factors and find ways to deal with it with the external environment. The argument is that the reasons for ICT integration are nestled in what the school as an organisation hopes to achieve and other factors like getting the right technology (Baker, 2012). Environmental factors can have positive and negative effects on the overall process of ICT integration because they represent external and unpredictable factors (Eze et al., 2020).

In this study, the TOE was crucial in drafting the interview questions. There is no ICT integration in school without first looking at what technology is there, how it is used, why it is used, by whom and what internal and external factors influence and affect its use (Eze et al., 2020). Thus, the interview guide aimed to gather data that answered such questions based on the TOE

components. Examples of these questions include the ones on which ICT resources were available for use by teachers and students in this school and how did teachers integrate ICT in their teaching of the various subjects offered in the school. These questions are adapted from the technological component of the TOE. Then questions like how was efficiency in carrying out school operations achieved with ICT integration and what challenges they faced in enacting ICT integration in the school are related to organisational component. As a consequence of using the TOE theory in question formulation, it was more applicable than that the research findings and themes should be evaluated and categorised into the three areas of the TOE theory. In data analysis, the results were interpreted using the theoretical framework as well. In this way, a deeper understanding of the topic was possible.

### **3.5 Weaknesses of the TOE Theory**

As mentioned earlier on, the TOE was designed for technology acceptance at the business and corporate level. So different researchers modified it to develop frameworks that inherit the comprehensiveness of TOE and suit their study (Jiang et al., 2010). According to Baker (2012), the TOE theory has relatively evolved since its inception because it has been viewed as aligned with other explanations and theories involving ICT integration rather than offering opposing explanations. Baker (2012) adds that no new concepts have been added, little theoretical synthesis and scant critique have been provided, and most of its academic development has been limited to numbering the different factors connected to ICT integration. In the current study, the TOE was adopted because of the requirements for ICT integration, the measures taken and meaning in a school do not deviate much from those of an established business entity. Another criticism mentioned in the literature is that TOE is not ideal for understanding ICT integration at the individual level because personal factors determine technology acceptance at this level (Jiang et al., 2010). Since the unit of analysis of the current study was an entire school, the TOE was still an appropriate theory of choice, with findings from individuals collectively used to describe a school context.

In the current study, the TOE theory was used concerning ICT integration. It was easy to adapt it to change the factors under each of its three components. Nevertheless, its major weakness was that it remains a list of factors to consider when making decisions about ICT integration. It

does not pinpoint who makes the decisions and how. Because of this flaw, it could not stand alone as a theoretical framework. Issues related to ICT integration leadership needed another theory to guide the phenomenon.

### **3.6 The Transformational Leadership Theory**

Technology perpetually evolves and constantly demands changes to ICT integration approaches, which must lead to continuously aligned readjustments. While this is hard to do in the business sector, it is a mammoth task for most schools whose budgets are not intended for profit-making (Waruwu et al., 2020). Thus, ICT integration planning and management in schools require competent leadership that adapts and adjusts to change. The TL theory was a more unified theory to ground school leadership in the current study. In this theory, there is a recognition of a transformative leader who plays an important role of influence (Machado & Chung, 2015; Rikkerink et al., 2016; Salleh & Laxman, 2014). TL is viewed as a process set into effect by critical stakeholders as the crucial strategy for initiating change, maintaining it and becoming suitable for changing conditions (Northouse, 2018; Obolensky, 2014; Randall & Coakley, 2007).

Downton created the concept of TL in 1973. It was popularised in Burns's 1978 classic works in the late 1970s, which attempted to connect influential leadership roles to operative followership (Duman, 2021; Northouse, 2018). Leaders support follower motives in ways that enhance the goal attainment of both leaders and followers (Burns, 1978). As implied by its name, TL changes and transforms people; assesses followers' motives; placates their needs; and primes work-related issues that deal with emotions, ethics, values, standards, and long-term goals (Lipesa et al., 2018; Northouse, 2018). The fundamental outlook of TL is that a person (and not necessarily a principal) engages with others in ways that create a connection that raises the motivation and morality of both the leader and the follower and the leader tries to help followers reach their fuller potential (Northouse, 2018). TL therefore plays a crucial role in developing relationships and interactions to promote more effective organisational performance (Ghasabeh, 2020).

Lipesa et al. (2018) describe TL as an approach that changes individuals. Nasir and Sin (2016) outline it as relationship-oriented and a style that results in the most sweeping change that assists in the formation of skills and people development. Northouse (2018) adds that

transformational leaders empower followers and encourage change by helping raise their consciousness to transcend their self-interests for others' sake. It is also a type of leadership where leaders create a vision that emerges from the collective interests of people in an organisation and the organisational goals and identity (Northouse, 2018).

Bass (1985) reviewed Burns' original ideas and came up with four components of TL: idealised influence, inspirational motivation, individualized consideration, and intellectual stimulation, which are discussed next.

### **3.6.1 Idealised Influence**

Idealised influence, or 'charisma', refers to leader behaviour (through the communication of values and belief systems) that arouses follower identification and emotional attachment with the leader (Dartey-Baah, 2016; Khatri, 2005). Charismatic leaders have certain personality characteristics and demonstrate specific types of behaviours that they represent strong role models for the values they want to inculcate in their followers (Northouse, 2018). Idealised influence is regarded as the core of TL, which strongly impacts followers and enhances sharing and owning higher objectives (Munir & Aboidullah, 2018). In a school set-up, this influence is not limited to principals, but others who understand the need for ICT integration to inspire staff and students and communicate the vision the school needs to take (Okeke, 2019). Through raising followers' morale and performance and using different inspirational strategies, TL fosters a culture of respect, trust and collaboration in schools (Munir & Aboidullah, 2018).

The idealised influence factor is measured on two components: an attributional feature that refers to how followers regard their leader based on their perceptions of their leaders, and a behavioural element that relates to the observations followers make of leader action (Northouse, 2018). According to Wang (2019), the idealised influence can make staff and students identify their abilities and strengths and produce a strong emotional attachment to the leadership and the school. He further affirms that when members of the team and students become partakers in participatory decision-making and leadership, educational goals are attained faster.

### **3.6.2 Inspirational Motivation**

Inspirational motivation is inspirational behaviour through a leader communicating a vision and modelling appropriate behaviour to articulate a desirable future (Dartey-Baah, 2016; Khatri, 2005). In this component, transformational leaders have a clear idea that permits them to inspire and motivate their followers to excel and perform above average to achieve the desired goals (Munir & Aboidullah, 2018). Speaking on leaders, the same authors argue that leaders always think harder on motivational strategies to keep employee morale high. They predict and hope for a bright future to achieve future targets. In practice, these leaders use symbols, signs and emotional appeals to focus followers' efforts to achieve more than they would when focusing on their self-interest, enhancing team spirit (Northouse, 2018). However, this component of inspiration can be done by other leaders (specially designated ICT leaders) who have competence and vision for ICT integration.

### **3.6.3 Individual Consideration**

In individual consideration, TL focuses on the capability of individual followers in pursuing the organisational goals and helping them develop necessary skills (Dartey-Baah, 2016). This factor represents leaders who provide support through listening carefully to the individual needs of their followers (Northouse, 2018). Subordinates in a school can rely on school leadership that includes principals, ICT teams and ICT coordinators to provide ICT professional development and resources as per requests. These leaders can act as coaches and advisers as they assist followers to fully actualise potential (Ghasabeh, 2020; Northouse, 2018). Delegation may be employed to help followers solve personal challenges (Northouse, 2018).

### **3.6.4 Intellectual Stimulation**

Intellectual stimulation refers to the ability of a leader to inspire followers to make risky efforts and think hard to generate innovative solutions (Ghasabeh, 2020). This action raises followers' consciousness of problems and influences them to be creative and innovative so that they can approach them differently. This process helps them challenge their and their leaders' beliefs and values (Khatri, 2005; Northouse, 2018; Supriadi et al., 2020). In this way, intellectual stimulation is the ability of an individual to be rational and intelligent as they assess the



environment, enabling them to generate new ideas (Abazeed, 2018). Principals who promote intellectual stimulation delegate and promote decision-making in ICT integration in areas where they may not provide adequate leadership (Day & Sammons, 2013).

### **3.7 Relevance of Transformational Leadership in Research**

TL has been used as a theory that guides research exploring effective school management and leadership in general and ICT integration in particular (Gacicio et al., 2021). Ashaye and Almonawer (2020) conducted a study to provide an insight into the TL's role in educational institutions in Kuwait. The study focused on the leader-follower relationship and found that TL inspires, stimulates and motivates people to achieve highly. Duman (2021) employed TL to investigate its effect on teacher commitment in school leadership and ICT integration leadership styles. The results showed that school administrators and teachers became role models for followers (other teachers). It led to more focus on concepts such as efficiency, quality, and interactive and liberating leadership styles.

Supriadi et al. (2020) aimed to analyse the influence of TL and organisational learning on the innovation competencies of teachers in Jakarta schools during the COVID-19 pandemic. The results indicated that TL had a positive effect on teacher innovation competencies through the leaders' optimistic effects on teacher creativity. Organisational preparation had an essential impact on the teachers' ability to become innovative with ICT. Similarly, (Bunjak & Bruch 2019) investigated how TL facilitated followers' ICT integration at work through enabling conditions and shared leadership. The study findings exposed that shared leadership intermediated the relationship between TL and followers' ICT integration at the individual level.

Munir and Aboidullah (2018) purposed to empirically investigate gender differences in school TL and its impact on teachers' academic effectiveness. The four TL characters, idealised influence, inspirational motivation, intellectual stimulation and individualised considerations, were used to assess the gender differences in TL behaviours. Although with different levels, principals were found to be transformational leaders in the four characters. Gender differences did not affect practising TL and promoted teachers' academic effectiveness.

Wirba (2015) examined the leadership styles of ten secondary school principals in Cameroon through semi-structured interviews with the principals and from, ten teachers and ten students. The majority of the participants described their principals as transformational leaders. Principals described themselves as ‘good leaders’ who promoted school vision and created circumstances for teachers and students to develop their leadership capabilities.

According to Anderson (2017), some schools have begun to function like businesses with complex management and administration structures; hence, leadership is critical for good school performance and student achievement. The international high school under study had a broad curriculum and offered an international curriculum that both created specifications and dictated ICT integration. In today’s world, change is inevitable. With science, technology and ICT developing and spreading rapidly, TL in schools is hence required to approach situations and problems with new and variant perspectives (Duman, 2021; Göçtü & Göçtü, 2014). Moreover, in fulfilling the responsibility of schools’ multidimensional functions, schools are affected by internal and external environmental factors, which can be positive or negative (Göçtü & Göçtü, 2014). Continuing, they say that eliminating negative aspects requires a TL's guidance to restructure and realign the school.

Gurr (2004) argues that ICT permeation of society puts extreme pressure on school leaders to integrate ICT into school curricula. As a result, traditional views of educational leadership, rigidly based on leader-centricity, cannot cope. Since ICT integration in a school is filled with challenges, TL offers the best conditions to deal with change and solve school problems, including ICT integration through intellectual inspiration and deliberative, inspiring, motivating, guiding, strategic, and at times entrepreneurial methods (Duman, 2021; Khan et al., 2020). The authority to act in ICT integration leadership must be decentralised (Gurr, 2004). TL favours this decentralisation because it operates in a field characterised by change. Its advantage comes with the ability to create dynamic and creative organisations where the emphasis is placed on relationships within a school rather than just focusing on the roles of individual members (Franciosi, 2012).

TL concentrates on futuristic and long-term issues (Avolio & Bass, 2001), which hugely impact societal and technological changes. According to Dartey-Baah (2016), the demonstration

of transformative behaviours can lead to fulfilling the “followers’ need for self-fulfilment, self-actualization, and self-worth, and this fuses the follower’s aspirations to those of the organisation. Another essential fact linked to ICT integration is that transformational leaders can give the members of their schools the responsibility to develop specific skills required for daily or future functionality (Duman, 2021). School leaders might not have the requisite management skills and leadership styles and might benefit from professional development in a TL style that has been proven to enhance educational performance (Anderson, 2017; Tengi et al., 2017).

### **3.8 Criticism of Transformational Leadership**

Like any other theory, TL has its weaknesses. One criticism is levelled against the lack of conceptual clarity because it covers a wide range of activities and features like creating a vision, motivation, being a change agent, giving nurturance and building trust, which makes delineating its parameters difficult (Northouse, 2018). This criticism is connected to trait characterisation that is accentuated by supposing that one person with unique qualities transforms others and is the most active component in leadership (Northouse, 2018). Creating a vision is seen as the leader’s proactive role, yet followers can be practically involved. Such negatives were dealt with in this study by linking TL with ICT integration leadership. The latter requires the school leadership to influence successful ICT integration, which requires a collective effort. Although there is more inclination toward principals being transformational leaders, the stance taken is the recognition that TL is not always centred on one individual, as argued earlier in this chapter.

### **3.9 Justification for Choosing two Theories**

ICT integration in schools is influenced by school leadership, but integration and leadership are distinct and broad aspects that can be discussed separately to bring about their constituent detail. Hence, it was necessary to ground this study on the two theories. The TOE theory components help organisations make ICT integration decisions (Alkhalil et al., 2017). From an operational point of view, the TOE determines the extent and level of ICT integration depending on the school’s makeup and context (Awa et al., 2016). Attempts at ICT integration and continual usage need planning and implementation regimes that school leaders must provide (Blau & Shamir-Inbal, 2017; Van Wart et al., 2017). The suitability of the TL in the current study is

embedded in the notion that it blends with setting goals, creating vision plans and establishing organisational relationships that enhance ICT integration (Day & Sammons, 2013; Machado & Chung, 2015). It, therefore, guided me to entirely grasp ICT integration leadership at the school. The TOE theory was used to produce interview questions linked to ICT integration, whilst the TL theory was used to create questions related to ICT integration leadership. Table 3.1 shows a summary of the theoretical framework.

**Table 3.1** *Summarising the Theoretical Framework*

<b>Theory</b>	<b>Main tenets of the theory</b>	<b>Relevance to ICT integration and ICT leadership</b>
Technology Organisation Environment theory	<ul style="list-style-type: none"> <li>- School technological context</li> <li>- School organisational context</li> <li>- School environmental context</li> </ul>	<ul style="list-style-type: none"> <li>- ICT decision making</li> <li>- Extent to ICT integration</li> <li>- Level of ICT integration</li> </ul>
Transformational Leadership	<ul style="list-style-type: none"> <li>- Idealised influence</li> <li>- Inspirational motivation</li> <li>- Individualised consideration</li> <li>- Intellectual stimulation</li> </ul>	<ul style="list-style-type: none"> <li>- School goal setting and organisation</li> <li>- Creation of ICT vision and policy</li> <li>- Empowerment and people development</li> <li>- Adaptability to change</li> </ul>

### 3.10 Chapter Summary

This chapter discussed two theories that were selected to foreground the current study. The first was the TOE theory, whose significance emanates from using it to analyse a school’s technological, organisational and environmental contexts as essential factors in investigating decision-making in ICT integration. The TL theory focuses on leadership that recognises mobilising and influencing people to solve problems in managing ICT integration. More importantly, it is concerned with leaders supporting follower motives in ways that enhance the goal attainment by both leaders and followers. The chapter again discussed the relevancies and criticisms levelled against the theories. The importance of the theoretical framework in this study was that it was used in developing the interview guide and data interpretation. The next chapter details the methodological aspects of obtaining research data and data analysis.



## CHAPTER 4

### RESEARCH METHODOLOGY AND DESIGN

#### 4.1 Introduction

This chapter outlines the steps that were taken to carry out this research. The research objectives were met by a research process that aimed to establish ICT integration for school operations and the influence of leadership. This focus was investigated in one international high school. The research process is hinged on a paradigm. And hence, this chapter begins by discussing the paradigm before delving into the approach and design. The chapter then outlines the research approach, design and sampling process to get both the research site and participants. Issues of data gathering and its analysis are discussed before the chapter ends with ethical issues and limitations of the study.

#### 4.2 The Research Paradigm

A constructivist paradigm was adopted for the study because the nature of the research questions meant that reality and meaning were socially constructed from the lived experiences of the participants (Creswell & Creswell, 2018; Mertens, 2019). Research questions are central to determining what and how is to be investigated, but the paradigm determines the direction research must take (Denzin & Lincoln, 2018; Saunders et al., 2019). Creswell and Creswell (2018) and Yin (2014) define a paradigm as a “worldview”. This description of a paradigm encompasses a set of beliefs about acceptable qualities that research must have and how it must be done. Kivunja and Kuyini (2017, p. 26) posit that “this worldview is the perspective, or thinking, or school of thought, or set of shared beliefs, that informs the meaning or interpretation of research data.” These beliefs are divided into four categories: ontology, epistemology, axiology and methodology (Creswell & Creswell, 2018; Mertens, 2019; Wahyuni, 2012).

Ontology addresses the nature of truth (Denzin & Lincoln, 2018). Truth is socially constructed and encompasses multiple mental constructions, some of which may conflict among people (Mertens, 2019). Therefore, truth comes with various realities that researchers, research

participants and readers of research embrace different realities. A discussion of ontology can involve both objectivism and subjectivism (Saunders et al., 2019). These authors describe objectivism in that social entities exist in reality external to social aspects concerned with their existence. In subjectivism, social phenomena are created from the perceptions and consequent actions of those social aspects concerned with their existence. These two descriptions, implied that the researcher's truth was socially constructed, multiple and subjective and came through varied voices, explanations and experiences (Creswell & Creswell, 2018; Saunders et al., 2019). In this paradigm, the intention of doing research is to report multiple facts obtained from the study (Creswell & Poth, 2018; Poni, 2014). Since the information collected is qualitative data, the process of getting it is referred to as 'data gathering' in this work rather than collection which imply obtaining readily available information. The evidence of various realities is found using multiple forms of evidence from generated themes that include actual words of different participants and presenting different perspectives.

Epistemology refers to credible and acceptable ways of knowing the truth (Cohen et al., 2018; Denzin & Lincoln, 2018). With the objectives of investigating ICT integration for school operations and the influence of leadership, the study aimed at getting the details of what prevailed in the school and the motivating reasons. Therefore, I got close to the participants and collected as much subjective evidence as possible (Creswell & Poth, 2018). According to Creswell and Poth (2018), these social interactions constitute how truth is known - through people's individual and subjective experiences. In understanding ICT resource provision at the school, some participants said that ICT tools were insufficient, while others said they were. It was essential to generate data that explained why there were different responses. This discrepancy seemingly resulted from what teachers could do and not with ICT. The satisfied teachers worked effectively with ICT whilst the dissatisfied teachers could not get what they wanted.

Axiology deals with values, ethics or standpoints in research and how they are demonstrated throughout it (Mertens, 2019; Saunders et al., 2019). As a researcher, I valued the information I obtained from the research and through discussion with participants and described my interpretation of my findings (Creswell & Poth, 2018). From an emic point of view, I used definitions and variables that participants used (Cohen et al., 2018). For example, I found out that

they used the word ‘technology’ more than ICT tools, and I needed to explain the phrase ‘ICT integration’ in the first instance that I ended up saying the use of technology for understanding each other.

The methodology refers to the procedures and research styles used in undertaking the study (Cohen et al., 2018; Creswell & Poth, 2018). Cohen et al. (2018) explain that social research should be conducted in natural, real-world settings. Data is collected systematically, analysed inductively, and the findings are derived and inferred from the data collected (Cohen et al., 2018).

### **4.3 The Research Approach**

The constructivist paradigm is associated with a qualitative approach (Mertens, 2019; Miles et al., 2020; Patton, 2015). Qualitative research involves working with text, still and moving images, and the data require processing before it can be analysed (Miles et al., 2020). In this approach, words and pictures are more valuable and informative than numbers (Shakouri & Nazari, 2014). Qualitative research is regarded as any research where findings are not arrived at by statistical procedures, and it can be about peoples’ lives, experiences, behaviours, feelings, and emotions. It can be about organisational functioning, cultural phenomena, and interactions (Rahman, 2020). The interest in qualitative studies is in participants’ beliefs, experiences and meaning systems to obtain rich and detailed descriptions from each contextualised source and not necessarily their number (Cohen et al., 2018; Levitt et al., 2018; Mohajan, 2018).

Research related to ICT integration and the influence of leadership has been done through qualitative investigations. For example, Vicente (2021) conducted a qualitative research inquiry to explore how leaders in a school shaped their identities in ICT- enriched educational environments while navigating continual and endless school changes. The central questions were how the leaders made sense of their identities and how they viewed their leadership in new educational landscapes? The nature of the questions justified a qualitative approach. The inquiry investigated and built emerging explanations to decipher school leaders’ sense-making in times of reform. Uygur et al. (2020) investigated stakeholders’ views on ICT integration with a focus on the role of leadership in sustainable, inclusive education. The study aimed to determine teachers' opinions, school administrative staff and education faculty members. Because the researchers needed to know the



views of the participants, an interpretive qualitative approach was employed. Multiple views from different participants then enabled the researchers to synthesise the meaning behind the research phenomenon.

Shamir-Inbal and Blau (2021) used a qualitative approach to explore the characteristics of pedagogical change when integrating ICT enhanced collaborative learning and sustainability issues in school culture. The participants were ICT coordinators (that included teachers) who were required to share their experiences concerning digital collaboration. The questions on how teachers designed e-collaborative learning activities and what was considered the complexity of e-collaboration, and whether the phenomenon was sustainable in schools were best answered through qualitative data.

The qualitative research approach does have its limitations. First, the Hawthorne effect can arise in fieldwork because the researcher's presence can change the usual situation. Participants could want to impress or avoid the researcher and sometimes wish to direct the proceedings (Cohen et al., 2018). Being aware of this effect, I made appointments a week before the meeting, and the interview context was made known so that participants could prepare for an interview related to ICT integration for school operations and the influence of leadership. I spent two days delivering and collecting consent forms; the participants had seen me before the interview. Second, another limitation connected to qualitative studies is the halo effect (Cohen et al., 2018), where information given by the participants is used in making judgments about subsequent data or participants. I resolved this by data triangulation and re-reading the data to get meaning (Mertens, 2019). Third, the most common limitation that most authors mention regarding the qualitative approach is that hard scientists regard it as unscientific, only exploratory, very subjective, with small samples and thus cannot be generalisable (Denzin & Lincoln, 2018; Rahman, 2020). However, according to Rahman (2020), no educational research should be regarded as generalisable because many contextual variables shape findings.

#### **4.4 The Research Design**

Yin (2018) describes a research design as a logical sequence that connects the empirical data to initial research questions and the conclusions raised. Cohen et al. (2018) declare that a

research design helps create the fundamentals of approaching, functionalising and investigating the research problem; setting out the approach, methodology to be employed; the types of data required, how the data will be collected; from whom and how the data will be analysed and reported. A case study was employed to investigate ICT integration for school operations and the influence of leadership (Yin, 2018). A case study was chosen to get a real-world perspective and to allow an in-depth focus on individuals and their social behaviour (Creswell & Creswell, 2018; Mertens, 2019; Yin, 2018).

The “how” and “why” questions deal with outlining operational processes over time, as was with the phenomenon under investigation in this study and a case study was appropriate to find answers to the questions (Yin, 2018). A case study was relevant in this work because in getting rich data, I did not need to have any control over the participants’ behavioural events and because the focus of my study is a contemporary issue (Creswell & Poth, 2018; Yin, 2018). Case study research commences with identifying a particular case that will then be analysed and described (Creswell & Poth, 2018). The significant advantage of choosing this design is that it can be designed to illustrate uniqueness or unusual interest. ICT integration for school operations and the influence of leadership cases fit this description. I made this design an intrinsic single embedded case study design that gave me a chance to get rich data (Creswell & Poth, 2018; Yin, 2018). The data collected allowed less dilution of the overall data analysis and theory building (Creswell & Poth, 2018; Yin, 2018) and provided more justification for choosing it.

The advantages of case studies are that it presents a detailed understanding of the case supported by different forms of qualitative data (Creswell & Poth, 2018). Nisbet and Watt (1984) explain that a wide-ranging audience easily understands the results of a case study as they are generally written in everyday language. Because of their attention to detail, they catch unique and subtle features that are likely to be lost in larger-scale data collection in other methods. These special features may be crucial to understanding the situation (Nisbet & Watt, 1984).

One of the challenges of a qualitative case study development is the need for a researcher to identify the cause or issue to investigate, bearing in mind that several could be possible candidates for selection (Creswell & Poth, 2018). Another challenge is that a researcher needs to consider whether to do a single case or multiple cases but bearing in mind that numerous case

studies increase the chances of resource, finance and time limitations, appropriate case selection, and cross-case analysis (Creswell & Poth, 2018; Yin, 2018). A concern mentioned in case study research is whether the results are generalisable (Cohen et al., 2018; Saunders et al., 2019). I do not claim that my results and conclusions can be. The aim was to acquire an in-depth understanding of ICT integration for school operations and the influence of leadership (Saunders et al., 2019).

#### **4.5 The Research Site and Participant Selection**

Many high schools in Eswatini have ICT as an add-on subject in the curriculum rather than ICT being embedded in all teaching and learning. Although the situation changed with the advent of online education amplified as a result of the COVID-19 pandemic, a majority of the schools still do not have ICT resources and had not planned that teaching could be done away from physical classroom interactions. Thus, schools that have ICT resources and use them in various school operations should have been selected for the current study. Considering my residential and work location and the feasibility of doing the study, three private schools were potential data sources. Whilst public schools offered the local curriculum EGCSE. These private schools offered international curricula like the Cambridge IGCSE, IB and South African IEB National Senior Certificate. As mentioned earlier, these international curricula have more demands on ICT use because of the variety of subjects they offer, content covered and the assessment aspects involved. For example, Music as a subject requires compositions that are produced using ICT, and assessment would be based on each student's work graded by an examination body.

In the preliminary stages of creating the research proposal, these three schools were meant to be part of the research because evidence from multiple cases can be considered more compelling than from one (Yin, 2018). Initial school visits started in February 2020, and one school consented to the onset of the research right away, while the other two needed time to work around the request. The COVID-19 lockdown was introduced before I started with the other two schools, and they called me to communicate that it was impossible to begin with them. Data gathering had already started in the first school hence a single case study it became.

The school was purposively sampled because of the international identification and selection of the site related to the phenomenon under investigation (Creswell & Creswell, 2018;

Palinkas et al., 2015). Purposive sampling was also used to select participants. Convenience sampling was used to determine students and teachers (Mertens, 2019), and this happened by getting participants who were available and had time to partake in the study. A total of 13 participants made up the sample. These were: a principal, deputy principal, two HODs, two students, an IT director/ICT coordinator, and six teachers. I wanted to have a representative of different stakeholders in the school, and I believed that the sampled individuals could help answer the research questions and bring an understanding of developing concepts (Creswell & Creswell, 2018). Clarified in the chapter. Participants were conveniently and purposively selected. When I started data gathering, the very first COVID-19 lockdown was announced in Eswatini and we could not continue with scheduled interviews. The participants who partook in the study during the lockdown volunteered to be part of the study. Although I had wanted to have mixed teachers in terms of subjects taught, I could not choose because of the circumstance. The two IB students were purposively selected. I wanted to get more seasoned answers from the most mature student representatives at the school. IB students were all afforded laptop computers by the school and had more Wi-Fi provision than the rest of the student body (in hostels). Thus, I felt that I would get more pertinent responses in line with my research objectives.

## **4.6 Data Generation Methods**

Interviews, and documents are dominant methods in qualitative research (Bashir et al., 2008; Creswell & Creswell, 2018) and in the constructivist paradigm (Lincoln & Guba, 2013; Mertens, 2019; Miles et al., 2020). These methods were used to generate data for the current study and field notes. Interviews and document methods were applicable because qualitative research involves open-ended questions and responses. Again, the social construction of reality is conducted exclusively through interaction between the researcher and research participants in the participants' natural settings (Creswell & Creswell, 2018; Denzin & Lincoln, 2018; Mertens, 2019).

### **4.6.1 Semi-Structured Interview**

The semi-structured interview was the primary method of data gathering. The interview guides are presented in appendices K to O. Interviews reveal insight and explanations of key events

through participant word of mouth and resemble guided conversations (Yin, 2018). The semi-structured interview involves a flexible interview guide that allows follow-up open-ended questions and probes (Creswell & Creswell, 2018; DeJonckheere & Vaughn, 2019; Denzin & Lincoln, 2018).

The interview guide had three sections. The first section covered the biographical data session. In this part, participants were asked about their professional qualifications, total years of experience as a teacher, HOD or principal and experience handling an international curriculum like IGCSE or IB. An exception was made for students and the ICT coordinator because the question of experience in handling the syllabi did not apply to them. This information was collected to build participant profiles. Experience in an international curriculum helped me deduce familiarity with curriculum content and an understanding of dealing with reforms and expectations of the curriculum that have occurred over time. Guided by the research questions and the theoretical framework, I came up with the other two sections of the interview guide. The sections involved one specifically on ICT integration for school operations and another on ICT integration leadership.

The second section contained questions that elicited information about ICT integration in school operations across the school functions. Guided mainly by the TOE framework, the questions in this section were meant to generate data that answered the first research question on how the school integrated ICT for school operations by looking into the organisational structure, the technology available and the environment in which ICT integration occurred. The third section addressed the aspects of leadership that led to ICT integration. Guided by the TL theory, I designed the questions so that both formal and informal school leadership would be examined for influence and support of ICT integration for school operations. Both sections intended to generate data on why ICT integration was integrated the way it was. The same interview schedule was used for all participants to get multiple realities and data triangulation (Cohen et al., 2018; Creswell & Creswell, 2018; Mertens, 2019). An exception was made with the ICT coordinator interview schedule, which was customised to elicit information on managing and organising ICT provision.

The interviewing process catered for interviewees' schedules and availability (Yin, 2018). Working with the deputy principal, we carefully planned the school time for my visits to the school

to reduce interruptions and disruptions (Creswell & Creswell, 2018). I explained the purpose of the study and the time the interview would take. All the participants knew in advance about the discussions. The first interviews were done face to face with the principal, deputy principal, the senior teacher, two students, the ICT coordinator, and one HOD. Soon after, the country went into lockdown in March 2020. The rest of the interviews (with five teachers) were done two months into the lockdown through Zoom cloud meetings. I requested to conduct interviews with two other participants to represent the science department (since other departments already had participants), but they were not forthcoming. The implication was fewer data from an equally important department.

During the interviews, I recorded the sessions using two audio recorders to ensure I reduced the chances of a technology malfunction. I made sure that I also recorded the Zoom interviews using the default record function of the software and a separate audio recorder. The actual interviews were probed to obtain detailed meanings (Creswell & Poth, 2018). For example, I probed on questions like the details on how teaching was done to get salient information. Figure 4.1 shows an example of some of the probing that was done.

**Figure 4.1** *Examples of Interview Probes Used*

<b>Interview question</b>	<b>Examples of probes used</b>
<b>The curriculum you are implementing places great emphasis on ICT integration across all subject disciplines. How do you integrate ICT in your teaching subjects?</b>	How do you teach with ICT?
	How many students use ICT in the teaching and learning process in a normal class?
	Describe for me a typical class in your subject where you use ICT
	How do you learn with ICT?
	Which software and hardware are most effective in your teaching?
<b>Do you have any leadership structure for ICT integration across the international curriculum? What does your school's organogram look like with respect to ICT integration across the curriculum? Who is responsible for what regarding ICT integration across the curriculum?</b>	In what other ways do you see leadership manifesting in others with regards ICT integration in teaching and learning?
	What roles are played by school leadership in ICT integration?
	How do you think you contribute to ICT integration in teaching and learning?
	What strategies are devised to stimulate ICT integration in the curriculum?

*Piloting the Interview Guide*

Piloting tests on the suitability of a research instrument before it is used in the field so that question format, length and wording can be adjusted and contextualise a study (Cohen et al., 2018; Creswell & Creswell, 2018). I chose a school (which was not to be considered for research) with two requisite characteristics; the IGCSE curriculum and ICT integration in the curriculum school for piloting the interview guide. Piloting was done three months before data gathering. Mock interviews were set with a principal, a HOD and a teacher. One thing I was worried about from the outset was that my questions were many, and 20 minutes would not be enough to ask all of them. In arranging the pilot study, the principal afforded me 20 minutes for the interview, and I used the same amount of time for the others. I carried out these three interviews, and 20 minutes proved to be sufficient for my line of questioning and probing. Most of the questions were clearly understood, judging from the responses that aligned with the questions asked. There were two exceptions. The HOD and teacher asked me to clarify. As I analysed the pilot data, I also decided to change the wording of these questions. One particular instance was the question: *When and for*

*how long have you been teaching using ICT resources available in your school in light of the curriculum demands?* I changed this question too; *To what extent do you use the ICT resources available in your school in light of the curriculum demands?* Most of the teachers interviewed used ICT; it was better to summarise what they do rather than question when and how long.

The principal suggested that ICT integration involves many aspects; hence, many schools need an ICT policy that guides operation. He, therefore, told me that I included a policy question in the guide. Instead of having a list of mixed questions from 1-15, a professor in educational leadership from a local university suggested that I order the questions separately into ICT integration questions and ICT leadership questions. He cited that: *“This would help you organise your thoughts to see what to probe further as well as give you direction in data analysis”*.

#### **4.6.2 Documents Reviews**

Documents are public and private records that qualitative researchers obtain about a site or participants in a study, including minutes of meetings, emails, and letters (Creswell & Creswell, 2018). Documents are good sources for supplementary data and do not need transcription for analysis (Creswell & Creswell, 2018; de Andrade et al., 2018; Young et al., 2018). I had hoped that all teachers would provide excerpts of their scheme books and lesson plans (these documents are a strict requirement in Eswatini public schools). Most teachers did not have them, whilst others initially agreed to provide and then did not honour their promises. Two teachers gave me sections of their scheme books and lesson plans, which corroborated ICT integration planning and execution. Another critical document I got was the school ICT policy. The school website provided PDF downloads like newsletters and other forms of communication. I also got a memorandum from the Mathematics department informing teachers about changed software passwords and dates. I managed to take pictures of the classrooms and IT centre to show the critical hardware and contexts that participants discussed. Table 4.1 shows a list of documents used in this study and their sources.



**Table 4.1** *List of Documents Collected and Their Sources*

	<b>Document type</b>	<b>Source</b>
1	Scheme book extract	French teacher (Faith)
2	Scheme book extract	Business teacher (Angela)
3	IT policy	Principal
4	Mathematics department memorandum	Mathematics teacher (Senzo)
5	Video on GeoGebra software use	Senzo
6	Screenshots on school information management system features and functions	Faith
7	Still images	Researcher sourced
8	IGCSE and IB subject syllabi	Faith, the Internet
9	History syllabus	Amos (History teacher)

*Note.* Names represent the actual pseudonyms of the participants used in the study

#### **4.7 Data Analysis, Reporting, and Interpretation**

This process started with the transcription of interviews, typing field notes, and sorting and arranging the data according to its sources. Data were initially prepared by creating word files of interview data, memos, field notes and moving images (Cohen et al., 2018; Miles et al., 2020). I transcribed the interview audio and asked a critical reader to verify the accuracy of the transcription. I used software to convert the Zoom audio recordings to text and checked their accuracy by reviewing them twice after transcription. I used a spreadsheet to enter all the participants' responses against the interview questions to ensure that I had all the interview questions answered accurately. Memos and other documents were labelled and kept in separate folders.

After this process, I needed to search for insights to define the priorities for analysis and the reasons why (Yin, 2018). This process started with reconsidering the research objectives to guide the raw data preparation (Cohen et al., 2018). It facilitated easy reading, re-reading of the raw data and coding to get a general meaning and refinement (Cohen et al., 2018; Creswell & Poth, 2018; Yin, 2018).

Data exploration led me to consider data reduction to a manageable size for reasonable reporting (Cohen et al., 2018; Mertens, 2019). My data reduction process involved a systematic coding system centred on generating themes. Coding ascribes category labels to pieces of data (Cohen et al., 2018), and these category labels were developed in response to the data collected. Most importantly, open, axial, and selective coding enabled a cyclical and evolving data circle where data was constantly compared and reduced to identify themes and for theory evolution (Williams & Moser, 2019). Open coding was the first to be done. It focused on the conceptualisation and categorisation of phenomena through intensive data analysis. It involved breaking the data into smaller parts (Harati et al., 2019; Vollstedt & Rezat, 2019). The aim was to clasp the core ideas and to develop descriptive codes. Thus line-by-line coding and paragraph-by-paragraph coding were incorporated to engage the text deeply and recognise and codify nuances so that the smaller analytical parts could be compared regarding similarities and differences (Corbin & Strauss, 2015; Vollstedt & Rezat, 2019; Williams & Moser, 2019). As a result, open coding produced many codes that described the data (Vollstedt & Rezat, 2019).

Following breaking down the data, axial coding was involved in taking similar open codes and recombining them in new ways (Cohen et al., 2018; Corbin & Strauss, 2015). At this stage, axial coding connected related codes and more significant categories of shared meaning to create a basis upon which the phenomenon revolved (Cohen et al., 2018; Harati et al., 2019). Table 4.2 shows how coding was employed in the data analysis.

**Figure 4.2** *Open and Axial Coding Process*

<b>Open coding</b>	<b>Axial coding</b>	<b>Theme/Category</b>
Software and media use in teaching and learning (6) <i>(Mentioning by participants of use of Moodles, Mathematics software, Google classroom, videos, audio, music-specific software, PowerPoint, Video-editing software etc.)</i>	- ICT integration in actual teaching and learning - ICT integration in academic research -ICT integration in extra-curricular activities - ICT integration in preparation for assessment material	ICT integration in active learning
Hardware used in teaching (5) <i>(projectors, computers, IWB, laptops)</i>	- ICT integration consolidated the teaching methods.	
ICT integration in work-related research (8) <i>(Teacher and student research)</i> <i>(Research for assignments, papers, and teaching material)</i>		
Online teaching and learning (5) <i>(Google classroom, WhatsApp, Zoom)</i>		
ICT integration in extra-curricular activities (4) <i>(internet searches, YouTube video)</i>		
ICT for assessment material production (2) <i>(Internet for blogs and research, ICT tools for musical recordings)</i>		

*Note.* The table demonstrates the different types of coding used in the content analysis for one theme. A description of what the codes signify is shown in italics in the first column. The figures represent the frequencies participants in interviews mentioned the codes.

Once I developed the codes, I moved on to the next step, a conventional content analysis of documents and interviews, which was necessary for summarising and reporting the data (Cohen et al., 2018). Content analysis is helpful in data reduction and producing a summary form through emergent themes. Reading through the data, I extracted and sorted it into key headings related to the research questions and put the issues raised into groups for discussion. This is exemplified by themes like *Creation of a school ICT vision, Strategic ICT resourcing, and Decentralisation of*

*ICT responsibilities and decision making*, to mention a few. Once I developed the themes, I could write the findings chapter.

Researchers must decide whether to present findings individually or combine critical issues that emerge across individuals (Cohen et al., 2018). It made more sense to use the latter approach, although there were instances where individuals stood out to emphasise certain aspects. For example, active ICT integration in the classroom was presented based on teacher practice, but I needed to illustrate how certain individuals used a specific software.

Researchers can also focus on the responses of significant people in a particular situation and quote their verbatim responses in the presentation (Cohen et al., 2018). It is done to present the participants' original words and validate data interpretation (Ngulube, 2015; Yin, 2018). Interpretation of the findings was based on the researcher's viewpoint and comparing findings to literature and the aforementioned theoretical framework (Mertens, 2019). The use of assertions helped me summarise findings from the main ideas mentioned by participants. This idea was based on a revelation that case studies often end with researcher-formed conclusions, patterns, claims or explanations about the overall meaning obtained from the participants (Creswell & Poth, 2018).

The research process was iterative because analysis started during data gathering. The interviews revealed essential details and some emergent issues that needed further exploration and confirmation by other people. For example, information on ICT integration by teachers and students was more attainable compared to leadership because teachers and students believed the questions on leadership had little to do with them. Hence more participants (and probing) were sought to get more information on ICT leadership until the saturation point was reached.

Selective coding was then used to identify core categories of the data and integrate them in forming one cohesive theory (Cohen et al., 2018; Corbin & Strauss, 2015; Harati et al., 2019). Selective coding continued the axial coding but at a higher level of abstraction and enabled further refinement of the data by choosing the main thematic category (Williams & Moser, 2019). Coding was followed by systematically aligning other selectively coded categories to theory creation and ultimately constructing meaning (Harati et al., 2019; Williams & Moser, 2019).

Through an iterative process of coding and data analysis, it became more apparent that events at the school happened to meet most conspicuously context-based needs. And so, the themes generated from axial coding could be aggregated to help create a theory that explains ICT integration leadership at the school, as shown in Table 4.2.

**Table 4.2** *Selective Coding and Theorisation*

<b>Themes</b>	<b>Selective coding</b>	<b>Emergent theory</b>
<ul style="list-style-type: none"> <li>- Strategic ICT resource provision</li> <li>- Professional development in ICT integration</li> <li>- Decentralisation of decision-making and responsibilities linked to ICT integration.</li> <li>- To enhance and sustain efficiency and effectiveness in teaching and learning</li> </ul>	Themes addressing people’s ICT-related needs	
<ul style="list-style-type: none"> <li>- ICT integration in active learning</li> <li>- ICT integration in remote teaching and learning</li> <li>- ICT integration to meet curriculum demands</li> </ul>	Themes addressing curriculum-based ICT needs	A needs-based approach to ICT integration leadership
<ul style="list-style-type: none"> <li>- Sustenance to effectiveness in performing school operations</li> <li>- Sustenance to efficiency in performing school operations</li> <li>- ICT integration in information management and school communication.</li> </ul>	Themes addressing school functionality-based ICT needs	

#### **4.8 Trustworthiness**

The quality of qualitative research is determined predominantly by two main criteria: credibility and transferability (Guba & Lincoln, 1985; Korstjens & Moser, 2018). I aligned my research to cover them. Credibility involves establishing that the findings are believable through detail drawn from original data and an accurate interpretation of the participants’ views (Creswell & Poth, 2018; Hammarberg et al., 2016; Korstjens & Moser, 2018). Triangulation (of sources and methods) and participants’ validation were used as measures of addressing credibility.

Triangulation involved using interview data and documents together to converge evidence (Mertens, 2019). Member checks were done after every interview. After the interview transcriptions, I sent the transcripts to the respective participants to check if I had captured their words accurately. Minor corrections were made in the process, for example, the number of years teaching and handling IGCSE and IB. I also asked two critical peer reviewers (fellow PhD students) to check my transcriptions before sending them to the respective participants. My peers and my supervisors were important in posing questions and ideas to guide me in the steps I was taking in the study (Mertens, 2019). A copy of the final draft thesis was availed to all the participants to check if the findings were a true reflection of the participants' experiences. The participants were free to seek clarification and changes on issues raised or aspects they were not happy with in the document. No problems arose after the participants had been given time to review the document.

Transferability refers to the degree to which the results of qualitative research can be transferred or generalised to other contexts or settings (Korstjens & Moser, 2018; Venkatesh et al., 2013). A description of the methodology enables other researchers to undertake similar research in similar contexts (Mertens, 2019). An audit trail in the form of a research journal helped me cross-check what I had done and what needed attention. This journal can be used later on by another researcher or me in similar settings to ascertain my steps in this research and confer transferability (Squires & Dorsen, 2018). I kept this audit trail so that there was documentation and proof that the findings and interpretations were not my imagination but derived from the data (Guba & Lincoln, 1985; Korstjens & Moser, 2018).

#### **4.9 Ethical Issues**

Ethical issues like informed consent, anonymity, confidentiality, right to refuse/withdraw, access and acceptance are some aspects to consider before conducting research (Cohen et al., 2018). Researchers need to obtain the approval of individuals in authority to gain access to sites and to study participants (Creswell & Creswell, 2018). Permission to do research in Eswatini was sought from the Ministry of Education and Training and the school before applying for an ethical clearance letter from the University of KwaZulu-Natal. These documents are found in the Appendix section. All participants agreed to participate in the study after I explained the research.

All participants then signed a consent form which gave them the right to stop or withdraw from the study at any time (Cohen et al., 2018). Two students were part of the study and were below the consent age, and the consent forms were hence signed by their parents. In the consent forms, all the participants signed up for me to video and audio-record them. However, I did not record any class observation because of the absence of participants at school due to a lockdown. By using pseudonyms for both the school and the participants, I made sure that the information provided by participants would not reveal their identities to guarantee privacy and confidentiality (Passer, 2014; Saunders et al., 2019). The school was given a pseudonym 'Herons', and all participants were given a single name. All research material on my laptop computer is password-protected to avoid unauthorised access.

As the above steps were taken into consideration, ethical dilemmas could not be avoided nonetheless. Researchers must strike a balance between protection of participant and place privacy and the need to investigate research problems (Cohen et al., 2018). Conducting a study of this nature in a small country is liable to ethical issues relating to identity. Information about the school's historical background, curriculum and the associations it had with different stakeholders could not easily be disclosed in this work without exposing the identity of the school. A person who is familiar with Eswatini and Mbabane, would immediately know which school was in question. Therefore, the use of pseudonym serves a technical commitment to hide information and to only partially expose the identity of the school. However, this institution was a very important place from where valuable information was obtained. The school also belonged to an amalgamation of international schools. To address this ethical dilemma, this group of schools is given a pseudonym 'XYZ' and where participants mentioned it in the interviews, XYZ is used instead.

#### **4.10 Chapter Summary**

The research process is a long and arduous journey but worthwhile travelling. This chapter outlined 'what', 'when', 'where' and 'how' to answer the research questions to make sure that the expectations of the process were met. This study focused on getting rich data from a single case study. This research design was ideal for getting multiple (text-based) realities from participants using a semi-structured interview and document analysis. Content analysis was discussed in this

chapter to present how data was used to develop codes and themes and eventually use them in theory development. This chapter explained the importance of following the guidelines stipulated in research, like participant confidentiality through pseudonyms and honouring gatekeepers. Certain flaws in the methodology were found. Such as not doing a multiple case study would have led to more cross-case analysis. This could have brought forth more depth in understanding ICT integration for school operations and the influence of leadership. The next chapter is a presentation of the findings from the field.



## **CHAPTER 5**

### **PRESENTATION OF DATA**

#### **5.1 Introduction**

In this chapter, I present the data collected from the field. This study aimed to explore how an international high school enacted ICT integration in school operations, investigate how leadership influenced ICT integration and why the school enacted ICT integration in the way it did. Through semi-structured interviews, and document reviews, I was able to obtain information that describes the context of the school in terms of ICT resources and their use in integration for school operations and the influence of leadership in the process. The first section of the chapter presents a brief background of the school, ICT infrastructure, the operation curriculum and the participants' profiling. The data collected is then presented in themes to answer each research question. This chapter is structured for a sole qualitative raw data description. Data interpretation will be made in the next chapter. Literature will not be used in this chapter so that more attention is paid to presenting the information obtained from the field.

#### **5.2 The School Context**

This section introduces the school setting by covering the school infrastructure, and curriculum. These details are provided to contextualise the setting of the study. The school in this investigation is found in Mbabane, Eswatini's capital city. It is a co-educational and non-denominational international high school.

##### **5.2.2 The schools' Infrastructure and Resources**

The information written in this sub-section and the next was obtained from having (both formal and informal) talks with the principal, teachers and students. Field notes and the school website were also used to detail school infrastructure. Most classrooms, halls, libraries and administration buildings were built in the first ten years of the school's existence. Over the years,

more classrooms, learning areas and administration buildings have been established to meet the school's needs. The IT centre was one such structure treated as the hub of all technology innovations at Herons. It housed state-of-the-art computers that both students and members of staff used. Cable internet connections to classrooms, teacher offices and administration blocks emanate from the IT centre. Wi-Fi routers, servers and other technological gadgets are also set up in the IT centre.

Figure 5.1 shows a collection of hardware like interactive whiteboards, data projectors and computers found at the school. The figure also indicates students using computers in the IT centre.

**Figure 5.1** *Hardware and Students Using Computers*



*Note.* Picture a shows a classroom set-up focusing on the teacher desk with a desktop computer and an interactive whiteboard in the front. Picture b shows an area in the IT centre to highlight a data projector and an interactive whiteboard. Pictures c depict students using computers in the IT centre.

Sports infrastructure at Herons included soccer and hockey fields; basketball, netball and tennis courts; a swimming pool and an outdoor volleyball court. An indoor multi-purpose hall made it possible to function normally under adverse weather conditions. During the visit, it was being extended to add more sitting space, a rock-climbing wall, a new roof and new offices for the sports department. There was also a school gym with new equipment used by students and staff.

### **5.2.3 Herons' Curriculum**

The school's formal academic curriculum was divided into three levels: Junior School, IGCSE and IB.

#### *The Junior School*

The junior school consisted of forms 1 to 3. At this level, the school's curriculum was designed by borrowing from IB and IGCSE content. This content was designed to offer a solid foundation for upper forms in critical areas such as handling homework, subject choice, developing study habits, socialising and collaboration. The subjects offered at junior school included: English language; French, SiSwati; (Spanish starting at form 3) Drama; Mathematics; Information Technology; History; Geography; General Science; Creativity, Activity, Service (CAS); Physical Education; Life Skills; Art and Music.

#### *The Cambridge IGCSE*

The Cambridge IGCSE was taught in Forms 4 and 5 and in addition to the junior school subjects, Chemistry, Biology, Physics, Business Studies and Economics were part of the curriculum. As a popular international qualification, IGCSE is regarded as an 'international passport' into leading universities and employers worldwide value it (United World Colleges, 2020a). Cambridge IGCSE has the global recognition as the most popular international

qualification for students aged 14 to 16 (Cambridge Assessment International Education, 2020c). Besides being international, it allows students to have the most options in subject choices and ways of learning and success. Cambridge IGCSE has a variety of routes that cater for different capabilities in students including those who do not use English as a first language (Cambridge Assessment International Education, 2020c). For example, there is a choice between Core and Extended curriculum examination papers in some subjects whereby the Core curriculum is within capabilities of most students and the Extended curriculum is designed for students who are more academically gifted (Cambridge Assessment International Education, 2020c). Cambridge helps schools build a curriculum that suits their specific needs and Cambridge IGCSE offers flexibility, a rich curriculum and different types of resources and training.

### *IB Diploma Programme (IB)*

Post the IGCSE level, Herons offered IB which was a two-year programme. The United World Colleges (2020a), considers IB as the most recognised international pre-university programme for high schools. The IB offers a range of international education and has Programmes designed to challenge students to excel in their studies and personal development (International Baccalaureate Organisation, 2020a). These Programmes are mainly Primary Years Programme, Middle Years Programme and Diploma Programme. The diploma programme is offered at ages 16-19 and it develops students with profound knowledge who flourish intellectually, physically, emotionally and socially (International Baccalaureate Organisation, 2020b). Some of the benefits of doing the programme include studying at least two languages and a rigorous curriculum in the traditional academic subjects (International Baccalaureate Organisation, 2020b). IB students choose a course of study from six subject areas which are: 1. Studies in Language and Literature; 2. Language Acquisition; 3. Individuals and Societies; 4. Sciences; 5. Mathematics and 6. Arts. The three subjects are done at a standard level, and the other three subjects at a higher level (International Baccalaureate Organisation, 2020b).

### *Co-curricular and Extra-Curricular Activities*

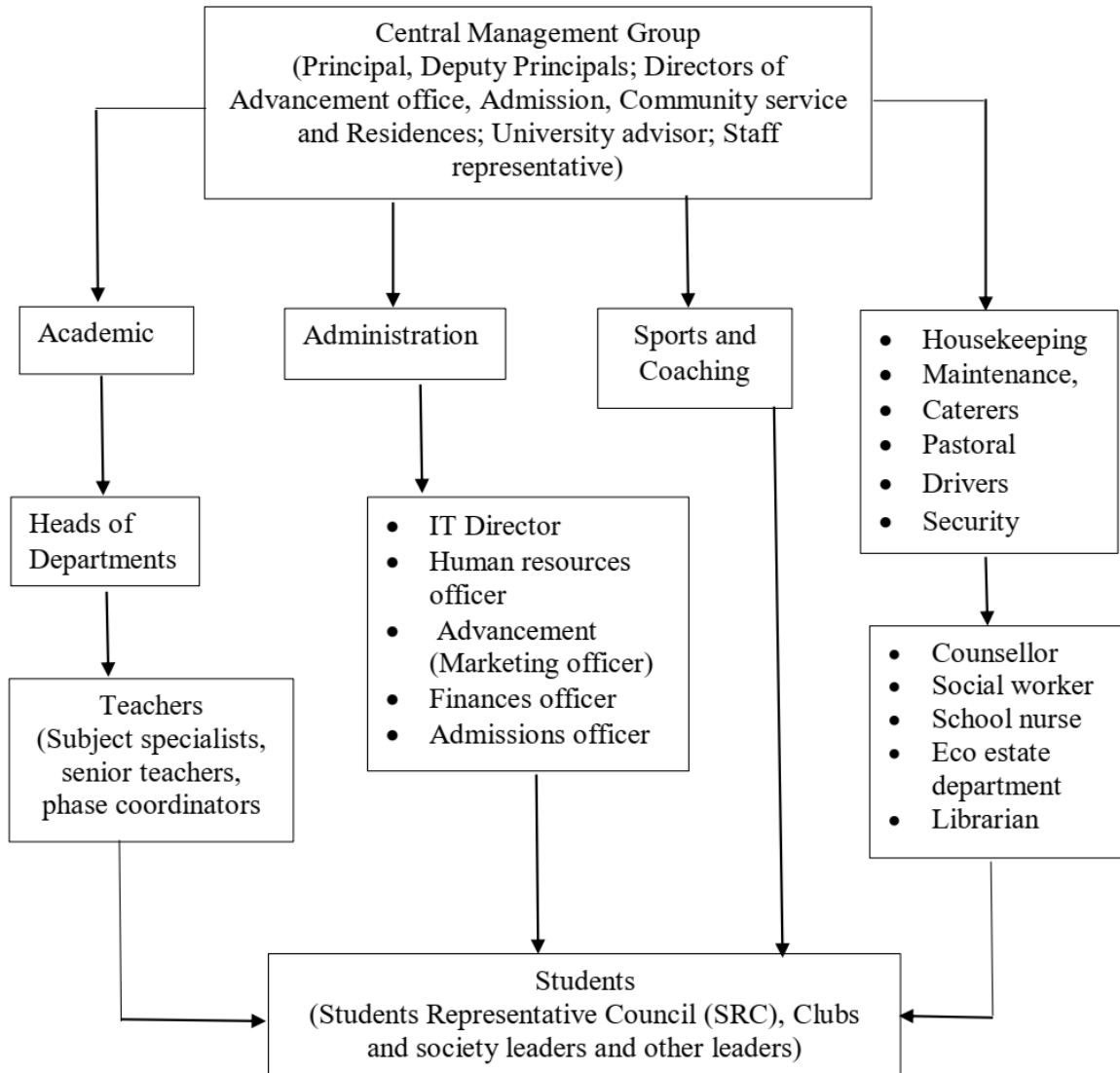
A variety of sports were offered at Herons and students could choose from soccer, basketball, rugby, netball, swimming, hockey, athletics, tennis, badminton and volleyball. There

were also indoor activities like chess, computer programmes, creative activities like music and art and adventure activities like rock climbing, hiking and canoeing. Some students were involved in classes for body relaxation and alignment like yoga. Students freely signed up for sport or any other activity of choice termly and weekly attended the sessions. Other than sports, Herons also had events that were commemorated annually and some of these days were the school's birthday; XYZ Day (to celebrate the diversity of nationalities and cultures in the XYZ schools); XYZ Africa Week (to discuss contemporary issues that were affecting Africa and the globe and how to help solve them); 24 Hour Run (a charity event in which students, staff, alumni, and parents are invited to form teams and complete sponsored field laps in 24 hours; Careers Fair (an IB year 2 student-organised event where high school students from around the country are invited to get career information and guidance from selected companies and organisations). The meaning and relevance of 'XYZ' was explained under the ethics in section 4.9.

### **5.3 Herons' Human Resources and Hierarchy**

Herons was composed of nine staff divisions; academic, administration, caterers, sports coaching staff, drivers, housekeeping, maintenance, pastoral and security staff. Figure 5.2 shows key people and positions in the organisation of the school. The principal headed the school and he was also a member of the Central Management Group which was responsible for planning and daily operations of the school. The other members of this group included two deputy principals (academic and pastoral), the director of advancement office, director of admissions and university advisor; director of community service; director of residences and the staff representative. This group met weekly to make and implement operational decisions for school management. It was not a surprise that teachers were also from different parts of the world with: 45 Africans, 15 Europeans, two Americans and two Asians. The total student enrolment in the year 2020 was 606.

**Figure 5.2 Herons' Organogram**



### 5.4 Participant Profiles

Data was collected from 13 participants whose pseudonyms and brief descriptions are shown in Table 5.1. Most participants had a lot of experience in teaching IB and IGCSE and therefore fully cognizant of the curricular.

**Table 5.1 Participant Profiles**

<b>Pseudonym</b>	<b>Position</b>	<b>Qualifications</b>	<b>Teaching Experience (years)</b>	<b>IB and IGCSE Teaching Experience (years)</b>
John	Principal	MED	30	11
Nash	Deputy	Diploma	24	17
Gary	Senior Teacher/ IB coordinator	BED	30	20
Joan	CAS HOD	BA	32	10
Senzo	Maths Teacher	BSC + PGDE	7	5
Ruth	Business Teacher	BSC + PGDE	20	7
Angela	Business Teacher	BSc	9	1
Mfundo	Music HOD	BSc	25	14
Amos	History Teacher	PhD	29	10
Faith	French Teacher	MED	25	15
Arianna	ICT Director	BSc IT	N/A	N/A
Tsitsi	IB2 Student	N/A	N/A	N/A
Solange	IB2 Student	N/A	N/A	N/A

### **5.5 Presentation of Data**

This section presents original data collected from the school premises, documents and 13 participants. The interview was the main source of data gathering then supported by documents. The data is presented in generated themes that answer the three research questions. The themes are also presented representing actual words that were used by the participants.

The mention of the word ‘lockdown’ in subsequent sections implies the period for the COVID-19 pandemic lockdown from March 2020 to December 2020. This is mentioned to reduce confusion because there were many descriptions of the lockdown as restrictions were loosened and tightened over time. Moreover, all schools in Eswatini re-opened in 2020. However, the Herons community never went back to school because of challenges involved with students traveling back to Eswatini. So, all schooling continued online.

In the following sections, the data is presented in a structured manner as informed by the research questions and interview guide questions. The data is discussed in themes to cover how the international high school enacted ICT integration for school operations; how leadership influenced ICT integration in the international high school. Lastly, the third section concentrates on the reasons why this international high school enacted ICT integration the way it did. For the sake of a clear and unrestricted understanding of the data, the actual wording of the research questions is not adhered to in this chapter.

## **5.6 ICT Integration in School Operations**

The field data showed that ICT integration at Herons was enacted for school operations like teaching and learning; keeping information and for school communication. Through interviews, and document analysis, evidence on ICT integration was collected for these operations.

### **5.6.1 ICT Integration in Teaching and Learning**

Teaching and learning are the core functions of a school and if a school has ICT resources and infrastructure, focus would be directed towards how teachers integrate it in their lessons and how students optimise learning with it. The data showed that teachers at Herons used ubiquitous ICT to facilitate teaching and learning. Figure 5.1 shows some of the hardware that the school had. The majority of the answers in this theme were generated in response to the question on how the participants used ICT in teaching and learning. All teachers (to varying extents) used ICT to prepare lessons, assess learning, access IB and CAIE websites and research subject matter. In the question about the extent to which ICT was used in teaching and learning,

Nash (the deputy principal) revealed that:

Teachers (and their students) do different things with technology during class interactions and their main advantage is having projectors in the classrooms and the school providing internet. However, not all teachers teach with technology and even those that do, they do not use technology every time.



The deputy principal portrayed a picture of how ICT integration occurred at the school basing it on the resources available and the choices people had. The detail on the interview question on how ICT was integrated to prepare content in the teaching process was revealed with examples from teachers Faith (French teacher), Angela (Business Studies teacher) and Senzo (Mathematics teacher). From these interviews, it can be envisaged that ICT was used in teaching and learning. Faith revealed that:

Traditionally, my teaching used to depend mostly on a CD player and CDs that students would listen to if I were doing a listening activity. I am still doing that, but since my classroom also has a projector, I can use something on my computer like a video. I can just go on YouTube and then select a video and then put on the projector and then my students can watch it. We find the use of PowerPoint handy because there are data projectors in the classrooms and with your laptop you just connect and students can learn through interaction with the visuals and or sound.

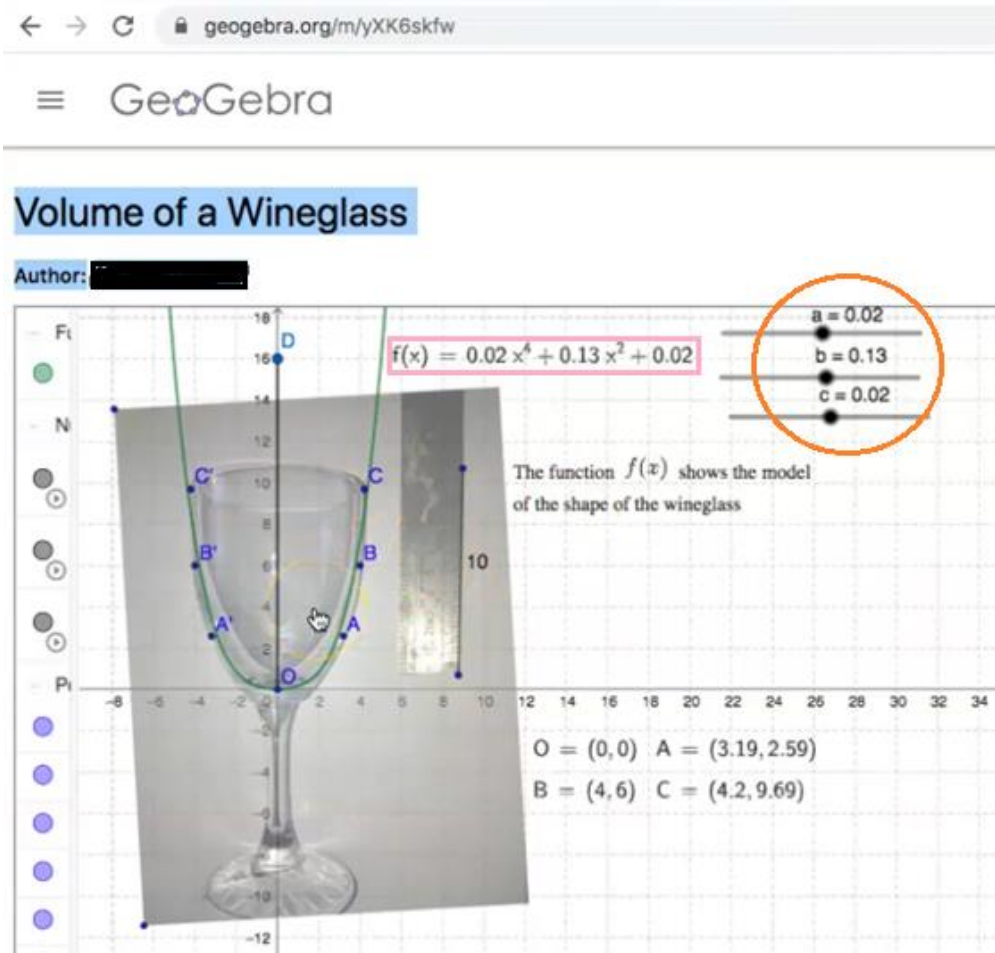
Angela presented more detail on different software use with one of her classes like this:

My IB1 Business Management students are currently uncovering various aspects of profitability and liquidity in finance. They are using an online version of monopoly that we play live during Zoom sessions, in teams, where they collaboratively fill their final accounts (pre-made) on Google documents, and everyone can edit and learn together. The game has been slightly adjusted on Google documents, with rules and additional cue cards that I have intentionally made for the purpose of the learning. In general, in my teaching I use EDpuzzle, Google documents, Google spreadsheets for student records and grade threshold formulas, Google Classroom and its interactive features including in-text comments and grading features, Padlet for interactive activities such as matching concepts.

Senzo talked about methods that aimed to make Mathematics less abstract. He provided me with a video that demonstrated how he used GeoGebra, (an open source interactive geometry, algebra, statistics and calculus application) with IGCSE Mathematics students. He created applets, uploaded them onto the GeoGebra account and shared them with students. Students were expected to work with an object or picture in real life to demonstrate Mathematics concepts. In this case,

they were given a picture of a wine glass that was superimposed onto GeoGebra as shown in Figure 5.3. I cut out a picture from the video to create this figure.

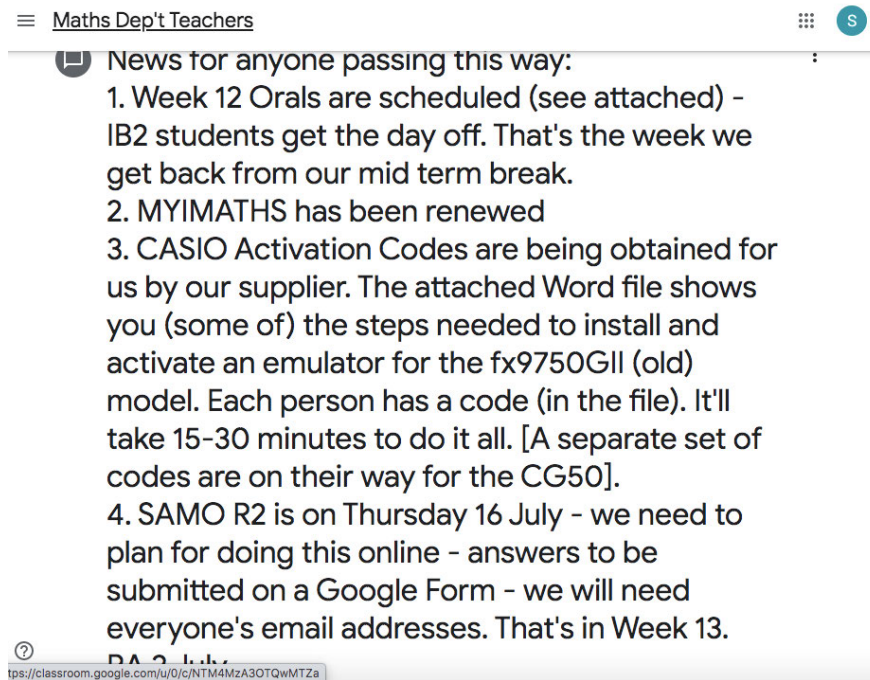
**Figure 5.3** *Modelling a Volume Calculation*



The idea was to use the software to generate a function (denoted in the pink box) in Figure 5.3 that was used to model the picture. Then once obtained, this function was integrated with learnt Mathematical concepts to calculate the volume of the wine glass. To get started, students were instructed to move around the sliders a, b and c (encircled in orange) to get the best fit of the wine glass picture on the grid so that they could harness the symmetry. They were then expected to use knowledge of similar shapes to find the correspondence between the actual model and the pictured ones. In this example, concepts learning and development were supported by software use.

In connection to the Mathematics department, Figure 5.4 shows a memorandum that Senzo provided to highlight that ICT integration was ingrained in several teaching-related activities teachers partook in. In this memo, there are snippets of information regarding some of the software used, as well as certain dates that teachers needed to diarise.

**Figure 5.4** *A Mathematics Departmental Memorandum*



*Note.* MYIMATHS, CASIO fx9750G11 and CG50 are names for software and applications. SAMO R2 refers to the South African Mathematics Olympiad round 2.

ICT integration was pivotal in students' daily activities. When I asked both students (Tsitsi and Solange) about how they utilised ICT in learning, they mentioned that they depended on ICT in doing research for assignments, reports, projects, for revision, class presentations, typing assignments and communication with their teachers. To capture this information, Solange said that:

At IB you do a lot of research and write many papers. So, we cannot do without the internet and computers in our learning. Then some teachers want us to do PowerPoint presentations in class. So, every day we are on the laptop and internet. If you need to research or make a class presentation, you just need to do that.

Similarly, Tsitsi said:

In learning, we use everything including computers and the internet and even use the traditional notebooks because some teachers prefer us doing it manually and writing things down. My assessment is that teachers want us to benefit and improve our learning with ICT. For example, in biology, recently we used a simulation in [DrosophilaLab](#) that allowed us to do genetic crosses and come up with possible offspring. The software is interactive and allows us to edit fruit flies and then get representations of the offspring. It made genetics easier to understand.

Whilst some teachers manipulated and evaluated educational software, others did not do that. Information gathered from Amos (History teacher) on the extent to which he integrated ICT, showed that he preferred to not integrate ICT for the whole class save for him using his laptop to deliver a lesson. Amos explained that he preferred not to use social media (especially Facebook) in the classroom for fear of losing control in the class and not sure about how he could structure his lesson effectively as justified in this comment:

In class, it's more with me using the technology, unless we have a session where I want them to participate through say Facebook. I have done it before once and I wanted to make them learn its use in learning History. But I have tried to avoid it because of its abuse by young students. Because then you might think that they are busy with their school work and yet they are busy with other things. So, it ends up being the teacher trying to use it when it's appropriate. I can use ICT but not that much because even without ICT you really feel that the group discussions they (students) take part in are more meaningful in a subject like History.

Nash narrated this information as well on the extent to which teachers integrated ICT in teaching and learning:

ICT is not our main source of interaction between teachers and students. In fact, ICT is the least used form in terms of content delivery and getting students to interact with each other. I believe more face to face is the way to go. It does not mean that teachers are not using technology. You get to see different technology use. That happens but that is not the main focus of teaching and learning here.

The viewpoint of teachers who used ICT more than others could be based on their competence, comfort with ICT and acknowledgement of the benefits of ICT. A reason why there could have been varying extents to ICT integration might be rooted in the fact that ICT requirements differ from subject to subject. I asked for subject syllabi (for both IB and IGCSE) from teachers and I got them from Amos, Faith and Senzo. The focus was to get an understanding of the curriculum expectation on ICT integration from the examination body. The IB and IGCSE syllabi advocate for ICT integration for introducing ICT skills, explaining concepts, and making learning easier. However, if one considers the content objectives item by item, some of them can be taught without ICT integration. For example, Figure 5.5 shows an extract of the first topics in the IGCSE History (0470) syllabus where the content could involve ICT integration but do not need interaction with sophisticated software. This was a syllabus document I got from Amos.

**Figure 5.5** *A Section of Content in the History Syllabus*

### Core Content: Option A

The nineteenth century: the development of modern nation states, 1848–1914

The Core Content in Option A focuses on six Key Questions:

- 1 Were the Revolutions of 1848 important?
- 2 How was Italy unified?
- 3 How was Germany unified?
- 4 Why was there a civil war in the United States and what were its results?
- 5 Why, and with what effects, did Europeans expand their overseas empires in the nineteenth century?
- 6 What caused the First World War?

#### 1 Were the Revolutions of 1848 important?

##### Focus Points

- Why were there so many revolutions in 1848?
- Did the revolutions have anything in common?
- Why did most of the revolutions fail?
- Did the revolutions change anything?

##### Specified Content

- The nature of revolutions in 1848, and the influence of liberalism and nationalism
- Causes and events of revolutions in France, Italy, Germany and the Austrian Empire
- Reasons for the failure of the revolutions

Adapted from (Cambridge IGCSE History Syllabus (0470), 2020, p. 10)

There were some subjects at Herons that ICT integration proved indispensable in the teaching process. Music and CAS came out as both examinable subjects, (the later only at IB). Students needed to produce musical compositions that would be assessed by CAIE and IBO. Hence

teaching, learning and producing examinable material could not have been possible without ICT. I asked Mfundo (Music HOD) about the extent to which he and his students used the ICT resources available in the school in light of the curriculum demands and he elaborated that:

So, in terms of composition in our IGCSE, and IB, we use technology throughout and its central to what those 'kids' learn about, how they produce their beat, practice it and then they can use it in order to be able to produce their assessments. Students also do performance strands. Most of the performance stuff that the students will do will be through live music. So, they'll sing and play musical instruments and use the computer. They'll do that as a soloist or in a group. Most of those interactions are with technology. They are about recording devices, learning how to record perhaps, and learning how to set up a mixer.

In a similar scenario, the IB students needed a pass in CAS to be awarded the diploma. Although there were different projects done by students, Joan (the CAS HOD) mentioned that one of the ways was that students had to upload content on a blog that would be assessed by IBO. She revealed that:

This CAS programme is a passing requirement for the IB. If they fail CAS they fail, the whole diploma. So, my assistant and I spent a lot of time checking on the blog to see what has been done and whether they are uploading stuff.

There was evidence of ICT integration in the teaching and learning process although, emphasis was put on teacher usage of ICT in teaching. The data showed that there were teachers and departments that involved software use in their teaching more than others.

### **5.6.2 Teaching and Learning During the Lockdown**

As mentioned in the previous chapter, this study coincided with the COVID-19 lockdown. ICT integration involved online teaching and learning. The COVID-19 pandemic brought a change to school operations but attempts were then made to bring continuity in school operations despite the disturbance. The data revealed that the school swiftly changed its approach to teaching to do everything online. Through Zoom Cloud Meetings, Skype, Google suite and WhatsApp teachers and students met virtually for lessons, meetings and discussions to bring forth continuity to what

the school was used to. When I asked participants how they used ICT in teaching and learning, Google Classroom was mentioned by Ruth, Faith, and Angela as the common platform through which teaching was conducted during lockdown. Angela said that: "I am now using Google Classroom more than I used to before the lockdown." Ruth (Business Studies teacher) gave this elaboration:

Google Classroom is very nice. With the lockdown going on, we are teaching with it every day. And what I like about Google Classroom, as compared to any other (platform) is that I'm able to post my work. When it comes to creation of the classroom, that's not hard and one thing I like is the way you add your students. You just need to have their emails and you just add the whole class at once.

In addition to this revelation, Faith gave more information on how learning was organised during the lockdown:

What is even more amazing is that we are on lockdown and no one is going to class now but we are in class. It's like we follow our timetable. Everything is online. So, when it is your class time you come to class with your students on the Google Classroom. When you want to give them work and you are not in class you can leave the class open and give them work to do. It is like you are in a normal class.

From these narrations, one gets an understanding that the school was able to adapt to change and took positive steps towards continued schooling activities.

I requested teachers to provide me with a sample of their scheme books and lessons to show how they planned for teaching and learning during the pandemic and only Faith and Angela provided sections from their scheme books. Figures 5.6 and 5.7 show this evidence. Figure 5.6 shows a picture of sections of Faith's scheme book showing how she integrated videos and interactive quizzes in her remote teaching planning.

**Figure 5.6** *An Extract From Faith's Scheme Book*

**F3 - Term 2 - April 2020**

*Week 1*

**Lesson 1 (Wed 22nd)**

1. Cliquez sur le lien et regardez cette belle vidéo "Paris vu du ciel" et faites le quiz interactif. 2. Il faut le faire plusieurs fois pour avoir la meilleure note. 3. Envoyez-moi votre meilleure note dans un message privé.
2. English: Click on the link below to watch the video "Paris - as seen from the sky" and do the interactive quiz. Take the quiz a few times until you have achieved your best score. Send me your best score in a private message.

Interactive video: "Paris vu du ciel" (repeat until all answers are correct)

<https://fr.islcollective.com/video-lessons/paris-vu-du-ciel-quiz>

*Week 2*

**Lesson 1&2 (Mon27th & Tues28th)**

They should watch the 1st video on the PC with 'avoir' a few times and do the exercises on the sheets from the following websites:

<https://www.youtube.com/watch?v=Mq6kEwQntik>

<https://www.languageguide.org/french/grammar/tense/past.html>

The scheme was prepared for a Form 3 class and relevant sections were selected. The sections in French were translated to English to clearly help those students whose first language was not French.

Figure 5.7 shows an excerpt from Angela's scheme book to depict how she planned to use technology in two Economics sub-topics. Her planned learning activities included online learning as well as a virtual round table conference in a Google classroom.



**Figure 5.7** An Extract From Angela's Scheme Book

Scheme of work for IB Diploma: **ECONOMICS IB 1(2020-2021)**

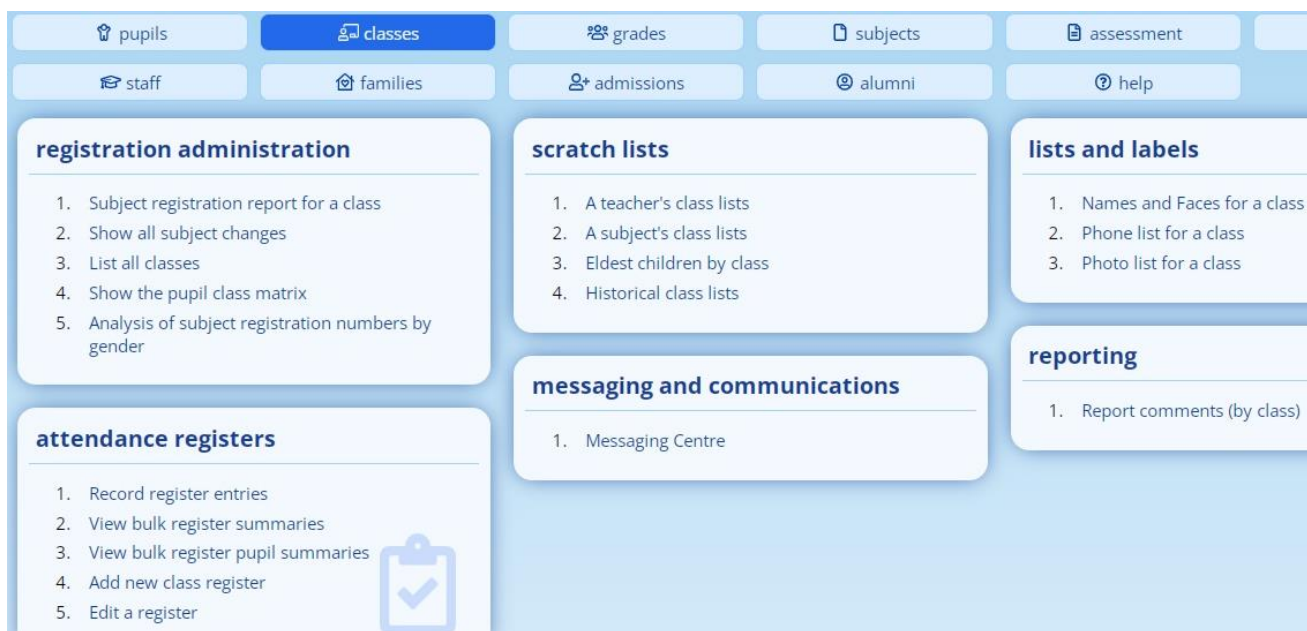
Term 2: 2020				
Week	Topic Subtopic	Learning objective	Learning activity	Assessment Plan
1	<b>Microeconomics:</b>  Government Intervention	By the end of this unit the students will be able to... <ul style="list-style-type: none"> <li>examine elements of Government Intervention as specified in the guide, and attempt segments of paper 1 &amp; 3 questions</li> </ul>	To achieve this learning objective, the students will... <ul style="list-style-type: none"> <li>Participate in an online moderated summary of the unit; introduction to varying price elasticity of demand (PED through demand for Vietnamese masks (week 1)</li> </ul>	To determine whether the students have achieved this (these) learning objective(s) ...  <i>Feedback on homework via in-text citations</i>
			<ul style="list-style-type: none"> <li>Jointly construct one paper 3 answer</li> </ul> <p><b>Homework</b> (a) Attempt past paper questions; in particular, paper 3 that breaks the whole unit down</p>	
2 – 4	<b>Microeconomics:</b>  Market failure	By the end of this unit the students will be able to... <ul style="list-style-type: none"> <li>examine elements of Market Failure as specified in the guide, and attempt segments of paper 1 &amp; 3 questions</li> </ul>	To achieve this learning objective, the students will... <ul style="list-style-type: none"> <li>Participate in a virtual round table conference as representatives of your own countries' (three chosen) and the impact of these interventions (stakeholder roles assigned and interjection allowed) starting with               <ul style="list-style-type: none"> <li>(a) Taxes (week 2)</li> <li>(b) Subsidies (week 3)</li> <li>(c) Price ceilings and floors (4)</li> </ul> </li> </ul>	To determine whether the students have achieved this (these) learning objective(s) ...  <i>Feedback on homework via in-text citations</i>

Teaching and learning involved ICT integration in different ways. All the participants mentioned ICT integration in various ways which enriched and differentiated their teaching or learning processes.

### 5.6.3 ICT Integration in Keeping Information

In answering the first research question it was discovered that the school enacted ICT integration for another school operation which was keeping school information. The school had an information management system called ADAM that facilitated easy storing and access to information. ADAM is a web-based programme and was accessed by staff members, parents, and students. The school kept all records about every staff member and student and this information was readily available on ADAM. For example, teachers could access and retrieve information about students from class lists, reports, summaries on subject registration, subject lists and send messages on the platform. I asked Faith how the system worked and her explanations were backed by screenshots she sent to show the main features of the programme. Figure 5.8 shows its logging and home page showing some of the features that its users could have access to and lists of some of the functions they could do with it.

**Figure 5.8** ADAM Home Page



Snapshots from the ADAM interface, also appear in coming sections and they were all sourced from Faith. Participants exposed the importance of ADAM in various interview questions like on how they used ICT, the extent of ICT integration and on ICT training. When I asked John

(the principal) about the extent of ICT use in the school, he underscored the importance of computer literacy with particular attention to the need for teachers to know how to use ADAM: "Teachers first need the ICT literacy as well as mastery of ADAM as the school management system. Through ADAM, they can give us daily information about students. Our student report system is based on ADAM."

The principal made it clear that doing daily school management tasks were of utmost importance and were given a priority. Nash (the deputy principal), Faith, Angela, and Joan (the CAS HOD) praised ADAM for its importance in easing paperwork. Nash gave an account on the significance of ADAM when responding to a question I asked on which resources were available at the school for teachers and students to use:

Maybe starting with the operating system, we have an administration system which helps us in management and administration of the school information which is called ADAM. Everything at this school obviously operates from an ICT perspective. New students in the school are automatically entered into the administration system and they automatically get a school email address as well.

The deputy principal's revelation was supported by Faith who said that:

All our information is kept on ADAM - all students, your classes, your students, yourself, and any type of information. Like at the beginning of the year for example, I do not know all my students, I can just open ADAM and go to my class and open people and then see all their pictures and relevant information about them.

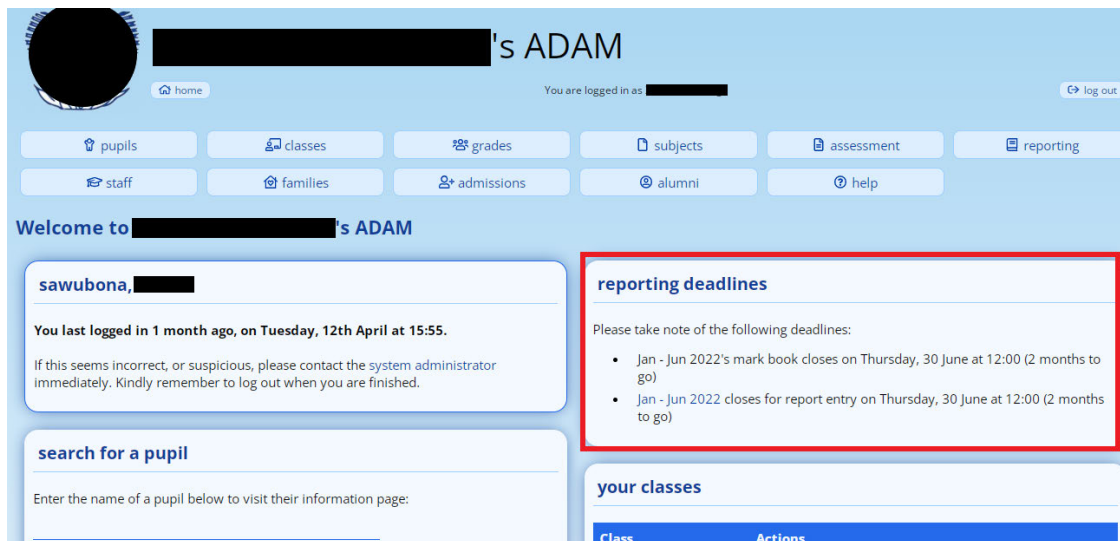
One daily duty that teachers did was student registration. They were tasked to check student attendance in their assigned classes and then feed the information onto ADAM. I probed Joan (after she had told me about information keeping) on how else was ADAM important in the school and she said that: "Class teachers check for absentees every morning and post it on ADAM together with reasons why a particular student is not in school." Tsitsi (IB2 student) confirmed this fact by saying: "We also use ADAM. I can directly report to my class teacher if I am not feeling well and cannot make it to school or if I am going to be late because of a doctor's appointment."

More information gathered on information keeping with reference to ADAM was exemplified by Angela who talked about ADAM on the question on the extent of ICT integration in the school. In this case she highlighted how ADAM was critical in helping teachers meet deadlines with report cards.

Deadlines are very important to meet here and the information will be there on ADAM. If you don't enter your report cards by the stipulated time, ADAM has a cut-off time and you will be in trouble. There is nothing you can do. Another thing is that what you enter on ADAM is final. You cannot change it. The IT centre reminds teachers about deadlines but ADAM will tell you too for instance that its now 3 days to go, 2 hours to go and when it cuts off, it cuts off. You will try to log in and it won't work. It just cuts off.

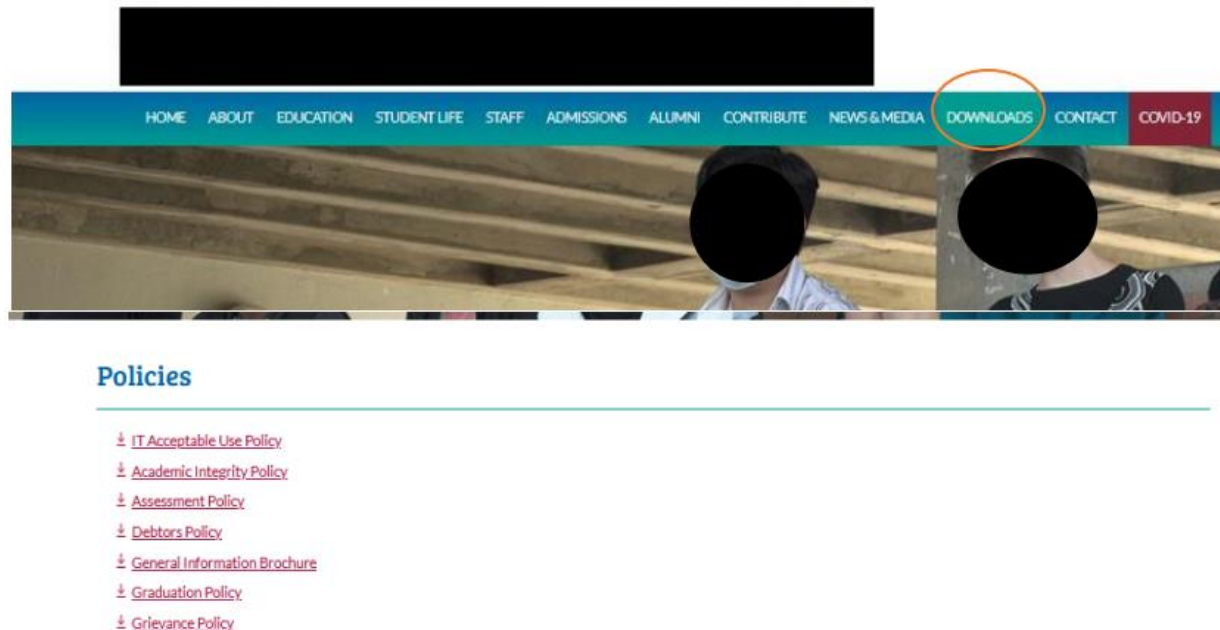
Figure 5.9 shows (a depiction in the red box) an example on reporting deadlines as shown on ADAM.

**Figure 5.9** Reporting Deadlines on ADAM



The school website was another place where information was kept and presented to interested parties. When I visited the website, I noticed that I could download material that was relevant to my study. For example, Figure 5.10 shows an icon for downloads (in red) and a list of policies that could be downloaded from the website.

**Figure 5.10** School Website Showing Some Downloadable Documents



#### **5.6.4 ICT Integration in School Communication**

Communication was very important to foster fluidity in school functioning. Through email, ADAM, the school website and WhatsApp, the participants were able to relay information as fast as needed. Email was a commonly used tool at Herons and all school members had a school-based email address that made communication specific and easier. Emailing was officially used to communicate to IBO and CAIE; parents; colleagues in the national and international community; Ministry of Education and Training; service providers and suppliers; and the general public to name a few.

The responses from the participants showed that Herons adopted modernity in communication as well in other operations. In response to how else ICT was important in school operations Nash said "Everything we do is electronic – email for communication and so on." John said: "I don't want unnecessary knocks on my door when they can email." In the same vein Senzo said that: "I might also mention the basic things we do daily like emailing, listening to music or online radio while we mark and so on." Amos responded that:

We use email to correspond with relevant parties for seminars and conferences. There are professional development courses that are offered by IB and Cambridge that can be done at any level. So, it's like you can look into whenever IB is offering a workshop, then you can put your name up and then the IB coordinator will then link you up for that course. I am saying it is communicated through email. You receive all these notifications through email and you respond accordingly.

In the question of how ICT was used in other functions, the principal said that: "Department heads and subject coordinators can directly communicate with IB or Cambridge on matters concerning the curriculum."

Posting on the website was another formal way of communication through which information was passed to parents, Herons community and interested parties. School parents had access to ADAM as well and could get important updates from the school. On the school website, the most important information about the school like curriculum offered, school history, service, was presented and besides being informative, the website served as a marketing and advertising platform for the school. I asked John about how he used ICT for administrative functions and he recounted that:

We have a school website that I must use to post newsletters and other items on a weekly basis to inform various stakeholders on how things have happened during the week. Other people also post various things too (like the IT people). As management we get so much feedback from the newsletters. I normally ask for questions at the end of newsletters so that stakeholders can interact with us so that our communication is helpful and we can get help in improving things. The website tells anyone who visits it all the important details about the school from its inception to now.

In support of posting on the website; Arianna (the ICT coordinator) communicated that they (IT department) maintained, updated it and posted relevant information. Therefore, she supported the principal's view of making school information available.

WhatsApp was commonly used too at Herons. Faith and Ruth mentioned that they used WhatsApp to send messages to the IT department. On how else she used ICT in her administrative

functions, Joan highlighted that the school also took advantage of WhatsApp groups because of the ubiquity of smartphone accessibility:

We use a lot of WhatsApp groups as well because all the community programmes I run take place out of campus so we need to find out where and what's happening with students' meetings where they are seeing people. I work with students and teachers in organising school events like the XYZ day and the Herons' Day to come up with the event activities and participants and WhatsApp is very handy. Communication with people in places to be visited is done through phone calls, email and WhatsApp.

Communication was very important at Herons as the data shows that the school thrived to make it effective. Through email and the school website, communication was made formal but WhatsApp was also used for quick relaying of information.

This section wholly presented data on the first research question on how an international high school enacted ICT integration in school operations. As presented, ICT was enacted in facilitating that computerised ways of teaching and learning; keeping information and communication were enacted.

## **5.7 The Influence of School Leadership**

The school leadership influenced ICT integration through creating an ICT school vision and ICT policy, acquiring ICT resources, ICT training and delegating ICT responsibilities and decision making. This section dwells on different aspects that the principal and other recognised members of authority did to influence ICT integration for school purposes. These different ways of influence promoted smooth enactment of ICT integration.

### **5.7.1 Formulation of ICT School Vision**

In investigating how the school leadership influenced ICT integration, it was discovered that the creation of ICT vision was one of the instrumental factors. All the participants understood that their international high school valued and incorporated ICT in their daily approach to duties. All participants mentioned that their school prepared students for international tertiary education

and connected tertiary education with a higher level of ICT integration. Thus, through school vision, all stakeholders were aware of strategic goals, ICT planning and the organisation of ICT integration in pursuing goals that fostered students' holistic development and helped them do their work. The participants were asked what the school vision was for ICT integration. The responses obtained zeroed on ICT integration in teaching and learning. Citing John, the vision concerning ICT integration was clarified in this way:

The vision with technology here is that the school strives to provide decent ICT infrastructure and tools for ICT especially computers and internet. Connected to that, members of staff and students need to have computer literacy to use the tools so that teaching involves computers and everyone fits in a technology-based world.

Similarly, Nash stated that:

The modern world has technology and the moment students come into the school, they must operate with technology. Our students must become confident users of ICT. The mission and vision are based on the responsibility and obligation the school has in educating children from different nations and backgrounds and obviously using modern methods.

The present ICT tools and infrastructure were made available based on a deliberate plan to create a modern environment with requisite resources and knowledge. All the participants agreed with the precept of the school vision. Mfundo (Music department HOD) and Ruth (the Business Studies teacher) had similar views to the principal's answer. They responded to what the school's ICT vision in the following manner. Mfundo mentioned that:

You can see the attempts and evidence (from the resources) to involve technology and expose the students to what is the norm these days. The school vision for that is vividly glaring. They must not lack in technology skills when every world system demands that.

Ruth concurred with Mfundo's when she said:

What I like about this school is that it has all the resources I need for my teaching. The vision for establishing this school is to lay a solid foundation for students to be responsible, have necessary skills and knowledge. The vision for ICT integration is



linked to this vision in that we must have ICT resources that help the teaching process and benefit students in academic growth.

Tsitsi was a student at Herons for six years and gave a description of ICT vision based on what she had witnessed over time:

Technology changes and here exposure to ICT starts from the moment you become a student. You work with ADAM and email and sometimes do homework on a computer. This has not changed over time. But now at IB, I even have a laptop for myself. So the school prizes technology and I guess they will want to maintain the vision in that way so that our learning is linked to technology.

Vision is realised through planning and action. The data showed that ICT decisions made at management level showed planning and enactment relevant to the school context.

### **5.7.2 Devising the ICT Policy**

Herons had an ICT policy that regulated ICT integration. I asked participants whether the school had an ICT integration policy and if they could give me a brief outline of the policy. Seven participants acknowledged the presence of an ICT policy. Nonetheless, the information established from most of these participants was that it was there, but they were not sure about its contents. For example, Amos says, "Yes, there is. I don't have it with me, but it is around safety, privacy, confidentiality and honesty. Tsitsi said, "The school has so many policies. I guess it's on the school website, but I have never seen it". Senzo remarked, "There is a policy for ICT use, but we rarely need to refer to it daily. It was made to educate mostly students on safety and healthy habits on the internet". Nash thought, "Yes, there is an ICT policy. I am trying to think of what it's called. It would probably be on our school website." Gary gave more detail about the ICT policy:

There is an ICT policy, and it's on the website. It's all-inclusive. Meaning we were all consulted when coming up with the policy. We never really have to refer to it unless there is cyberbullying. You know when students are abusing ICT.

The principal gave a more sufficing description of the policy in this manner:

Policy governs this school in everything we do. Policies control and regulate how things are done. We have got a policy on ICT use that is acceptable use. It's just the everyday ICT use in education. It is about information that everyone needs. We create awareness about the goodness of ICT but also need to inform them of possible dangers and misconducts that arise from ICT use. This school is about growing young people into desirable adults that fit the modern world. The modern world has technology and the moment the students come into the school, they must operate with technology. But they must know what is acceptable and what is not.

Participants' submissions pointed to the presence of an ICT policy that they rarely used and was somewhat irrelevant to their daily ICT integration. I downloaded the policy from John's email. It is entitled 'IT acceptable use policy' and it was produced to guide stakeholders on ICT use in the school. Figure 5.11 shows the introductory part of this policy.

**Figure 5.11** *Heron's IT policy's Introduction*



## **POLICY: IT ACCEPTABLE USE POLICY**

### **Introduction**

1. The purpose of this document is to ensure that all users (employees, contractors, volunteers, students, visitors, etc.) of [REDACTED] computing facilities are aware of [REDACTED]'s policies relating to their use. Effective and proper use of information technology is fundamental to the successful and efficient running of [REDACTED]. However, misuse of information technology - in particular misuse of e-mail and access to the Internet - exposes [REDACTED] to liability and is a drain on time and money. It is critical that all users read and understand this document and make themselves aware of the risks and exposure involved.
2. It is the responsibility of all users of [REDACTED] computing facilities to be aware of and follow all [REDACTED] IT policies and guidelines and to seek advice in case of doubt.
3. This policy may be updated or supplemented by specific standards or procedures to reflect further developments in technology or legislation or other relevant changes.
4. [REDACTED] encourages the use of School computing facilities for the mutual benefit of [REDACTED] and its employees and pupils. Similarly the regulations that constitute this policy seek to provide for the mutual protection of [REDACTED] and the rights of its employees and students.
5. [REDACTED] staff should not unnecessarily store sensitive pupil information on personal devices.

This introduction states that all users of ICT must follow guidelines and understand that it was produced for the mutual benefit of everyone in the school. The rest of the policy continued with sub-sections that gave guidelines on the use of computing facilities, private use of ICT; legislation and disciplinary procedures; incident reporting and an appendix that showed examples of behaviours which resulted in disciplinary action being taken. An analysis of this policy shows that it had nothing written down on how the school was to enforce ICT integration in the curriculum. This probably explains this statement by the principal from a question on how he ensured effective ICT integration, especially in the curriculum:

I think ICT is an assist and not an end in itself. I do not agree with the idea that good ICT means excellent education at all. I think you can have an excellent education without ICT whatsoever. Education was excellent 40 years ago when there was no ICT anyway. I think it is simply a tool towards a goal. Every teacher has different teaching styles and I do not enforce use of technology in their teaching. I think you can get a very boring teacher who uses PowerPoint and technology all the time. I do not think knowledge equals interesting. I still think it depends on the human being. I think you can get a traditional teacher and I will tell you this: we have a traditional teacher here who is one of the most popular teachers in the school. And has nothing to do with the laptop. Technology does not equal excellence in education. It does not mean interesting and does not mean creativity

It can be inferred from these expositions that John believed in the school providing the ICT resources and professional development and then giving the teachers a choice as long as students were taught, syllabi were covered, and they all passed. In this case, while ICT was seen to be of great value, John was not bothered that some teachers did not fully utilise it in their teaching.

Whilst enforcement of ICT integration was not part of the policy, it revealed significant aspects that influenced ICT integration. For example, who manages the ICT resources, how they are acquired, internet usage and online teaching and learning to name a few. These aspects and how the policy fits in will be discussed in the coming sections.

An ICT policy ensures that technical aspects are regulated. Analysis of policy showed that it was developed to help all users at Herons to know acceptable conduct with ICT. The fact that

participants knew a little about it possibly led to them not fully understanding the school expectations on ICT integration.

### **5.7.3 Acquiring ICT Resources**

This theme provides an understanding that school leaders influenced ICT integration through a process of providing ICT resources. The data showed that the school planned ICT integration for school operations and ICT provision proved crucial for life at Herons. This importance was seen through how ICT resources and infrastructure at the school were set up and acquired. An IT centre had ICT resources like desktop and laptop computers, projectors and interactive whiteboards. From the IT centre, the IT technicians operated and networked the whole school. The principal summarised the resources in a question that asked which ICT tools and resources were available in the school.

We have an IT centre with computers for all students to use for learning and research. The computers have an internet connection. Every classroom has a projector, a sound system, and internet connections so they can use videos, PowerPoint, and all sorts of mechanisms. We have got five classrooms with smart boards in them. They are not commonly used. To my knowledge, two teachers make use of them. Our approach is that if a teacher is using technology and wants to use it, we are very willing to invest in it. But they got to show that they are using the resources. We don't insist that students have laptops; indeed, in the lower forms, they should not. At the IB level, it's highly recommended that they have a laptop computer. And for those students on scholarship, we provide a laptop that will be part of the scholarship offer.

In collaboration, Amos said: "Computers obviously and the internet. The biggest investment in ICT in this school is having an IT centre which houses the computers, other hardware and software resources that students can use."

I asked Arianna (the ICT coordinator) about the distribution of ICT in the school, and she thought that:

The classrooms have internet. They even have Wi-Fi. The classrooms have Wi-Fi for teachers so the signals in the classrooms is only accessible to teachers and the reason

being the teachers' offices are up against the classrooms and so should they want to work between classes they should be able to work and we also have cables in place for the teachers because we want them to have a full day provision. We have backflips to secure the teachers and protect them from students who can hack the Wi-Fi passwords.

ICT resourcing was seen at Herons in the way in which all teachers and IB students were afforded laptop computers because of the needs these stakeholders had for teaching, planning, assessment, management, learning and research. Senzo declared that: "For me, the school provides me with every ICT resource that I need to be able to execute my duty." Similarly, Ruth responded: "What I like about this school is that it has all the resources I need for my teaching". Contrary to this, on the question of challenges faced, Mfundo mentioned that his Music department lacked enough and newer computers to fit their functions in producing music:

There are six computers and we could do with twenty-five, you know. I mean, that would be ideal. So, in the lower school the students in F1 and F2 are big classes of about twenty-five students. They don't get to use technology because of the numbers against the sort of machines ratio means it's almost impossible. It is always difficult also because the machines are too old to compete and they're not fast enough. They haven't got enough processing power. So, we have a limited range of the actual instrumental sounds that we can use.

Similarly, in response to the same question, Gary (Geography teacher) added, "We have basic forms of technological resources here, and a school of such status can definitely do better than this." The narratives by Mfundo and Gary show that whilst the school tried to provide ICT resources, in some areas, they were not adequate according to certain people's needs compared with others.

In terms of the internet, the school stayed connected online, mainly by contracting three different internet providers so that if one failed, they could try the others. However, some participants found the internet limiting and it frustrated their integration. Joan said, "I think one of the biggest frustrations here is the internet itself and how in Eswatini it is not as fast as we would like it to be." She was answering a question on the challenges faced in enacting ICT integration. Mfundo said, "Internet connections are not always great." Amos said:

We have challenges with the Internet resource just like everyone else in Eswatini. At times you really cannot get the best quality you want for you to be able to deliver, and that has been a challenge for students to do their work at different times.

On the same question, Gary said: "The challenges have to do with ICT being sufficient for 600 students. So, on average, I think close to 2000 devices are connected to our internet network and this congests the internet I think. So, I have my laptop, computer, phone, and students will have their own devices too".

Associated with acquiring ICT resources and infrastructure is the fact that the school employed an ICT coordinator who led a team of ICT technicians. These professionals managed the IT centre and all the school ICT resources. They prepared the IT laboratories and work stations every morning to ensure that all ICT tools were working. They also helped install programmes; fix faulty gadgets; provide training and professional development; and give advice and support to all stakeholders. Students and teachers could easily access information by preparing different kinds of drives to save data from notes to past examination papers. I asked Arianna the question about how the IT department was organised, and she revealed that:

Well, I don't work alone in this department. We are a team that strives to make people happy and supported in using technology. The IT department is divided according to responsibility. Five guys work in the centre with me. There is the IT centre manager, server administrator, network administrator, ICT administrator and the general maintenance guy who assist with conduits and making holes through walls and things like that. There are also two teachers, and at the moment two students and the sports coach. There is always someone in the community who is studying IT on their weekends or evenings and they come and ask if they can be of assistance here whilst they are between classes or jobs and see what happens in the ICT lab.

There is no ICT integration that is not directly tied to providing the essential resources. Whilst a few participants did not have satisfactory provisions, most of the data presented in this sub-section showed satisfaction with what was there. Resource availability directly connects to ICT integration; ICT training is another area for consideration because it equips stakeholders with know-how.

#### 5.7.4 Provision of ICT Training

By necessitating the inculcation of necessary skills in staff members, training is another way the school leaders influenced ICT integration for school purposes. All participants, save for the students, mentioned that Herons offered training opportunities, and teachers developed crucial skills that helped them or their colleagues in ICT integration. This training was organised by the IT department and the school leadership. In this theme, most answers are in response to how the school upskilled teachers for effective ICT integration. The principal and the deputy principal cited that teachers received regular training, which Arianna (the ICT coordinator) attested that it was twice a term on average. New students (and teachers) got an induction week to familiarise them with the ICT tools at the school. They get an email address, and training on using ADAM. On how the school trained teachers for effective ICT integration, the deputy principal responded like this:

The IT department is constantly offering training to teachers so that they can better their technology skills. The school has necessitated that opportunities are open for the teacher to go and say, 'look I want to say use Google Classes, how do I get started?'

In one way, John's approach to ICT professional development was trying to foster ICT skills in others and in another hoping that teachers could educate themselves using the available resources. These statements on the same question revealed his stance:

If there is a teacher who says they want to go do a course or training for something we support that. If there's general training for everyone, there must be interest from the staff. At times we want them to learn certain software for use in the school and we organise that. However, in terms of teacher training - well times have changed. Teachers cannot always wait for the IT director or the school to train them. There is the web. With other things, they must learn on their own. I was never trained on computer literacy. We have got a few efficiency issues on ADAM but I was never trained on it. You learn with the device.

Some teachers appreciated the training they got at the school. Joan (the CAS HOD) talked about ICT training in the school when I asked her to elaborate more on how training was organised. She specifically said that:

The school management has always prized ICT training. You will find that all of our teachers have done some kind of ICT training in the school. When I arrived here, I did various courses and sessions on Microsoft Excel. Many voluntary courses were offered and any one could sign up and get the training.

The school had an obligation to offer training in ICT use because of various ICT tools, and the expectations teachers had in daily duties. Hence, it was essential to ask the ICT coordinator if she offered ICT training to staff members and how it was arranged. Her response was:

We organise training for teachers. Although you do not expect anyone not to know how to use a computer, you can find that some have basic typing and printing knowledge, yet there is a lot to learn on MS Word. Then there are other skills that everyone must know, like connecting laptops to projectors and using PowerPoint, for example. New teachers need to learn about ADAM and be inducted in other ways. It is almost the same with new students. The first three weeks of the first term are usually hectic, getting students a school email address and profile and teaching them how to use a computer.

I probed Arianna on how teachers responded to this training, and she elaborated that teachers usually got busy and that, at times, it was not as frequent as they wanted it to be. An exciting assertion was that some teachers did not appreciate the sessions because they exposed them as not ICT competent and did not want their colleagues to see that. She added that:

When I organise teachers' classes, they are not usually received well. The timing is tricky because they have many roles, and getting them into a class is really difficult. But they do come individually or in groups. Sometimes they get confident with me, and I say, sit over there. I will work here, and you will work on your device. If there is an error like this, you fix it like this. So, I always try to empower someone because I do not want to run out to them every 15 minutes to go and fix the problem for them and they also don't want to look stupid and ask about the same thing.

I also asked Arianna about the challenges she usually faced in training. In response, she commented that in the month preceding the lockdown, she had tried to set up training for Google Classroom training but kept on failing to get the right opportunity because of time constraints.



Teachers interviewed during the lockdown reported the most remarkable influence from ICT training. These responses were still on the question of how the school upskilled teachers for effective ICT integration. The responses naturally mentioned more about teachers' training to teach online using Google Classroom. When the school took the initiative to continue online in early April 2020, teachers (and students) needed training on using Zoom for meetings, Google Classrooms and other platforms. Again, this was orchestrated by the IT department through ADAM, the school website, and Zoom itself. I failed to interview Arianna about training during the lockdown because of her busy schedule. However, I asked Amos how the training was organised, and he narrated that:

I can say that it was done for four days (prior to us starting online teaching) and besides that, teachers could have private sessions with the IT Director. The way this training was done was that she uploaded documents and videos that introduced us on how to use Google Classroom and Zoom through ADAM and the school website. Once teachers got an idea on how to use Zoom, we were invited to meetings to familiarise ourselves with how it worked and get hints on Google Classroom too.

Ruth confirmed receiving training in this statement:

Now with me, the training I have had is on the use of Google Classroom and some of the software that we are using during online teaching but not of the interactive whiteboard. With online learning training, we had a number of sessions and workshops for days, just to be taught how to go about it. So, the IT department organises training and in the source material. In addition to that when we are faced with challenges, we communicate with them and if it is a challenge that affects everyone they organise something, even if it's a video which they may upload in our group so that everyone gets to have an idea of how to go about it.

More exposition on the training was explained and supported by these statements from Faith:

The IT department and the administration show us how things work. The IT department helped us learn how to use online teaching (especially the Google Classroom). They normally show us by sending us a short video on how something works. Like when people have a problem in doing something. You can send the IT people a message. So,

they make a short video and post it to our teacher group. We look at it on how to do this particular task.

The views of these three participants revealed that training was integral to the school's need to promote ICT use, especially when it was the only way teaching and learning could be done. Contrary to what the others said about training, Mfundo commented that there was little training that their department received in terms of software used in producing music. He said that:

The school will offer training in terms of various technology things. Obviously, that has been exacerbated by the pandemic and the way in which we have needed to learn many things about online teaching and learning. But in terms of music, very little training is done. We do it ourselves. We think about music and teach ourselves what we need to do. Like I have said, I have learned to teach with Google Flat during the lockdown.

In this case, the IT department was also limited in what they could do for all participants. The influence of leadership through training contributed to ICT integration by equipping the participants in critical areas.

### **5.7.5 Delegating ICT Responsibilities and Decision-Making**

Heron's leaders influenced ICT integration by spreading ICT responsibilities and decision-making in the school. ICT integration in school purposes at Heron's showed that ICT resources were used in different ways that individuals and the school found fit in executing duties and contributing to the school's vision with ICT. Because of many departments, different stakeholder needs and ICT competency levels, decisions on ICT integration were taken at school leadership, departmental and individual levels. The school leadership was responsible for ICT resource procurement, organised training opportunities and developed futuristic plans. In particular, the ICT coordinator created school plans mostly in ICT resource set-up and professional development. For example, the planning of expanding internet connection to teacher homes and offices and how Wi-Fi was distributed at the school. The principal and deputy revelations were that the day-to-day running of ICT integration was left mainly to the ICT coordinator and concerned teachers. This information was obtained by questioning whether the school had any leadership structure for ICT integration, what the school's organogram looked like concerning ICT integration and who was

responsible for what regarding ICT integration. In this case, John was forthcoming with this information:

The people there (the IT department) see to it that computers and other gadgets are working properly. Their feedback also helps us plan and budget as well. I don't have much to do with day to day technology needs in the school. The IT director and her department are the best people to address all IT related responsibilities.

A similar understanding was obtained from Nash in response to the school's ICT leadership:

The IT director is hands-on with all IT issues in the school and so it is safe to say that there is what you are calling ICT integration leadership from that end. She is instrumental in the school acquiring gadgets and making decisions so as to be sure that everything is working smoothly.

Senzo deliberated that ICT integration leadership was also delegated to others for informed guidance. Senzo and Nash voiced out that the IT centre was responsible for ICT integration in the school because most communication about ICT came from the department. Teachers interacted with the ICT coordinator and their HODs more on ICT matters than with the principal or deputy principals. He voiced that:

The IT department is a team of people who have been hired to ensure that all ICT facilities are always working. They have the responsibility of deciding the best way of tackling problems we might have. They know the programmes the school needs. For example, what can be installed and what cannot. What antivirus to buy and so on.

The perspective brought forth by the principal, deputy principal and Senzo was that the school could not function in ICT matters without the assistance of the IT department. I asked Arianna about her and the department's responsibilities in the IT centre, and she recounted that:

The school management entrusts us with the operation of technology in the school. As the leader in this department, I allocate duties according to our numbers and capabilities. We deal with technical issues that a lay person may not understand. The school management trusts our judgement when we make decisions and change things. Just

recently we upgraded. We found a way of making Wi-Fi faster for the teachers using existing infrastructure. And we were in the middle of that when a big storm hit last week (and we had just recovered from a previous one). We had already experienced three in a couple of weeks. What we do is we make sure that we are insured. Secondly, we have decided to buy the CISCO devices which are one of the best devices out there. It's our job to get the teachers functioning. We get all these devices to them and make sure that there is no issue with internet connectivity.

She then added that:

Thunderstorms come with a lot of damage. We need to have the ICT gadgets insured. As soon as we buy any gadget, we need to send the serial numbers to the insurance agents. To make sure that they are on the list of things that are insured. We also use devices that can be repairable than always buying a new one, and at times warranty helps us.

The ICT policy regulated decision-making by the IT department. Figure 5.12 shows an excerpt from the policy considering the relevant areas. For example, point 6 in Figure 5.12 shows that ICT facilities were managed by the IT department concurring with the notions highlighted that decision-making was delegated to the department. Decision-making on ICT tools was again determined by consultations with and the approval of the IT department.

**Figure 5.12** *An Excerpt from the IT Policy on Computing Facilities*

**Computing facilities**

- 6. Access to school computing facilities is managed by Technical Support. Use of any of [redacted] computing facilities is at the discretion of [redacted].
- 7. Definition: The phrase 'Computing Facilities' as used in this policy shall be interpreted as including any computer hardware or software owned or operated by [redacted] and any allocation of time, memory, disk space or other measure of space on any of [redacted] hardware, software or networks.
- 9. Desktop PCs: are a critical asset to [redacted] and must be managed carefully to maintain security, data integrity and efficiency. Users must consult Technical Support before installing non-standard software on computers managed by Technical Support as a Desktop PC. For clarification of a machine's status as a 'Desktop PC' or what software is permitted please consult Technical Support.
- 14. Software: Only software properly purchased and/or approved by Technical Support may be used on School hardware, except in certain circumstances.

*Note.* The figure does not have chronological numbering to show that the policy items shown were the most relevant to the theme under discussion and were taken as they appear in the policy document. The policy's term 'Technical Support' refers to the IT department staff.

I asked Arianna about a suggestion box I saw in the IT centre. She highlighted that she believed that in running the IT centre, they needed input from everyone that used the centre, and ideas were welcome. Figure 5.13 shows the suggestion box.

**Figure 5.13** *A Suggestion box in the IT Centre*



Students, members of staff and visitors to the centre were welcome to place their suggestions which the IT department read and helped them evaluate their service.

The data collected also showed that school departments and teachers were given the latitude to decide what they wanted to do with ICT and how best it was as a tool that met their needs. Then teachers and students were at liberty to ask for extra ICT resources, which they could bring to the attention of the ICT coordinator or school leadership through their HODs or subject coordinator. When I asked Angela how the school ensures that ICT integration leads to effective teaching and learning in the teaching process, she explained: "The head of the department gives us the latitude to use ICT as we see fit. The whole administration is very supportive." Amos responded similarly:

The school does allow autonomy to individuals, teams or departments to look at what sort of issues they want to address with technology. It is the department that must agree on what they need and then the HOD takes it up to the management. You obviously see that our needs in History are different from the needs of Accounts or Science.

A typical example of this latitude was the allowance of the Mathematics department to use software like MyiMaths across the whole school. The responses on autonomy by the two teachers seemed to favour how they preferred integrating ICT in their functions.

Delegation of ICT responsibilities and decision-making was a leadership aspect of allowing people to come up with solutions to problems and issues they needed to address. The delegation provided opportunities for shared leadership, empowerment and experimentation. Other areas discussed in this section were equally crucial in that ICT vision and policing provided a basis for operation and guidelines to follow. These two aspects led to understanding why the school acquired specific ICT resources and provided training.

## **5.8 Justifications for ICT Integration in School Operations**

In this section justifications are presented to come up with a fuller understanding of why the school enacted ICT integration in school operations in the way it did. The justifications for ICT integration in school operations were rooted in the school responding to curriculum requirements, and the influence that school associations had on the school. They were also based on dependence on ICT for effectiveness and efficiency in school operations.

### 5.8.1 ICT Integration in Meeting Curriculum Requirements

ICT arguably had a significant impact on the school's curriculum, and meeting curriculum requirements was one of the main reasons for ICT integration. The evidence from the school website, participants and field notes showed ICT integration in curriculum engagements. The definition of curriculum in Chapter 2 was that it involves all activities that take place under the guidance of a school. In this case, students had a wide choice of subjects at IGCSE and IB depending on their junior-level foundation, strengths and future aspirations. Co-curricular and extra-curricular activities then complemented the mainstream subjects.

In a question on how teachers integrate ICT in teaching the various subjects offered in the school, Nash commented: "The aim of our school curriculum is to provide a broad-based education and technology is the in-thing these days so that our students will not have any limitations in the future." Thus, curriculum requirements were partially met by an irrefutable advantage of ICT integration created at the school. On the same question, four teachers mentioned that ICT integration was a curriculum requirement in the syllabi documents, and teachers had to comply. For example, Senzo declared that: "Although I enjoy using ICT, the syllabus actually states that students should choose and use ICT tools such as graphic display calculators, graphing and other software to improve their understanding. So, ICT is a syllabus requirement." Gary gave a differing response:

Yes, technology is important but different teachers have different approaches as long as they cover the syllabus. For example, when I am doing Geography coursework with IB students, I ask them to bring their laptop computers. From time to time I ask them to do presentations using PowerPoint. All our classrooms have projectors but we are very basic compared to other schools. I have always given students presentation tasks ever since I started teaching and over the years, technology has taken over. I also want my students to be confident with technology so I ask them to research from different websites.

As mentioned earlier, Music was offered at Herons as an examinable subject. The implication was that compositions, practices and producing examinable material depended on ICT tools. I asked Mfundo (the Music HOD) how do teachers integrate ICT in teaching the various

subjects offered in the school? His response outlined details that involved the use of different software. This narration outlines the points:

In our department, Music is a taught subject in the timetable but can also be regarded as an extra-curricular activity. In the taught curriculum, students come to some point experience learning music through technology. IB and IGCSE students must compose and produce a musical piece. All of the music is created using technology and then sent away as the technological package for assessment. So, if we want to write music notes to make it into a stave, we're using this software called Sibelius. We also use Logic Pro as the sequencing software for students to explore more sorts of popular genres, more music that needs sequencing rather than notating.

Critical data connected to ICT integration in meeting curriculum demands were exposed through how community service was incorporated into the school curriculum. All IB students were meant to do and fully complete the stipulated CAS hours that represented the community service aspect. All teachers were expected to guide students in forming CAS projects based on awareness of contemporary issues and student interests. Activities from the Herons school website included students' visits to hospices, pre-schools, and care point centres to cook for the elderly and children. They also visited government hospitals; career support initiatives, animal welfare and rabies education; eye testing projects and environment-related activities. Regarding the question: To what extent do you use the ICT resources available in your school in light of the curriculum demands, Joan (CAS HOD) offered this explanation:

Community service varies from visits to social centres and schools to teaching certain skills, like swimming, first aid in primary schools around Eswatini. For most projects they do, they have to do some research on the internet. They may be working on a literacy programme for example. In the field, technology is used for taking pictures, recording audios and videos of events. When students get back on campus they need to transcribe audios, upload and download stuff and also back-up, store and retrieve information using different ICT devices.



Joan explained that students (with the help of their teachers) could develop ideas on what they wished to do as a club activity or project and have the support of the school. I probed Joan to elaborate on how exactly the internet was used, and she exposed that:

There is a group working in my room right now on traffic awareness for children in primary schools. They have to use Google to look for information, and better ways of presenting stuff. In their case, they also need to go teach the primary school learners on how to safely use public roads around the city. Remember that CAS is a diploma requirement and hence it is partially fulfilled with technology.

Co and extra-curricular activities are important in the education system. At Herons, their existence was hinged on ICT, creating many opportunities that students and teachers exploited for diversification. Students with teacher guidance, used the web and other ICT resources to develop relevant clubs and methods of contributing to school activities like fundraising for specific projects; career guidance, and creating educational content and podcasts. The question on how else ICT was important was answered succinctly by participants who mentioned co-curricular activities like Tsitsi (IB student) and Faith, (the French teacher). Tsitsi revealed that she belonged to a club that raised funds for educating Swazi (a name used to refer to Eswatini aspects) children at Herons. This group was composed of students, teachers, parents and alumni. It used social media to increase global and national awareness on scholarships and to reach out to well-wishers who could assist. The importance of social media was apparent in her comment:

Having international interactions (using social media) with people from all around the world has improved my understanding of life and prepared me to prepare for tertiary education. We must all have clubs or outside-class activities. I am in this club because I enjoy humanitarian work and will do a degree related to that. We communicate with the school alumni (e-mail) and encourage them to donate - say a minimum of E1500.00, and they get an engraved glass brick as a token of appreciation and recognition.

Faith's response revealed how extra-curricular activities come about and how her activity uses the internet:

Technology helps us meet both curricular and co-curricular requirements. At the beginning of the year, students should choose a club or sport to do. Teachers sort of

market the activities they offer and students must have a choice list of three activities but they must select one. I like drama and art and with students we can use the internet to search for resources in performance and developing drama skills.

Participants' responses showed that they understood the curricular expectations from their syllabi and the school. As a result, ICT was then used to meet the different purposes they intended.

### **5.8.2 Meeting Expectations of the School's Associations**

This theme discusses how different school associations influenced ICT integration depending on how they were connected to the school and how this expectation was also a reason for enacting ICT the way it was done. Stakeholders like parents, funders/donors, IBO, CAIE, and the XYZ organisation had expectations of ICT integration at Herons. ICT resource availability had a bearing on ICT integration, and some of the resources were provided by well-wishers. In response to a question on how parents and other organisations were involved in supporting ICT integration in the school, John remarked that:

Our school has ties and associations which are influential for our survival and in a way influence technology provision. Connected to that, we have an advancement office here that is responsible for organising funding from international organisations. This funding is mostly used to provide scholarships but can also be used for ICT resourcing.

Belonging to an international organisation of schools and having sister schools in first-world countries was another push factor for ICT integration in the school. CAIE and IBO curricula specify preferred approaches to teaching and learning that schools need to consider. A question was asked about the motive behind offering international curricular IB and IGCSE rather than following the Eswatini General Certificate of Education like other schools. All participants mentioned 'international expectation and compliance' that was linked to belonging to XYZ and IBO, which both played crucial roles in defining the school's identity, culture and overall school climate. Angela gave this citation:

We are referred to as XYZ school more than an international school and this association influences the way everything is done. XYZ schools are known for having students from different backgrounds, economic and social status. As a school, we must have

conditions that favour students from rich backgrounds as well as poor families. I don't think schools of such nature can be big without having technology for its teachers and students.

Another revealing addition to the same question was captured from Nash, who similarly explained that:

We cannot really only offer a localised course because obviously we have students coming at different stages in the school and they also leave for different reasons. When they leave, they need to be able to enter into an international system and go back to a different system in the world. We need a curriculum that is recognised across the world and so at the lower level we have the IGCSE and at the higher level the IB diploma programme. So yes, our international curriculum is a base that is trying to reach our clients and make sure that we provide a service to them wherever they come from and wherever they are going. So, every effort is done to make sure the school can maintain or reach international standards.

The school benefitted through other relationships it formed with the community. In this case, impact came through stakeholders having a closer tie with the school. Such stakeholders involved parents, Parents School Association (PSA), funders, and alumni. These stakeholders financed school projects and development. In this case, the influence was the actual set-up or buying of ICT facilities. For example, two teachers, Senzo and Faith, talked about the PSA creating money-generating functions like golf tournaments for raising money that could be channeled to school needs, including ICT provision. This response from Senzo reveals the detail:

We have a Parents School Association (PSA) that is very active and influential. They can host for example a golf tournament somewhere to raise funds just to support some of the initiatives of the school. So, if you wanted to buy a subscription to some facility or to some software that you think might be useful for you in class, you write a requisition to the PSA. Then all our needs as teachers are weighed against the other requests (from other teachers) and again if you win, you are lucky if you do not.

Faith also gave a similar explanation that proved that schools need to form associations and said:

Our PSA is a strong one. They do a big fundraising for the school. And if we have, like a project to do in the school they can finance. The project can include work in the IT centre or anywhere else.

In answering a question on how parents and other organisations were involved in supporting ICT integration in the school, Gary and Amos gave responses that were connected to existing resources and the IT centre. Gary highlighted that:

Parents have a huge influence in this school. The IT centre used to be one big space and now it is divided into two. There was a donation that was put in to help us partition it. A couple of years ago one member of the school board used to pay for our internet and early this year one parent expressed interest to help us improve our technology.

Amos had this say:

I just know that the PSA does help in terms of any needy areas but that's not limited to IT, but it's open to any sort of need that might arise. So, they have influenced ICT integration in several ways, including even buying some of the hardware in the IT centre that I've heard about.

Information gathered from Arianna was that she had recently joined Herons but had heard about donations made by the PSA for the IT centre in terms of mostly computer donations. The data presented in this sub-section showed that schools do not exist as islands but need to foster and nurture beneficial relationships with individuals and organisations.

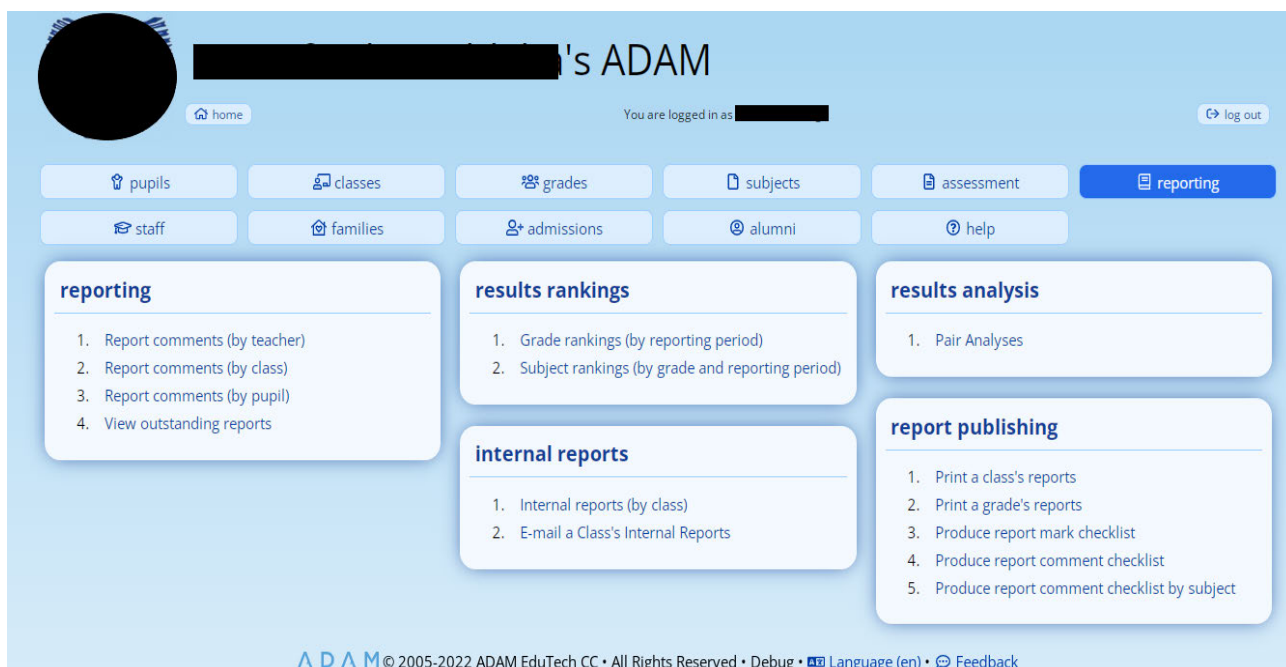
### **5.8.3 Dependence on ICT for Effectiveness in School Operations**

Another primary reason why Herons enacted ICT integration the way it did was related to the fact that participants depended on ICT for school-wide effectiveness in school operations. ICT is one of the modern tools that facilitate smooth school systems operation. Likewise, ICT proved to be a resource that the Herons community used and relied on for effectiveness in their various activities. As highlighted in previous sections, the school leadership provided ICT resources and promoted ICT integration through training and professional development. The rest of the school used their competency, innovation, knowledge and expertise to facilitate the ICT integration

process. For the participants, effectiveness in ICT integration came from knowing what to do, who to approach, with regards ICT. When I asked Solange, (IB student) why ICT was so important to her, she said, "We are always online. We use laptops and technology to do our assignments. In research, we share useful websites and links and other information from the internet. We depend on technology to be effective in all these aspects."

Effectiveness was seen in other functions as well. Some of the work the participants did could have been done without ICT, but technology has revolutionised mechanisms and created better advantages and benefits over time. For example, most schools in Eswatini do not have computerised report cards or SIMS to store information that modernised record keeping and produced quality at Herons. Figure 5.14 shows different aspects that teachers could do on reporting with ADAM.

**Figure 5.14** *Report Production Functions on ADAM*



Known traditions helped teachers and students get through daily functions. Besides processing the information in the reports, centralising the reports on ADAM facilitated easy access to information without teachers needing to ask it from individuals or look for it in a physical place.

Therefore, people could even work from home and at their convenience. All the participants agreed that communication was more accessible through email, ADAM and the school website. Angela responded to the question on how else she used ICT for school operations and cited that: "Email to communicate. We communicate over email more than by face to face and still have productive interactions."

ICT integration impacted effective teaching and learning. Students have different learning methods, and using various teaching methods, including incorporating ICT, did not only help their education but ensured that life-long skills were nurtured. Effectiveness depended on individuals and what worked best for them.

On the same question, Ruth described how ICT made her work effective and enjoyable in this description:

My students like the interactive whiteboard a lot. I do too and it makes my teaching effective. I make them play games and do quizzes with it. There is usually collaboration involved and they can work very well in teams. They will just touch and click in groups. They are so excited about these games and as a teacher, I can create my own games or simply get some of them online. The interactive whiteboard also works for me in that I use it as my big computer and I browse the internet and import resources using it. I can also record lessons, meaning that if for example there is a student who was absent during a lesson, they come in during lunch hour and access the lesson.

Another area for dependence on ICT for effectiveness was shown through having a school website. It was custom-made to present important information about the school. This information included the education offered at the school, student life, staff, alumni, news, projects, unique experiences, downloads and even an additional icon for COVID-19. I discovered that the website was vital for communication with the school community and other interested audiences. For example, Figure 5.15 shows a notice I found about TEDx that would get the attention of stakeholders interested in live talks or themes under discussion.

**Figure 5.15** *An Event Notice on the School Website*



#### TEDx 2020 is Here!

TEDx 2020 is already taking place and the presentations for this virtual event have now been uploaded. These talks are now available to view from TEDxUWCSA's virtual discussion programme on Zoom from 10am - 12pm based on the talks and the theme. The discussion programme and Zoom links can be accessed.

TEDx 2020 is already taking place and the presentations for this virtual event have now been uploaded. Our theme is 'The Butterfly Effect' and we have several speakers from *Heron's* who will each address the theme within their chosen topics ranging from direct impact in communities to a shift in perspectives. You can see an overview of the speakers and their talks [here](#). These talks are now available to view from TEDxUWCSA's [YouTube channel](#).

Tomorrow we will run a virtual discussion programme on Zoom from 10am - 12pm based on the talks and the theme. The discussion programme and Zoom links can be accessed [here](#).

This information was one of the many notices that would help the planners to organise and effectively relay information. Dependence on ICT for effectiveness in organisational operations is current in all sectors. The data presented showed that this was the case at Herons too.

### 5.8.4 Dependence on ICT for School Effective Operations

Efficiency is essential in any work done. Efficiency resulting from ICT integration at Herons was related to how tasks and duties could be done in less time and with minimal resources. For instance, efficient ways of getting information from the internet were required. The internet has all kinds of data, and other sources' credibility often needs to be verified. One way the school helped teachers was to promote using known websites. Known and trusted subscription websites were collectively shared so that there was accessible information that teachers would spend less time using Google searches. For example, I asked Angela to explain how efficiency was achieved with ICT in doing school operations, and she alluded to the fact that:

IB has many sites. Like IB thinking and IB home, where you find all relevant information. On those websites, you find everything like lesson plans, how to plan them, resources and so on. You basically find everything there. The school pays these subscriptions because they are trustworthy, verified and for the efficiency we need in teaching.

Linked to this quote was that the school created easy access to teaching material through the idea of shared drives. I discovered that the school utilised many designated Google drives from departmental to school-wide. Specifically, Ruth answered a question on how efficiency was achieved for school purposes with ICT. She mentioned that before the exam, the IT centre created

drives for revision which had revision notes and past examination papers and links would be sent to students to access these resources. Ruth added that:

The school has an efficient way of storing, retrieving and sharing information. You see, if I am a new teacher, they don't want me to start afresh. Like writing down how to plan a lesson. All the staff is there in shared drives and easily accessed. Everything you do, you put there. So, I am teaching a topic, I put my notes there. I am doing a lesson plan; I share it with all the teachers in the department teaching the subject. Now and the next 10 years they can still find it there. The idea is that you don't waste time making a PowerPoint that somebody has already made. You spend less time preparing than the actual teaching.

Ruth and Angela's responses showed school-wide effectiveness seen through ICT mechanisms in the school. Similarly, Senzo gave this response in line with efficiency:

We have departmental meetings every week on Mondays this year. We meet to discuss the week past and plan the week ahead. We discuss as teachers the achievements and failures. I always share what has worked successfully in my class and the other teacher would say, "No, I do not think Desmos is good for this. I think you can use GeoGebra for those sorts of things."

As seen through this chapter, the whole school depended on most of the functions being digitally supported. I asked the ICT coordinator how they managed to help meet different individual needs and problems. On this matter, she responded that:

This school is a busy place and we need to find efficient ways of doing things. We set up an ICT desk, which is an online reporting system for reporting problems that need attention like malfunctioning cables, gadgets and so on. Teachers do not need to flood the IT centre with complaints in that way. However, response and attention depends on the task at hand and the manpower available.

Some teachers found that software enriched their teaching or facilitated fast knowledge capture. An advantage was found from Senzo with regards to the MyiMaths software. It was revealed earlier that the software helped all Mathematics students get more practice, do homework



and individually test themselves. I asked him to describe how efficiency was achieved in teaching and learning using software, and he acknowledged that:

The MyiMaths website for example gives the students a chance to learn on their own. I am mentioning MyiMaths more because it is the one that all Mathematics students in the school do use from forms 1 to IB. The efficiency is determined in that students don't have to wait until the following morning to ask me how they can solve the quadratic equations for example. They log on to MyiMaths and choose that section on quadratic equations and then they'll be able to get a video. There will be a few questions that have been solved and then an exercise after practice. The programme then marks and students get feedback. If the student wants more information they can get more difficult questions level after level and they can repeat a question at one level.

In this regard, some of the teachers' functions were taken by the software and efficient teaching was promoted. Software used in Mathematics was an add-on benefit to teaching and concept development in learning. Still, another addition from Senzo was that MyiMaths solved the problem of students not doing their homework because they liked working on it. Parents could log onto the platform and monitor their children's work and progress.

In some instances, teachers relied on ICT programmes to perform other duties. Gary conducted workshops in the comfort of his office:

I am also a teacher trainer and a workshop leader for IB teachers in different parts of the world and we use different platforms for workshops. In my case, I can login and run a Geography workshop in real time and interact with people in Kenya or Brazil. One assignment I have been assigned to do by the IBO is to create and develop an online course for IB for running online workshops using WebEx (an online video conferencing platform).

According to Angela, other teachers found efficient ways to save time by using ADAM: "We use ADAM to manage and process students' marks. You can process data more easily and efficiently with ADAM compared to Excel. You can easily do rank orders, select the top ten, bottom five etc. and save time."

The data in this sub-section is about the school and the individuals involved in finding efficient ways of carrying out school operations based on ICT integration. Similarly, ICT integration was documented to lead to effectiveness in school operations and meeting curricular demands.

## **5.9 Chapter Summary**

This chapter presented the data from the case study in themes. The themes were organised to answer the research questions formulated in the first chapter. For the first question, ICT integration for school operations was seen through the significant functions of ICT in teaching and learning, keeping information and school communication. To answer the second question, it emerged from the data that the school leadership influenced ICT integration by creating a suitable ICT vision and policy and acquiring ICT resources. The school leaders recognised that staff members required ICT and appreciated autonomy in ICT integration through delegating ICT-related responsibilities and decision-making. The last section in this chapter was about the last question on the reasons that emanated from the data on why Herons enacted ICT integration the way it did. These justifications were that Herons integrated ICT to chiefly respond to curriculum requirements and comply with the influence of different associations and stakeholders. Lastly, the discussion focused on how the school depended on ICT for effectiveness in doing school operations as well as the consideration of efficiency. In the next chapter, findings and an ensuing discussion of the findings are presented.

## CHAPTER 6

### FINDINGS AND DISCUSSION

#### 6.1 Introduction

In the previous chapter, data collected from interviews, and documents, were presented in themes that answered the research questions. The last chapter presented raw data as obtained from the field. This chapter presents findings to show data synthesis, analysis, and inferences that go beyond mere data presentation. Themes generated in Chapter 5 are used (and in some instances modified) to present salient findings from the data. Assertions are incorporated to foreground the major points raised in the themes. They bring meaning to the presentation of findings in each theme. The findings are then followed by a discussion that incorporates literature use. A compare and contrast approach outlines how the findings diverge and deviate from available research and aspects of the theoretical framework. This chapter also highlights the surprise findings that helped develop new ideas.

#### 6.2 Enactment of ICT Integration for School Operations

Enactment of ICT integration for school operations concentrated on active learning, remote teaching and learning (RTL), information management and school communication. The enactment of ICT integration in active learning showed how ICT was dynamically used to promote student-centred learning. The IB and CAIE syllabi offered at Herons emphasise that ICT integration should promote students' accessing, processing, evaluating and communicating information and data. These objectives were also promoted in RTL although ICT was predominantly used as a tool for facilitating teaching and learning. Information management and school communication used ICT to promote effectiveness and efficiency in these processes. Enactment in this section is initially discussed by presenting the findings. A cross-examination of the findings in relation to literature and theoretical framework will then follow.

### 6.2.1 ICT Integration in Active Learning

Assertion: Various dimensions of ICT integration existed in active learning.

ICT integration in learning focuses on accessing information, knowledge acquisition and creation in students. ICT becomes a means to learn rather than an end itself. However, ICT integration also embeds the usage of ICT tools for teaching and learning. Although teacher-centred, ICT use in lesson planning and delivery; scheming; accessing different kinds of websites cannot be ignored as part of ICT integration in teaching. Because ICT in learning invokes a more profound interpretation than mere ICT use, different dimensions of ICT integration brought a categorisation of ICT integration into a hierarchy. At the lowest level in active teaching and learning there was ICT use with no specific skill development besides lesson delivery. Basic ICT use of computers in Microsoft Word, PowerPoint and other audio-visual methods were revealed by the participants. Three teachers, principal and deputy principal mentioned the use of PowerPoint presentations as a common delivery method in teaching. A quote from Faith revealed this: “We find the use of PowerPoint handy because there are data projectors in the classrooms and with your laptop, you just connect, and students can learn through interaction with the visuals and or sound.”

A high level of ICT integration refers to an elevated notch where teachers were creative and invested in subject-based software use. Students interacted with ICT in problem-solving tasks and knowledge development and helped engage in meaningful learning. Through creativity, novel approaches in software use were tried to improve learning and solve problems. Teacher responses also depicted a higher level of ICT integration aimed at students benefiting from accessing and processing information in various subjects. Four teachers highlighted software use in diversifying teaching. A typical example of a higher ICT integration level is shown in Figure 5.3. Students were given tasks on the GeoGebra platform to make Mathematics concepts less abstract. In this case, through manipulating sliders, they formulated equations that helped cement information taught in class.

The high level of ICT integration in active learning was portrayed through students interacting with software to develop knowledge or better understand the content. Tsitsi’s response relates to this high level:

My assessment is that teachers want us to benefit and improve our learning with ICT. For example, in Biology, recently, we used a simulation in [DrosophiLab](#) that allowed us to do genetic crosses and come up with possible offspring. The software is interactive and allow us to edit fruit flies and then get representations of the offspring. It made genetics easier to understand because the colours would show how it came about.

Students revealed that they set, reviewed learning goals and constantly used the internet to find better ways of understanding content and collaboration amongst themselves. The ability to collaborate in learning represents student leadership in that it promotes selflessness and sharing ideas and common goals. Operating at a high level of ICT integration implies that both students and teachers had higher ICT skills, competence and a recognition of the true implication of ICT integration. They both exhibited an initiative that students and teachers leaders should have in ICT integration (Göker, 2019; Jomezai et al., 2018). Teachers need an extensive pedagogical knowledge so that they can accommodate and integrate ICT effectively in their teaching (Dong et al., 2020). The implication of the finding was that teachers could guide students in the more helpful ways.

A low-level ICT integration shows elementary ICT integration and has a low pedagogical impact. Avidov-Ungar and Iluz (2014) identified this level as a basic level that involved the use of simple and primary ICT and a general lack of technological know-how that often led to anxiety related to ICT integration. Since ICT integration in the classroom depends on the teacher (Dina & Ciornei, 2013), students can miss out on learning opportunities that ICT brings. These findings suggest that a low-level of ICT integration does not permit teachers and students to exploit the resources at their disposal fully. This occurrence resonates with the findings that ICT was not integrated into every subject. Teachers that exhibited a low-level of ICT integration could have complications in combining pedagogical approaches and technological provision (Vandeyar, 2020). In that case, an understanding of ICT integration was confused with ICT use. Teachers' competence and attitude towards ICT also determine frequency of use (Polizzi, 2011).

Teachers who used educational software provided interactive activities such as matching and online gaming and improved student speed in carrying out certain actions. MyiMaths software was cited for having reduced non-submission of homework. This attribute of ICT integration in

teaching and learning in solving inherent problems could be related to the appeal that ICT generally has in teenagers. Thus, they learn better when exposed to tools that they like. Similarly, research by Boholano et al. (2021) indicates ICT improves teacher and student productivity skills and their ability to use technology.

Studies by Eickelmann and Vennemann (2017) and Ogalo et al. (2017) focused on teacher beliefs and attitudes as key criteria for ICT integration. Nonetheless, they fell short in highlighting the positivity towards ICT integration that could emanate from teachers having a sense of ownership in ICT resources and a moral obligation to use them. Teachers at Herons that promoted ICT integration had the privilege and commitment to do so. An inference that can be made is that some teachers felt it was a duty to use ICT. They used their judgement, experience in teaching and competence after analysing syllabi content objectives to decide what ICT to use and how. The school leadership did not need to understand all intricate details like GeoGebra use in Mathematics but trusted that IB and IGCSE syllabus aims were covered.

The findings relate to the existing theoretical framework. As teachers used ICT tools, technological aspects of the TOE, like a relative advantage, trialability and observability were under consideration. In this way, they experimented and compared ICT tools to find what was best to use and share with others. By exhibiting the intellectual stimulation of the transformational leadership theory, the school leadership encouraged innovative thinking and new ways of doing things (Abdullah et al., 2018). The findings contribute to the advancement of an understanding of ICT integration that the people who are involved in the process must be supported in their endeavors to find out how best technology can work for them.

### **6.2.2 ICT Integration in Remote Teaching and Learning**

Assertion: ICT integration was not effective in RTL.

ICT integration was enacted to facilitate RTL in a dire period caused by the COVID-19 pandemic. The criticality of ICT in teaching and learning in this area was seen when the country went into lockdown. RTL was a new experience that affected participants both positively and negatively. The negative effect was the suddenness that teachers and students needed to adjust to

new ways of teaching and learning when they were ill-prepared. The positive experience included the development of new skills as they became more engrossed with online tools. The swift manoeuvre to online teaching displayed the school's adaptability to changing conditions and commitment to their students' education. Through Zoom Cloud Meetings, Skype, Google suite and WhatsApp, teachers and students virtually met and had lessons, meetings and discussions to bring forth continuity to what the school was familiar with.

Nonetheless, the findings at Herons show that the RTL was a contingency plan for schooling to continue. It could have become challenging for teachers who were not used to ICT integration to facilitate students' continuous development with ICT. Similar to the low-level ICT integration in the previous section, four teachers talked about engaging their students through posting notes, interactive quizzes, and YouTube videos. A quote from the History teacher summarises the ICT integration involved with RTL:

Teaching has greatly changed because of the lockdown now, and we have everything online. So, we have these virtual school classrooms and students have to be on a certain gadget be it a computer or phone and then you post lessons and then they have to post their responses.

Whilst the findings showed that ICT was used as a tool during RTL, the promotion of ICT skills in students was still promoted by other teachers. Three teachers went further than sending notes. Angela taught profitability and liquidity in finance through an online version of monopoly she modified so that students could play live during Zoom sessions. Students played in teams and collaboratively filled in final accounts (pre-made) on Google documents. In regular school circumstances, IB and IGCSE Music students composed and produced musical pieces using ICT. Mfundo gave a response that typified ICT integration in RTL:

During the lockdown, I've learned a lot. We are used to sequencing notation software, so we are currently using Google flat as the notation software. We use *Soundtrack* as the sequencing software. And three months ago, I had never used either of those programmes. I asked students to download and install these

programmes and through my guidance and their own discovery, they are able to create music and send it to me. It's not the best, but for now, it works.

The submissions of the above teachers show that RTL created opportunities for teachers to be resourceful and creative in teaching students in virtual classrooms. In the same way, Senzo continued with the approach shown in figure 5.3. Three teachers described how the principal reached out soon after the lockdown, appealing to them to start acquiring knowledge about various technologies and psychologically prepare themselves for full-time teaching online. The leadership initiative was essential to ensure that schooling continued immediately after the lockdown when other schools in Eswatini took time to adjust or never adjusted. The initial online teaching moments were as expected, not smooth. Some of the changes involved accessibility issues in different students' home countries; challenges of subject content to cover, and adjusting to teaching, learning and assessment. The IT department provided a dimension to ICT integration leadership through teacher and student support. Videos they sent from time to time when participants did not know what to do sustained incremental ICT use and developed their skills.

RTL at Herons required planning and organisation from untraversed standpoints. Similarly, in a study involving Korea, China and SouthEast Asia schools, Doll et al. (2021) discovered that pedagogical aspects, leadership and practical strategies must be aligned to support productive online learning. It is worth noting that RTL created a burden on teachers. Robinson et al. (2023) discovered that RTL during COVID-19 times caused job-related stress in areas of adaptability, concerns for students' well-being, frustrations with administration in terms of inclusion and adequate support. Some of the stresses needed the school leadership to employ different strategies for the process to become successful. Findings by Ramos-Pla et al. (2021) established that principals in Spain were crucial in leading RTL. The results indicated that principals lead differently in times of crisis than regular times. Crisis requires a distributed leadership approach to counteract leaders' weaknesses. In Turkey schools, Göçen (2021) findings signified the importance of ICT-competent leaders, the need for a prepared plan for post-pandemic cases, and paradigm change in terms of teacher approach to pedagogical and ICT leadership competencies.

In a discussion of transformational leadership in Chapter 3, idealised behaviour was mentioned as the most discussed aspect of the theory. This attribute deals with leaders' high moral



judgment, optimism and self-efficacy and it was evident in these findings. Seyal (2015) claims that leaders strongly believe in their actions' ethical and moral values and push boundaries to achieve the desired state. It was evident that both the principal and teachers had a moral obligation that students must continue learning despite the lockdown and be ready for impending examinations. The fact that the initial change needed to be facilitated by the principal agrees with Jomezai et al. (2020) Pakistani findings that principals are change facilitators. In the current study, leadership tasks of maximising ICT use in teaching were fulfilled through interactions and synergies of many staff members (including teachers and the IT department). The aim was to help maintain high-quality teaching and learning. RTL at Herons brought an implication that taught the participants that change can happen in the least expected ways. Despite John's stance on ICT integration and teacher unwillingness to use ICT, it became the only way schooling could continue. Participants became optimistic about holding virtual classes and responded to change.

The leadership act of facilitating remote teaching and learning addressed a critical school-based need to deal with change. The TOE lacks the ability to address change in a school. Although change can be discussed under the environmental factors of the theory, the guidelines on how to deal with it still need formulation. Transformational leadership emphasises subordinate or team stimulation, motivation, stimulation and consideration (Northouse, 2018). Like the TOE, it does not have specific strategies for handling change. The limitations of the theoretical framework in this regard suggest that a deeper understanding and analysis of ICT integration leadership must be made.

Teachers at Herons experienced connectivity issues at some point, considering that students were in different regions of the world with obviously different internet provision and speed. Effective lesson delivery was, therefore, not possible every time. In an Indonesian study by Octaviani (2021), Zoom was used in teaching English Language. Still, teachers experienced internet connectivity problems and would end up using other platforms like WhatsApp for teaching, which would not have been planned. In a study on the use of Google Classroom, Nursyahrina et al. (2021) obtained information on benefits that included enhanced teachers' and students' capability to use ICT wisely, increased collaboration among students and provided timeless communication. However, challenges of connectivity surfaced as well.

Whilst RTL made schooling possible despite the pandemic, many authorities questioned the effectiveness of the process. One research area was the effectiveness in experimental subjects like Physics, Biology and Chemistry, to name a few. In particular, Hong et al. (2021) had results that indicated that the number of online sessions and their duration were negatively related to students' online learning ineffectiveness. Other authors argue that online education can be as effective as traditional education, whilst studies have focused on student satisfaction with online instruction (Butnaru et al., 2021). Romanian results by Hong et al. (2021) indicated that students reacted differently to online education. The reactions were based on proficiency in using online tools, ability to access the online content, and how the teacher conducted the learning activities.

### **6.2.3 ICT Integration in Information Management and School Communication**

Assertion: ICT use in information management and school communication was top priority.

The school enacted ICT integration for other operations like information management (student registration, report-making, keeping and retrieving information) and school communication. The finding was that the school members relied on the school's SIMS, (ADAM) for both. Seven participants mentioned that the mastery of ADAM was essential that new teachers and students had it in their induction so that they could use the system. The screenshots (Figure 5.8) demonstrated that ADAM was a versatile software. The school used it to keep different data types about staff, student records, school-related reports, and communication. Five teachers, the principal and the deputy principal all revealed that the system made sending announcements and messages easier to get through. The software brought the convenience that teachers appreciated. For example, Faith said this about ADAM:

All our information is on ADAM - all students, your classes, your students, yourself, and any type of information. Like at the beginning of the year for example, I do not know all my students, I can just open ADAM and then go to my class and open people and then see all their pictures and relevant information about them.

The school leadership recognised the need to advertise the school and provide relevant information to different parties. Hence, the school website could offer information about curriculum, student life, news and media, school contact, how to contribute to school projects and downloads. Communication was vital to foster fluidity in school functioning; hence, through e-mail and ADAM, the school website and WhatsApp, the participants could relay information as fast as needed. In fulfilling the school management tasks of class registration every morning, teachers fulfilled the need for communication. Information was passed early in the day about who was present and who was not, and teachers could make the necessary adjustments to their daily planning. E-mailing was a commonly used tool at Herons, and all school members had a school-based e-mail address that made communication more specific and more straightforward. Seven participants mentioned its use in different spheres in communication with colleagues, teachers (for students), examination bodies and other authorities. While it was commonly used, it intensified during the lockdown, considering that people neither met in the corridors nor checked the physical noticeboards.

Posting on the website was another formal way of communication through which information was passed to the Herons community and interested parties. The principal posted newsletters on the website every week to keep all stakeholders updated and informed to signify a leadership commitment to communication. The culture of sending posts proved crucial during lockdown too, because important information on updates and current events was obtainable, and stakeholders waited for it.

It was with regard to information management and communication that the school leadership demanded ICT use. The principal expected everyone to know how to use ADAM. Putting deadlines on ADAM reached everyone simultaneously and increased the chances of teachers seeing them. Figure 5.9 shows an example of deadline communication. ICT could be used in teaching and learning but was a must in information management and school communication. This finding was surprising because schools typically put more emphasis on integration in teaching and learning. One would expect that ICT integration would be more prevalent in teaching and learning (or be at par with other ICT functions) since they are the core activities at a school. However, it was also sensible to expect the school leadership to emphasise ICT use in tools that

commonly affected everyone in daily operations. Leadership determines how a school operates, and it can be deduced that the predetermination of ICT integration in information management and communication operations met school functionality-needs.

Centralised systems of SIMS store, process and retrieve data to facilitate easier working for school processes (Grepon et al., 2021). Data collection was an important aspect at Herons. Like with Mutisya and Mwanja (2017), record-keeping and information accessibility were improved. In relation to the use of ADAM, Shah (2014) learnt that SIMS changed school management and leadership in decision making, human resource management, managing workload, communication, job responsibility, strategic planning and evaluating staff performance. However, not all of these functions could be ascertained with how ADAM was used at Herons. All teachers received training in using ADAM and were confident users. Three teachers, the principal and deputy principal were happy to have and use it. This finding differs from other scholars (Alenezi, 2018; Forrester, 2019) who point out that SIMS have many inhibitors to their use, like lack of confidence and training. Thus, SIMS use is contextual and depends on how the software is introduced and for what purposes.

Pollock and Hauseman (2019) found that e-mailing created an accountability trail in participants' work by keeping an accurate record of activities, tasks and communications. As mentioned, emailing was a key feature in school communication. The significance of communication is that it allows the school to continue growing by passing ideas, attitudes and visions to other members, thus creating common beliefs, values, trust and cooperation needed to accomplish goals (Lee & Kuo, 2019). Pollock and Hauseman (2019) found that e-mailing intensified Belgian principals' work and transformed their jobs into mobile positions with ill-defined work hours. However, half the principals described it as a welcome addition to how they worked because it decreased workload and efficiently communicated with stakeholders.

The website was a tool/platform for promulgating the school's vision on ICT integration. It made the ICT vision accessible to all stakeholders, including prospective students/parents who are important for the growth and sustainability of a school. It promoted quality assurance auditing by XYZ/CAIE and IBO. Like Herons, Tubin and Klein (2007) showed that websites availed different types of data, were used for increasing accountability, communication and as a learning

platform. In corroboration to the current study findings, Gu (2017) unearthed that in Sweden, school websites reflected the school's perceptions and understanding, provided homework information, and collaborated with the community. Thus the bonds between homes, communities and schools are strengthened through increased communication and interaction (Kington et al., 2002). The Herons findings on ICT integration in information management and communication directly link to the connection that ICT has to organisational synergy from the TOE.

### **6.3 School Leaders' Influence in ICT Integration**

The influence of leadership is integral in this study. The discussion in this section is centred on how the school leadership influenced how ICT integration was enacted. Therefore, this section has themes that describe how the school leaders influenced ICT integration for school operations. These themes are; creating a school ICT vision, an ICT policy; strategic ICT resourcing; decentralisation of ICT responsibilities and decision-making and facilitating ICT professional development. In creating a school vision and policy, common ground was sought for operation with ICT. Strategic ICT resourcing led to the acquisition of fitting school tools and systems. Decentralisation of decision-making empowered people on the ground to make appropriate decisions related to ICT. Like in the previous sections, the following discussions summarise the findings, which are then compared and contrasted to the literature and analysed through components of the theoretical framework.

#### **6.3.1 Creation of a School ICT Vision**

Assertion: ICT vision was connected to ICT meeting international school status and meeting stakeholder needs in performing school operations.

The school's ICT vision provided a roadmap for ICT integration in all school operations, organisation, and overall school culture. This vision was interpreted through a need to provide a schooling system enriched by ICT. The school was obliged to ensure that students operated with technology and became confident users of ICT. The vision was also, in part, an alignment with the international curriculum offered. Hence the school leadership promoted computer literacy so that teachers could help students learn in optimal ways and to fit in the technologically driven world.

Besides the principal and deputy principal expositions on the school vision, all participants related the vision to their international school status and the necessity of ICT. Nash's (deputy principal) quote summarises this standing:

The modern world has technology and the moment students come into the school, they must operate with technology. Our students must become confident users of ICT. The mission and vision are based on the responsibility and obligation the school has in educating children from different nations and backgrounds and obviously using modern methods.

CAIE and IBO were discussed in Chapter 2 in that their students must develop certain attributes. Cambridge students should become confident, engaged, reflective, responsible, and innovative (Cambridge Assessment International Education, 2018). IB students must become knowledgeable, confident, inquirers, thinkers, communicators and reflective, among other attributes (International Baccalaureate Organisation, 2017). Distinctively, these attributes are supported and developed through teacher guidance and students interacting with different ICT forms. IB students went through their programme knowing that their next destination was tertiary institutions. Most Heron's graduates attended international universities, which required a commanding appreciation and usage of technology. The IB teachers interviewed worked with this notion. For instance, Gary (used presentation software), Angela (used editing software), and Senzo (used manipulation and simulation software). This understanding made it clear that ICT was associated with the school being relevant and appealing to its clients.

The understanding of the ICT vision at Herons was the presence of ICT to meet modern technological and curricular needs. The participants were exposed to the ICT tools they decided to use. An element of choice led to some teachers not using ICT or ICT being teacher-centred rather than student-centred. The implication was that ICT integration, as stipulated by the examination bodies, was not adhered to. The school leadership allowed it and did not put mechanisms in place to evaluate teachers' ICT integration. There was no enforcement of ICT integration (as cited by the principal and the deputy principal), and the school leadership allowed teachers to teach as they wished. For instance, the deputy principal noted that:

ICT is not our main source of interaction between teachers and students. In fact, ICT is the least used form in terms of content delivery and getting students to interact with each other. I believe more face to face is the way to go. It does not mean that teachers are not using technology. You get to see different technology use. That happens, but that is not the main focus of teaching and learning here.

These statements indicate a misrepresentation and misunderstanding of ICT integration. It can be inferred thus that the school provided ICT resources and professional development, and then teachers decided on what and how much ICT integration could be promoted in their classrooms. It is possible that some teachers were not comfortable with ICT and perhaps that they did not fully understand what ICT integration entails. These participants understood the school vision but partially fulfilled it in terms of ICT integration in learning.

School vision for ICT can set a certain precedence on how staff members integrate ICT. A vision is regarded as the foundation of ICT integration leadership because it provides direction and guidance to schools in ICT matters (Okeke & Dike, 2019). Therefore, John (the principal) and Nash (the deputy principal) affirmed the creation and support of a school vision tailored towards providing ICT resources, planning for ICT professional development and supporting staff in acquiring ICT tools. Teachers declared that their school had a vision for ICT integration, basing the comments on ICT resources and their general use at the school. Tondeur et al. (2017) exposed that all schools develop a distinct culture, building upon the fact that structural and cultural factors affect ICT integration and are rooted in school vision.

Being the chief decision-makers (and control school finances and budgets), principals determine ICT integration and hence are central to ICT vision, strategy. Uğur and Koç (2019) discovered that school leaders can be apprehensive about change but in setting school vision need to become more familiar with it to better implement ICT integration in their schools. Scholars Qureshi (2013), Lander (2020), Yuen et al. (2003) and Rabah (2015) all mention the relevance they established for aligning strategy for ICT integration to school leaders' vision. Habiballah et al. (2021) posited that developing a clear vision improved ICT integration. However, their study contradicted the current study because they considered the principal as a designated ICT leader who acted as an example to others and believed in conveying a compelling ICT vision to the whole

school. Qureshi (2013) exposed that a principal might not be an ICT expert to promote ICT integration but must have a vision of what can be done. With this vision, distributed and innovation leadership can be used to refine and formulate ICT integration leadership. The school vision can then be instrumental in addressing issues of ICT integration like training, support and resources provision (Rabah, 2015). Distributed leadership and adaptive leadership were seen at Herons through the way ICT responsibilities and decision-making were decentralised to promote ICT integration leadership. To this end, transformational leadership was also denoted through a critical drive to initiate transformational processes and maintain them with the help of others or teams (Arokiasamy et al., 2016; Gacicio et al., 2021). Transformational leadership values productive relationships (Abdullah et al., 2018) and schools function on similar understanding. The organisation around ICT integration in the current study was closely related to the TOE theory. It was a manifestation of the decisions to integrate ICT considering the technological provision, organisation of the school and factoring the environment in which ICT integration was made possible. Such phenomena will always be crucial in schools of the 21<sup>st</sup> century. The organisational structure plays a part in influencing the development of learning and technological innovation (Waruwu et al., 2020). The findings at Herons showed that the school operated from a digital perspective. ICT resources and people were organised to fulfil technological requirements. The organisational context of the TOE was thus related to the characteristics of the school, like the human and financial resources instrumental in ICT organisation, culture, organisational expectations, school support and general management of ICT. This atmosphere is mainly influenced by school leaders who contribute to how other stakeholders perceive their school and how they shape their values and attitudes towards the school.

Transformational leadership cannot be ignored when dealing with ICT integration leadership because of the innovation and motivational activities involved. In earlier studies by Jung et al. (2003) and Tan (2010) on the importance of transformational leadership regarding ICT, it was established that this leadership style enhanced organisational innovation through empowerment, a conducive and supporting organisational climate for all school stakeholders. Empowerment distributes leadership. Ilomäki and Lakkala (2018) documented in a three-school case study in Poland that one school had a vision concerning ICT related mainly to teacher technological skills and ICT resources. In this case, most teachers shared it, but the vision was not



fully clarified in teachers' minds, and ICT integration became haphazard. Contrary to the findings in the current study, Herons participants recognised the vision and contributed to how they responded to ICT integration in their work.

### **6.3.2 Creation of an ICT Policy**

Assertion: Participants' ICT integration was self-directed and not guided by an existing school policy.

An ICT policy existed at Herons and was referred to as an "IT acceptable use policy" (figure 5.11). The interview question about whether the school had a policy was affirmative with seven participants. It was school-drafted to provide specific guidance and regulations about ICT usage in the school. The policy postulates that all ICT users must be aware of its presence relating to ICT use. It further states that it is critical that everyone reads and understands the policy document (before they use ICT) and seeks clarity when in doubt. Nevertheless, whilst participants acknowledged its presence, it was not a document they were versed with nor had referred to in recent history. For example, Senzo (the Mathematics teacher) remarked: "There is a policy for ICT use, but we rarely need to refer to it daily. It was made to educate mostly students on safety and healthy habits on the internet".

Participants did not refer to the policy to guide ICT integration to imply less applicability of its statutes in day-to-day operations. For eleven participants, ICT vision appeared more prominent than ICT policy as they could talk more about vision than policy. However, the policy outlined essential aspects concerning ICT in the school. Its content analysis imparted how computing facilities were utilised in the school; management of personal and school information; technical support; e-mailing guidelines; online teaching and learning; legislation; disciplinary procedures, and incident reporting. With all this critical information on the policy, it was surprising that five participants who knew about it were not conversant about its content. Clearly, the school leadership did not emphasise that participants be policy-aware. This disconnect implies that ICT integration leadership lacked policy guidance.

The link between policy and vision is that vision is usually an outcome of what is written down in the policy document. ICT vision could be seen from daily operations and policy contents were not common knowledge to the participants. Worth noting from the IT policy is the fact that it did not dwell on the enforcement of ICT integration in the curriculum. Perhaps, it was because the policy was made for guidelines on what was deemed acceptable use. The reasons that the school did not enforce or supervise ICT integration in teaching and learning was probably because it was not part of the school policy regarding ICT integration. This lack of supervisor roles in evaluating ICT integration is counteractive in ICT integration leadership. Strategising for influencing others becomes difficult when leadership is not clear on exactly what is being done.

ICT policy depends on a school's vision for ICT (Njoroge et al., 2017). Schools must then draft their policies based on context and how ICT can foster practical reform (Ugwu & Nnaekwe, 2019). From this understanding, a school-made policy has more exactness in ICT integration. Well-structured policies support educational innovation because they help question the role being played by technology, its social relevance to reveal what functions and the objectives are being met (Corre et al., 2010). The Herons ICT policy showed that ICT integration at Herons was planned with specific considerations depending on the school's uniqueness and needs. ICT policy is instrumental to ICT integration because ICT policies encompass infrastructure, integration in teaching and learning, professional development programmes, intellectual properties and acceptable use (Mokhtar et al., 2006). For these aspects, Assefa et al. (2021) regard an ICT policy as an essential document that directs ICT strategic plans.

Studies by Rahim et al. (2016) and Habiballah et al. (2021) substantiated that policing develops strategic plans that help set clear goals and the means to attain them. Likewise, the Herons policy was drafted to articulate how ICT use would be organised. In Pakistan, Rahim et al. (2016)'s findings demonstrated that successful ICT integration involved policing and that the policy planning process should involve the whole school community. Furthermore, the planning process was deemed relevant if the policy was considered versatile and based on school culture. The Herons ICT policy was a crucial document, which was like the Pakistan findings produced by the school to serve the school's needs. The Herons participants could partake in policy change and when it was made, teachers had contributed to its development.

Leadership that involves other stakeholders in policing promotes ICT integration leadership and practices transformational leadership. The leaders are said to be more concerned about improving value and creating agreeable working environments (Gacicio et al., 2021). However, the Herons participants needed to be conversant with the policy document to identify what needed alteration.

Whilst the participants at Herons had a choice in ICT integration, in some cases, policy regulations can be push factors. In figuring out what factors made teachers integrate ICT, Youngkyun et al. (2008) elicited in South Korea that teachers generally used ICT involuntarily as they responded to the policy and other external factors. Contrary to the findings in the current study, John mentioned that he did not enforce ICT integration in the curriculum, and thus teachers could decide whether they integrated. One would expect that a principal demands total ICT integration to promote learning. He did not fully believe that ICT significantly impacted teaching and learning and regarded it as just a tool that people could do without. Such a belief was contrary to the school's vision for ICT. Hence the principal could have given a double impression to his subordinates on the expectations of ICT integration in the school. Jomezai et al. (2021) characterised principals as task-oriented when they were concerned with syllabus coverage and did not regard the teaching methods employed. These researchers clarified that such principals had less or no information concerning ICT integration and arguably considered ICT an additional activity. However, John exhibited competence in ICT use and mentioned his confidence in using technologies. His leadership style permitted teachers to have the freedom they had.

### **6.3.3 Strategic ICT Resourcing**

Assertion: Strategic ICT resourcing provided an impetus for ICT integration.

Enactment of ICT integration for school operations was made possible through the school leadership making available apt ICT tools. The findings related to ICT resourcing demonstrated that Herons provided ICT infrastructure and resources that fulfilled the obligations for ICT integration leadership. Figure 5.1 shows examples of ICT tools found at Herons. ICT provision at Herons denoted well-thought-out resourcing with a cumulative effect of each resource producing the ICT integration seen at the school. For example, whilst all classrooms could not have

computers and internet connection for all students (because of financial limitations), the IT centre was designed and tailor-made to meet students' needs in internet searches, doing homework, lessons, getting information and assistance from IT technicians. As highlighted in the previous chapter, participants had access to computers, the internet, IWBs, projectors, Wi-Fi and relevant software or programmes. These were the major resources that aided teaching and learning processes, enabled effective communication and helped information management. The principal, showed the level of ICT resourcing at the school:

We have an IT centre with computers for all students to use for learning and research. The computers have an internet connection. Every classroom has a projector, a sound system, and internet connections so they can use videos, PowerPoint, and all sorts of mechanisms. Our approach is that if a teacher is using technology and wants to use it, we are very willing to invest in it. But they got to show that they are using the resources. We don't insist that students have laptops; indeed, in the lower forms, they should not. At the IB level, it's highly recommended that they have a laptop computer. And for those students on scholarship, we provide a laptop that will be part of the scholarship offer.

With all classrooms having data projectors, teachers had the convenience of diversifying their teaching process to incorporate videos, images, animations and simulations. The school made provisions for subscriptions for specific software and websites used in certain subjects. The internet is a rich source of information that teachers and students should capitalise on. This facility was one of the main factors behind ICT integration at Herons. The school leadership support for individual or group requests is connected to a realisation that teacher needs differ. The school could not provide all ICT tools (evidenced by a lack of sufficient computers for all staff members and students). However, strategic ICT resourcing, planning and enactment reduced the impact of the limitations. For instance, students could use their own devices and provide them with internet/Wi-Fi. The provision to allow teachers to request extra ICT exposes an inference that the school approach in this way was people-based to maximise tapping into their potential. The same approach was also used in awarding IB students' laptop computers because they had the most need for them compared to the lower forms.

Although evidence pointed to strategic ICT resourcing, two teachers registered displeasure with ICT provision. The Music HOD's displeasure sprang from limited and old-fashioned computers. He said:

There are six computers (in the department) and we could do with twenty-five, you know. So, in the lower school the students in F1 and F2 are big classes of about twenty-five students. They don't get to use technology because of the numbers against the sort of machines ratio means it's almost impossible. It is always difficult also because the machines are old to compete and they're not fast enough. They haven't got enough processing power. So, we have a limited range of the actual instrumental sounds that we can use.

The limitations to software they could install and the range of musical sounds students could produce reduced the level of ICT integration, particularly the exposure the students needed in the subject.

Resource provision is a significant determinant of ICT integration leadership. The discussion for strategic resourcing is impacted by the fact that a school budget for ICT integration should translate into consistent investments that teachers and other stakeholders can relate to and utilise in daily operations (Ghavifekr et al., 2016). Polizzi (2011) discovered that school leaders' support for ICT integration depended on contextual-based level variables that included the amount of ICT equipment available for teachers in their school. The findings from the current study inform that the primary determinant of ICT integration is the availability of technology as in the TOE theory. This finding is similar to Gacicio et al. (2021). They based their findings on the TOE and circumstantiated that ICT integration is enabled by accessible ICT infrastructure and a conducive organisation of the learning environment. Other researchers, Camilleri and Camilleri (2017), established that having various ICT resources created a positive acquaintance with digital resources and an opportunity to enhance proficiency levels and expertise. Nonetheless, this finding is contrary in that ICT did not always create a positive acquaintance in that teachers (prior to the lockdown) were reported to show a reluctance in ICT integration in their teaching. Such reluctance concurs with an earlier study by Cuban et al. (2001) who suggested that issues of teacher skills, reluctance and resistance often mar ICT integration.

Appropriateness of ICT resources is critical in strategic resourcing. Evidence from the school included school leadership strategy in sourcing tools that led to convenience. Examples were projectors in all classrooms, computers for teachers and IB students, website and examination body subscriptions and multiple internet service providers. In comparable studies, Rabah (2015) and Ghavifekr et al. (2016) established that school budgets for ICT investment must include different types of appropriate hardware and software, reviewing the curriculum, developing the infrastructure, and regularly updating and upgrading the latter. The introduction of ICT is not a one-off process but must seek to lay a foundation for contextualised, continued and dynamic enhancement (Titus, 2020; Unwin, 2005). Hence there was a provision for teachers to tender their extra requisitions.

As stated by two participants, ICT tools were not enough for all teacher needs. Estimating the causative effect of ICT investment in education is fraught with difficulties (Machin et al., 2007). One of the difficulties is that schools sometimes spend a lot of money on ICT resources that they do not fully utilise (Tondeur et al., 2017). Two participants at Herons mentioned using IWBs and the school invested in five. According to Ahad et al. (2018) and Lawrence and Tar (2018), ICT resourcing leads to ICT integration, but it is not always the case, as seen with the IWBs in the current study. One contributory factor to this occurrence could be the lack of evaluation or enforcement on ICT matters. Another reason could be a lack of knowledge.

Connected to strategic resourcing at Herons was that the school employed professionals to address issues of ICT integration. The IT department provided ICT integration leadership by managing ICT issues, providing support and solving technical problems. In line with ICT personnel at a school, Woo and Law (2020a) found out that ICT technicians could be formally or informally recognised. They could be teachers with ICT expertise, ICT teachers or ICT specialists. Their roles involve providing instructional, pedagogical and technical support; shaping ICT decision making and infrastructural development. Consequently, employing ICT personnel reduces pressure on teachers by combining school ICT matters with their teaching workload (Tondeur et al., 2010).

ICT resources directly fit with the TOE's technological component. Stakeholders use available technology and make every effort to acquire more of what they need. Technological

factors dominate implementation concerns and decision-making of every school (Angeles, 2013). Based on the TOE theory, every school should do a technology-organisation match to ascertain what is suitable and relevant for them.

### **6.3.4 ICT Professional Development Programmes**

Assertion: ICT professional development programmes offered basic knowledge in ICT use.

For a school with a vision of ICT integration and thrived to provide ICT resources to all, a mechanism of ICT professional development needed to be put in place. Professional development was understood and referred to as ICT training by eight participants. They regarded it as a significant duty the IT department did. Having an IT department had a dual purpose of providing support in daily functioning and facilitating different forms of training and professional development. People that joined Herons learnt how to use the school network, and those without computer literacy needed training in the IT centre. The participants required information on how specific software or applications worked and got help from the IT department. John's citation was more informative:

If there is a teacher who says they want to go do a course or training for something we support that. If there's general training for everyone, there must be interest from the staff. At times we want them to learn certain software for use in the school and we organise that. However, in terms of teacher training - well times have changed. Teachers cannot always wait for the IT director or the school to train them. There is the web. With other things, they must learn on their own. I was never trained on computer literacy. We have got a few efficiency issues on ADAM but I was never trained on it. You learn with the device.

Despite John and Nash saying that teachers received regular training, Arianna said it averaged twice a term. Twice could be regarded as infrequent, considering that there are many aspects of ICT and integration in which teachers need help. Because of time constraints, it was challenging to organise training programmes for all teachers. Teachers had their insecurities and

they were unwilling to expose ignorance to their colleagues. It can be deduced that the professional development was ineffective and could have failed to meet the intended goals. Perhaps, the missed opportunities in ICT professional development could have become counter-productive to ICT integration in learning.

The typical professional development that transpired was about using standard hardware at Herons, and the Microsoft package. Computer literacy was an essential start; other skills could be learned with time and interest. The most recent ICT professional development was offered during the lockdown on how to set up Google Classrooms and Zoom cloud meetings. Teachers were happy to be able to have virtual classes and facilitate learning. However, emphasis on how ICT could impact students' learning and development was not the primary concern.

Teachers have different competence levels and hence require different needs. Training in pedagogical software was not offered, which could have negatively impacted ICT integration. The training did not serve to teach higher skills in ICT integration like programming or designing educational software. The training offered fell short of meeting specific departments or individual needs. For example, the Music department used subject-oriented software, and the HOD remarked that they always taught themselves about software use. It was also possible that the IT department might not have been familiar with the software in different departments. Having professional development sessions imparts knowledge but does not imply ICT integration. Teachers need the motivation to integrate ICT, amongst other factors.

ICT professional development is crucial for ICT integration leadership. School leaders need to create time for programmes that raise awareness of ICT integration and offer skills that facilitate teacher and student engagement (Hu et al., 2021). Studies by Uğur and Koç (2019) and Polizzi (2011) showed that principals also need development in technology skills to afford them flexibility and knowledge to become more visionary in ICT integration leadership in the 21st digital educational environment. The drive for professional development at Herons was in line with a Kenyan study by Mwawasi (2014). His study recognised that when teachers were given the opportunities to learn computing skills, school leaders influenced and empowered them to implement pedagogical changes. Several prior studies also support the importance of ICT professional development (Ghavifekr et al., 2016; Oluoch, 2016; Owen et al., 2020). Drossel et al.



(2017) declare that teachers who participate in professional development have stronger ICT self-efficacy and are more likely to use ICT more frequently in their classes and put more emphasis on teaching ICT skills in students.

The training was essential when new programmes were introduced at Herons. For example, the Zoom Cloud meetings platform was new before the lockdown. The findings resonate with Albalawi (2021), whose results disclosed a need for professional development and a recognition that it must be an ongoing process necessitated by technological advances. Ghavifekr et al. (2016) documented that teachers who failed to develop sufficient confidence in ICT integration avoided using it in Ireland and Canada. They felt embarrassed that their students knew ICT more than they.

Professional development is embedded in transformational leadership's individual consideration component, by focusing on the capability of individual followers and helping them develop necessary skills. Kouni et al. (2018) and Beverborg et al. (2017) elaborate that providing individualised support to teachers leads to developing their intellectual stimulation, which they then use to calibrate and try new approaches to teaching. The inspired motivation attribute of transformational leadership is also related to the professional development needs assessment stages of ICT integration (Seyal, 2015). In this case, leaders motivate their followers and give them reasons to persevere. Owen et al. (2020) found that principals and teachers needed not just basic ICT training but professional learning about integration, especially in pedagogical practices. Although teachers at Herons got valuable skills in ICT use, none of them mentioned receiving specific pedagogical training in fundamental areas of their teaching.

The professional development programmes might not have been sufficient to foster all the requisite skills in the staff members at Herons. Still, they saved a vital leadership aspect of meeting people's needs in computer knowledge. Developing ICT skills in people in an institution demonstrates how school leadership values ICT integration. However, professional development in ICT integration should be followed by evaluating skills imparted to the stakeholders (Garone et al., 2022).

### **6.3.5 Decentralisation of ICT Responsibilities and Decision Making**

Assertion. ICT responsibilities and decisions were best made at points of expertise and need.

Heron's leaders influenced ICT integration by spreading ICT responsibilities and decision-making in the school. Decisions about ICT acquisition, training and eventual integration needed to be decentralised for better ICT integration leadership. Decentralising decision-making and responsibilities to departments and individuals brought relevance to actions, impacted ICT integration, and developed people. This theme was developed from participant responses that the school leadership had inadequacies in ICT issues and depended on and trusted subordinate and colleague judgement. Participants recognised Arianna's (the ICT coordinator) leadership because they related to her and the IT department for all ICT matters. Five participants recognised the importance of decentralising ICT responsibilities. Besides that, they also acknowledged their importance in ICT integration through the decision they took for their teaching. A response from Nash represented the notion of decentralisation:

The IT director is hands-on with all IT issues in the school and so it is safe to say that there is what you are calling ICT integration leadership from that end. She is instrumental in the school acquiring gadgets and making decisions so as to be sure that everything is working smoothly.

The school trusted the teachers and the ICT coordinator's leadership in given areas. Such faith in subordinates comes with an awareness that specific individuals are capable and can contribute to the school vision with ICT integration. Decentralisation of ICT responsibilities and decision-making represented a collaboration amongst colleagues to foster ICT integration leadership. The people that made ICT decisions and were tasked with responsibilities worked from the point of having more knowledge to give than others. The ICT coordinator highlighted typical examples of decision-making about internet provision extension beyond teacher offices, what devices to insure, software to buy and organisation of learning and technicians in the IT department.

Teachers were the actual facilitators of ICT in the curriculum and knew how or what was suitable for learning accomplishment. Therefore, it made sense that opportunities for decision-making and responsibility be awarded to them as well rather than dictated. In that regard, teachers and departments used IWBs (for example) if they promoted learning and incorporated software (like MyiMaths, Padlet, GeoGebra) if the student body would learn better. This leadership approach by the school was also people-based. Teachers accumulate knowledge over time and could know better approaches to teaching with technology. Hence, decentralising responsibility and decision-making could empower teachers and be essential to the promotion of ICT integration leadership.

Decentralisation of ICT responsibilities and decision-making represented an ICT integration leadership aspect that created opportunities for teachers to lead where it was critical without needing to be administrators themselves. School leaders are facilitators of ICT integration and decentralising decision-making promotes applicability of technology adoption (Abraham et al., 2019; Isa et al., 2020). Salokangas et al. (2020) established that teachers considered themselves autonomous and independent in their classroom practice because of their experience with technology. Related to the autonomy teachers at Herons enjoyed, Pettersson (2018) discovered that teachers needed a working environment that gave them room to accommodate the change to practice. Likewise, Moreira-Fontán et al. (2019) found in Spain that teachers who got support from their leaders were more independently motivated in executing their work and experienced positive emotions with ICT integration in their functions.

In this study, decision-making was critical from planning to enactment. In Singapore, Tan and Ong (2011) discovered that functional differentiation distribution was in operation, and the principal, vice-principals, HODs, senior teachers and IT coordinators all took part in planning school ICT initiatives and goals. The principal and vice-principals came up with the ICT vision, and teachers appointed as coordinators worked with the ICT department in deciding the directions for ICT integration. Although four divisions, infrastructure development, special projects, staff development and student development, were created within the ICT department, parallels exist with the findings in the current study.

The school leadership at Herons came up with a vision for ICT integration and enacted distributed leadership in terms of creativity and implementation in ICT integration. The school leadership raised the staff's consciousness of problems through transformational leadership's intellectual stimulation. It influenced them to be creative and innovative so that they could find solutions in their way. The overarching effect on subordinates (and applicable to other schools) was their empowerment and recognition of their value in the school. New forms of ICT integration leadership emerged consequently.

#### **6.4 Reasons for Enactment of ICT Integration the way it did**

Themes in this section were synthesised to discuss why the school enacted ICT integration the way it did. ICT integration fulfilled meeting curriculum demands. The curriculum offered at Herons had ICT expectations that bolstered the learning process. Various stakeholders connected to the school, directly and indirectly, influenced ICT integration. ICT integration was also related to how efficiently and effectively school processes could be done. The findings in each theme will be presented initially. A discussion then ensues to evaluate how similar or divergent they are to the literature. An analysis is done in comparison with the theoretical framework.

##### **6.4.1 ICT Integration to Meet Curriculum Demands**

**Assertion:** ICT contributed to setting and achieving curriculum needs.

The curriculum at Herons was developed around ICT presence, expectations, support and ideation. All participants recognised the importance of ICT in their education system. Attempts were thus made to use ICT in various ways that involved lesson planning, sourcing information, and collaboration with colleagues. Students learning embedded ICT integration. Class tasks, assignments and revisions, and information searches involved ICT use. All teachers and students stressed various ways they used ICT in multiple aspects of the school curriculum. ICT integration ultimately translates to students' educational attainment with technology. Arguably, many participant actions meant ICT use in teaching and learning rather than ICT integration. ICT was not left out in teacher and student activities. Hence the assertion acknowledges its integral role.

Gary, relating the theme to the findings, represented how teachers met curriculum demands with ICT.

Yes, technology is important but different teachers have different approaches as long as they cover the syllabus. For example, when I am doing geography coursework with IB students, I ask them to bring their laptop computers. From time to time I ask them to do presentations using PowerPoint. All our classrooms have projectors but we are very basic compared to other schools. I have always given students presentation tasks ever since I started teaching and over the years, technology has taken over. I also want my students to be confident with technology so I ask them to research from different websites.

ICT integration is a curriculum imperative in 21-st century curricular documents. International curricula are designed to produce a wholesome learning experience for the development of students who take it. Various information sources and ICT tools at Herons supported the teaching process and revolutionised how participants approached what could be learned or done with ICT. In this study, ICT integration could be said to have had a three-way function; to deliver, support, and transform the curriculum. In delivery, students got instruction. Support materials were found in various online sources that enhanced teaching and learning. Transformation is interpreted from a subject and activity diversification perspective on how ICT changed teaching and learning.

Subjects like Music could not be done without ICT because compositions, recordings and assessments were done explicitly with ICT. ICT was integral in IB students' conceptualisation and execution of CAS projects. These projects included communal youth programmes, tutoring and mentoring primary school children, fundraising programmes, and volunteer work. Career support initiatives and environment-related activities. Critical skills like presentation and communication skills were developed as students participated in these projects. ICT integration was involved in co-and extra-curricular activities as well. It gave students an edge in building knowledge in artistic, culinary, music and sporting activities.

CAS is unique to the IB curriculum. Participants pointed out that it helped students to think about and do humanitarian activities in Eswatini communities. The main idea was for students to get more concerned about how communities around them lived and, where possible, developed charitably. Connected to this, Tsitsi (IB student) belonged to a school club that raised funds for educating Swazi children. In this club, students were tasked with developing fundraising strategies, using e-mail and social media to communicate with potential donors and identifying students needing help. In this way, student leadership was promoted. ICT promoted knowledge development (ideation and strategising), organisation, record keeping and communication skills.

ICT integration should go beyond just a provision of resources. ICT contributes to setting and achieving curricular needs, but a problem with school standards existed. The school leadership could have improved ICT integration by advocating ICT integration in teaching and learning. None of the deputy principals, HODs, and subject coordinators monitored lessons for ICT integration. Therefore, no standards could be set. Interpreting a low-level ICT integration as ICT integration created a false impression that teachers effectively engaged their students with ICT. Although a fuller understanding of ICT integration could have been missed, all participants recognised ICT as a powerful tool that drove curricular goals. Their methods could have been wrong, but an attempt was made to use ICT to meet the needs of the curriculum.

An and Reigeluth (2011) discovered that teachers' perceptions, barriers, beliefs, and support need contribute to ICT-enhanced, student-centred classrooms. As mentioned in chapter 2, computers and the internet improve teaching, learning and adaptation to changing educational interfaces (Gawande, 2020; Sharma, 2020). In a Finland study on determinants of ICT integration, Hakkarainen et al. (2000) established that availability and access to ICT tools are necessary for ICT-enhanced student-centred learning activities. From their analysis, a belief (in students) that technology-supported learning produces meaningful learning increased that extent of use. Both students at Herons underscored that they extensively used their laptops and the internet to access information and process it for various purposes. It was established in chapter 2 that IB and IGCSE are challenging, adaptive, flexible, and global in approach and still culturally sensitive to develop informed and curious students who gain vital skills for university and future careers (Cambridge Assessment International Education, 2020a; International Baccalaureate Organisation, 2017).

Teachers dealing with these digital natives are thus stretched far and wide, are tested to adjust, advance, and be imaginative in the teaching process (Abraham et al., 2019).

CAS was associated with student skill development, like time management and communication skills. Billig (2017) unearthed positive outcomes like civic-mindedness, efficacy, and a service culture from sampled IB students from Canada, the United States of America, and Central and South America. In an earlier study, Billig (2013) uncovered that students developed confidence and personal development skills in communication and leadership to lead projects or teams. Students compared notes, researched how others had done similar projects and found ways of improving their projects.

#### **6.4.2 Stakeholder Expectations on ICT Integration**

Assertion: Stakeholders influenced ICT integration in direct and indirect ways.

Stakeholders fostered ICT integration through ICT resource provision, committing to school fees, donating funds and supporting ICT-related school projects. The stakeholders mentioned included donors, parents, school alumni, the XYZ and the examination bodies. The examination bodies are included in this list because IBO, for example, is mentioned on the school website as a partner whose influence permeated school operations. Herons was affiliated with XYZ, which set high standards for quality education, including methods that incorporated modern technology. Linkage to different kinds of stakeholders created a direct and indirect influence on ICT integration. The indirect influence was related to ICT resource and facility development, while a direct effect involved expectations and conditions for ICT integration. Five participants recognised an integral part that stakeholders played in ICT integration in the school and cited different ways in which they were involved. John provided the most concise quote about stakeholder influence:

Our school has ties and associations which are influential for our survival and in a way influence technology provision. Connected to that, we have an advancement office here that is responsible for organising funding from

international organisations. This funding is mostly used to provide scholarships but can also be used for ICT resourcing.

The school sourced funds and got donations for ICT provision from parents, well-wishers, alumni and through an advancement office. Parents and other well-wishers were alluded to by three participants that they donated hardware and funds for ICT projects like partitioning the IT centre. After receiving ICT tools, and funds, the school was expected to put them into use so that the donors knew how their resources were managed or utilised. This indirect influence by these stakeholders facilitated improved ICT provision and facilities.

IBO, CAIE, and the XYZ organisation created a direct effect because of ICT standards that made up their ethos. As an international institution that values a contemporary approach to education, Herons was supposed to meet standards known to teach 21-st century students. IGCSE and IB curricular specify preferred approaches to teaching and learning, and it follows that schools that follow their syllabi comply for better handling of the learnt content. IBO and CAIE do not offer different educational goals. Hence schools like Herons that offer both IB and IGCSE do so more effectively if the conditions for ICT integration are met.

Herons' parents, alumni, and local and international communities positively impacted ICT integration. Mulford (2003) reported that if schools are to become effective, they must have positive relationships with surrounding communities. The idea of schools looking for funding is supported because it helps schools develop in areas they can be financially limited (Museng'ya, 2018; Ritzhaupt et al., 2008). The fact that the school looked for funding is similar to a Kenyan study by Oluoch (2016), who uncovered that schools took several steps to help enhance ICT delivery by looking for grants from NGOs, parents, teacher associations, and government and donations from the community to buy computers. Light (2010) found that schools had multiple sources for getting ICT resources, including government programmes and parent associations for ICT provision, providing broadband Internet access and computer donations. In an earlier study, Kington et al. (2002) discovered in England that morale was generally high where teachers, students, and parents were happy about the level of ICT innovation in their school and parents, and community support influenced ICT integration. The findings highlighted in this subsection are also applicable to organisational form due to ICT provision as discussed in the TOE.



### **6.4.3 Sustenance to Effectiveness in Performing School Operations**

Assertion: ICT enabled participants' achievement of desired results.

ICT sustained effectiveness in participants' school operations. ICT is one of the modern tools that facilitate smooth school systems operation. A reliance on ICT promoted a required and expected effectiveness in information management, communication, teaching and learning. Effectiveness was participant-specific, and it was a measure of whether ICT led to getting the intended results. ICT helped participants work better, accomplish tasks and be more productive in their functions. Both theme and assertion in this section were synthesised from information gathered from five participants. Solange (IB student) gave a more suitable expression on ICT sustenance to effective ways of operation: "We are always online. We use laptops and the internet to do our assignments. In research, we share useful websites and links and other information from the internet. We depend on technology to be effective in all these aspects."

Typical details emanated from responses of participants who found specific tools desirable in their operation. For example, Ruth used an IWB more frequently than others did. The advantages she derived from this was that she could record lessons for future reference and that her students liked its interactive features in learning and playing educational games. Although different responses were obtained about how ICT integration in teaching and learning transpired, the general conclusion was that ICT enhanced the process. From the use of interactive online games, YouTube videos, PowerPoint presentations, interactive software, and simulations, ICT diversified teaching methods. Although there was a teacher-centred use of these tools, they helped meet students' different learning methods. The effectiveness of ICT integration was also pronounced during the lockdown through the use of Zoom cloud meetings, Google Classrooms and other suitable platforms.

ADAM produced an effective way of information management and communication. The school could keep and retrieve information relatively easily, keeping it for longer and in less bulky methods. Since all report cards were digitally produced on ADAM, standards like calculating averages and writing comments could be maintained. Fast communication was possible with ADAM, and e-mailing, and website posts also helped participants remain informed.

Participants in Onyema (2020) Nigerian study agreed that ICT integration (especially of emerging ICT tools) brings modernization to education and promotes the achievement of set objectives. Similarly, Herons participants could use ICT for intended purposes in educational software or produce report cards on ADAM. In line with this, Hatlevik (2017) discovered that digital competence led to more regular, sensible and critical ICT use in a Norwegian school. Studies by Semerci and Aydin (2018) and Comi et al. (2017) attested again that effectiveness with ICT integration was linked to ICT offering diverse teaching and learning opportunities, making it easy for teachers to plan and efficiently deliver a lesson and general attainment of educational targets.

Google drives were used at Herons for various types of information. In Sweden, Jaakkonen and Hosseini (2018) found out that Google Drives improved students' learning and writing ability in English. Al-Samarraie and Saeed (2018) verified that cloud computing tools supported collaborative learning activities in editing, sharing, communication and discussions. However, this extent was not established by the current study findings. Teaching effectiveness was positively impacted when teachers shared ideas and methods. In line with this finding, Drossel et al. (2017) found that the priority of ICT at school is a significant predictor for ICT-related collaboration in six European countries.

In the current study, four teachers extensively used educational software. These teachers found out that they enhanced effective learning. For example, Senzo propounded that MyiMaths facilitated efficient concept development through students getting much-needed practice, doing homework and testing themselves in ways teenagers usually find fun. Gil-Flores et al. (2017) discovered in Spanish high schools that the availability of appropriate educational software influenced 'true' classroom ICT integration. In Mathematics, Herons students got more practice with a different approach to foster effective learning and concept development. Flogie et al. (2018) discovered in Slovenian schools that ICT improved in students competence in skills like using social media and internet effectively and critical of web information as well as improving positive psychosocial impact in learning.

In findings similar to the Herons experience, the advantages associated with Mathematics software were explored by (Tong et al., 2021) in investigating the relevance of GeoGebra in an

experimental group. Post-test scores indicated that practical class students experienced higher learning outcomes and developed superior problem-solving skills compared to the control group. Zulnaldi and Zamri (2017) found in Indonesia that students who used GeoGebra in learning Mathematics had higher conceptual and procedural knowledge than students who learnt the subject through conventional methods. These findings attest to the efficiency that ICT integration can bring.

#### **6.4.4 Sustenance to Efficiency in Performing School Operations**

Assertion: ICT facilitated faster ways of accomplishing school operations.

Besides effectiveness in performing school operations, ICT was found to sustain efficiency in carrying out school operations. Measures of efficiency were based on doing tasks in ways that saved time. Schools are busy places, and when participants found efficient ways of performing school operations, the hours spent at school were spent more fruitfully. A culture of constant e-mailing and information management improved efficiency. In teaching and learning, efficient ways of getting and sharing information were commonly mentioned. This example and others related to teaching and school operations were reported by five participants. On the use of websites to explain the notion of efficiency, Angela recounted that:

IB has many sites. Like IB thinking and IB home, where you find all relevant information. On those websites, you find everything like lesson plans, how to plan them, resources and so on. You basically find everything there. The school pays these subscriptions because they are trustworthy and verified and for the efficiency we need in teaching.

The attributes of ICT integration leadership were exhibited in how ICT sustained efficiency in performing school operations. The internet was essential in daily operations and glitches experienced were reported to the IT department through an online reporting system called an 'ICT desk'. This mechanism reduced the time (or need) queuing at the IT centre for service. The IT department also produced efficient ways of getting information by promoting known websites. Thus, one could visit an IB site for trusted resources and get simulations, animations and other

material. Shared Google drives were created to keep a different kind of information from past examination papers, slides, and examination material. These initiatives by the IT department created opportunities for teachers and students to work efficiently and provided leadership through the implementation of school plans, collaboration and communication. The school leadership created an enabling environment that allowed people to work and try new ways of doing things.

ADAM was an efficient tool for fast communication, storing and retrieving information. ADAM's accessibility to parents prevented them from being left out in important announcements and feedback (on students' performance). Their scheduled feedback created a leadership aspect of providing results-based input and opportunities for parents to get involved in their children's learning. It also opened communication channels for sharing ideas.

Efficient ways of performing school operations were supported by having appropriate ICT in the school and the school's expectations. In similar ways in Bhutan, Gyeltshen (2021) found out that efficiency in ICT integration was linked to the principal's ICT leadership dimensions which were teacher support of productivity and professional practices. Kukali et al. (2018) established in Kenyan public secondary schools that ICT integration management relied on principals' leadership. However, their impact was below expectations due to many factors, including their lack of training in ICT use. The findings from these two studies differ from the current one when the principal is considered the sole ICT integration leader. However, Amie-Ogan and Tagbo (2021) found out that principals worked efficiently using computer and cloud storage systems for enhanced administrative effectiveness.

Regarding information management, Abduloh (2021) discovered in Indonesia that a website-based SIMS provided quality and efficient educational services. This study yet again focused on what principals do to improve schools. Contrary to this study, the school leadership at Herons worked in tandem with subordinates to achieve this. Bosker et al. (2007) established that secondary schools used management information systems (MISs) for clerical purposes and not to support higher-order managerial activities. Unlike at Herons, the MIS use was only limited to principals. Their study focused on principals and investigated principals' training only to improve SIMS use. Therefore, their findings were specific to principal actions in decision-making.

## 6.5 Chapter Summary

This chapter presented a discussion of findings using themes generated from the data. ICT integration helped determine how participants approached teaching and learning, whether it was by choice or forced on them by extenuating circumstances. Literature supported notions and imperativeness of ICT in modern education. ICT integration is valuable in other school operations, as shown by the findings of the current and other studies considered in the discussion. In most reviews and studies, ICT integration is a critical requirement for schools, and it is a matter of how much the process can be promoted. Therefore, the discussion on how the school leadership influenced ICT integration was linked to factors that helped sustain and promote incremental ICT integration. These factors were discussed through an analysis of the influence of school leadership. The reasons why the school enacted ICT integration the way it did focused on the benefits and advantages of executing school operations and why ICT integration was justifiable.

ICT integration leadership was the phenomenon through which technology was accessed, used and maintained at Herons. In trying to understand this phenomenon, it materialised in the discussions that ICT integration leadership was a process that addressed four needs in the school. The school operated with ICT by meeting different needs of people, school functionality, curriculum and change levels. Curriculum-based needs were linked to how ICT was required to complete teaching and learning content. School functionality and change-based needs were about how ICT was directed linked to daily and yearly requirements and factoring in being responsive to change. People-based needs were focused on empowerment, development and resource provision. The needs concept is fully discussed in the next chapter and completes the theorisation of understanding ICT integration leadership at this particular school. The next chapter is a summary chapter for the whole study and also reveals the limitations upheld and recommendations for future studies.

## CHAPTER 7

### SUMMARISING AND CONCEPTUALISING ICT INTEGRATION LEADERSHIP

#### 7.1 Introduction

This study aimed to investigate ICT integration in an international high school and the influence of leadership. Three research questions were formulated to accomplish this aim. The first question explored how the international high school enacted ICT integration, while the second investigated how leadership influenced ICT integration. The last question investigated why the school enacted ICT integration the way it did. This chapter presents a summary of the study findings. In Chapter Six, the discussion of the results narrated how ICT integration unfolded at the international high school. The school leadership influenced the process and contributed to why ICT was integrated in the way it was.

The context of the school and especially the curriculum offered had a more significant bearing on why ICT was integrated in the way it was done. This chapter summarises the findings and uses them to examine the study's implications for current theory, its extension and in applied settings. The study had methodological limitations, which will be presented as well as the recommendations for future studies.

#### 7.2 Summarising the Research Findings

*Research Question 1. How Does an International High School Enact ICT Integration for School Operations?*

This question was meant to collect information about the facilitation of ICT integration in teaching and learning, information management and school communication. In teaching and learning, ICT facilitated the occurrence of both active and remote teaching and learning. Teachers used ubiquitous ICT tools to promote active learning, but two different levels of ICT integration emerged. A low level of ICT integration involved primary computer usage in presentations, videos and audio in lesson delivery. A high level transitioned from teacher to student-specific methods of

teaching that promoted meaningful learning. In this case, curricular objectives were met through ICT to support a constructivist learning process. It involved more creativity and competence in addressing learning objectives.

The COVID-19 pandemic necessitated RTL at a broad scale. Like most schools in the world, RTL's preparation and implementation had challenges ranging from lack of skills; adaptation; internet provision and access; and evaluating its effectiveness in the teaching process. It can be summarised that at Herons, it offered a way for the continuity of schooling because a regular timetable was followed. However, ICT integration was mostly about ICT usage in content delivery, although attempts were made to develop knowledge-processing, collaboration, and problem-solving skills.

Information management and school communication were other aspects through which ICT integration was enacted at Herons. Information management in this study chiefly included data keeping and retrieval with a computerised system. The school's SIMS (ADAM) doubled for information storage, access, and communication. The school leadership defined the school system to be ICT-based because of a reliance on ADAM, emailing and the school website. The findings showed that the school leadership, rather than enforcing ICT integration in teaching and learning, gave a higher antecedence to information management and school communication operations.

*Research Question 2: How does leadership Influence ICT Integration in an International High School?*

The school leadership influenced ICT integration by creating an ICT vision and policy; strategic ICT resourcing; organising ICT professional development programmes, and decentralising decision-making and ICT-related responsibilities. The importance of influence was in the motivation it brought for the participants to plan for ICT integration with the knowledge of what they had, needed, what could be offered and what to do when facing challenges.

An ICT vision was a leadership determinant and was about ICT resource provision, computer literacy promotion and ICT use strategies by all stakeholders. The school's mission was about teaching to lay the foundations for students to become responsible citizens with a sense of

purpose and a wide range of skills and knowledge to provide potential leadership in Africa and the rest of the world. Therefore, the vision of ICT integration was seen through aligning ICT development to students learning, their all-inclusive development and that the school systems which supported it were in place.

Creating an ICT policy provided specific guidance and regulations about ICT usage in the school. The policy described how computing facilities were to be used in the school; management of personal and school information; technical support; e-mailing guidelines; online teaching and learning; legislation; disciplinary procedures, and incident reporting. These essential aspects of ICT integration were supposed to be understood by participants, but they were not fully conversant with the contents of the policy. Therefore, ICT integration was self-directed and not guided by the school policy.

Strategic ICT resourcing was discussed in recognition of the planning that was done by the school leadership to provide ICT tools and facilities. Data projectors were fixed in all classrooms to reduce the need to carry them around and afford teachers and students the convenience of using them. The high enrolment deterred the school from buying computers for every classroom, but by setting up the IT centre, students could access both computers and the internet. Another aspect of strategic resourcing was the school's IT department, which served for ICT support, professional development and student training.

Professional development programmes in ICT integration were as important as acquiring the ICT tools. These programmes were localised and offered by the IT department to develop skills needed for day to day functionality. The professional development programmes seemed infrequent because of the number of times provided in a term and less effective because of the lack of skills they failed to foster.

The school leadership decentralised ICT responsibilities and decision-making to the IT department and teachers, allowing ICT integration leadership to be distributed. Therefore, pertinent decisions on where and how ICT tools were distributed and used were made at the place of usage and need with the school leadership's approval, support and guidance. Decentralisation



of ICT responsibilities and decision-making empowered participants to offer specific ICT integration leadership.

*Research Question 3: Why does an International High School Enact ICT Integration the way it Does?*

The reasons echoed the school's vision, mission and aspiration to offer a worldly education in technological innovations and change. In this regard, the grounds were connected to the school's responsiveness to; curriculum demands, stakeholder expectations and ICT integration being central to providing sustained efficiency and effectiveness in school operations.

Technology helped meet curricular demands by having tools for implementation and assistance. An essential resource in meeting curriculum demands was access to the internet. It facilitated that all sorts of information and support material could be found and helped the teaching and learning process. Teaching was supposed to be aligned (in higher forms) with IB and IGCSE requirements. Curricular documents have expectations and suggestions on handling and covering the syllabi that guide teachers. Nonetheless, the level of ICT integration where teachers operated at a low level of ICT integration meant that students did not fully fulfil all curriculum expectations.

Parents, funders and donors indirectly influenced ICT integration by injecting money into the school, which was also channelled to ICT projects. Some donations were the existing ICT resources. A direct influence was evidenced through the expectations of examination bodies, and XYZ had on the school. International and technology-infused standards influenced school operations. The school generally operated from a technological point of view, and exposure to these international organisations' standards increased ICT use and what students could do with ICT.

ICT integration helped the school sustain effectiveness in performing school operations. The school operations were significantly rooted in how ICT could improve processes and that participants get desired results. The advantages and benefits that Herons participants enjoyed showed a reliance on ICT with a click of a button. Data storage and retrieval, school communication, and accessing information and resources are some of the benefits. In this way,

staff found ways of executing tasks that made their work bearable. Teachers who used software in teaching and learning found its effectiveness in education.

In the same vein, ICT integration was linked to the sustenance of efficiency in performing school operations. In this regard, ICT was associated with fast processes and easy use of ICT. Participants used similar websites, software, and shared documents and ideas to increase efficiency in their functioning.

### **7.3 Implications of the Study for Current Theory**

This section discusses the implications of the study to the theoretical framework. It dwells on the two theories used in the study and their relevance in understanding the focus. It provides indicators of new ideas on ICT integration leadership that emerged from the findings.

The TOE and TL provided a baseline for interpreting findings. The TOE was used to understand the school organisation, the ICT tools present and how they contributed to ICT integration. As mentioned in Chapter 3, the TOE is used in research to understand how ICT integration decisions combine technological, organisational and environmental factors in a given school. The TOE provides a list of the elements found under each of the three components, which must help decision-making in ICT integration. In this case study, the theory helped tie people to the school organisation, to evaluate and analyse factors of consideration in ICT integration. Although the idea is meant to help understand how ICT integration decisions come about, specific details of what constitutes decision-making and by who remains elusive when using this theory.

The TL theory helped in this case study in understanding the leadership aspects. It focuses on people and building the productive organisational relationships, beliefs, values, and attitudes (Lee & Kuo, 2019). It is consistent with varied, modern social trends and accentuates the moral requirements of leaders and their followers. Transformational leaders (commonly denoted as principals) stimulate, motivate and inspire their followers through their vision and personality (Abdullah et al., 2018; Afshari et al., 2012; Franciosi, 2012; Money, 2017).

However, this aspect of one person's charisma became its weakest point. The charm was not glaringly visible in the school leadership, and other staff members (like the ICT coordinator) were regarded as transformational leaders. Leadership placed in an individual is bound to have gaps in how ICT integration leadership is executed. Although some strictly principal roles are to be done in a school, ICT integration leadership is better shared. The deficiency of the TL theory emerged from it being a general theory that is not specific to ICT integration. Therefore, critical aspects of the 'how' and 'why' of ICT integration could not be critically analysed using it.

Having said this, it became clear that the theories could not stand alone in addressing ICT integration leadership in this study. At the same time, they seemed to be better placed considering the study phenomenon. Hence applicable tenets from each theory were selected. For example, the technological and organisational components from the TOE remain critical in any theorisation in line with ICT integration leadership. Intellectual stimulation and individual consideration from the TL apply to developing ICT integration leadership. Nevertheless, bringing the two theories together did not fully exhaust what ICT integration leadership was in the context of this case study.

In expanding the scope of ICT integration leadership, an iterative engagement with the data was done to produce themes that, when collated, showed that ICT integration leadership seemed to emerge as a needs-based approach centred on school leadership. There were ICT needs to be met in addressing curriculum demands, people actions, school operations, and change. Hence, in this study, ICT integration leadership can be viewed as a process that meets different categories of needs related to ICT integration.

#### **7.4 ICT Integration Leadership: A Needs-based Approach**

This section extends what is known in ICT integration leadership. It presents a discussion on ICT integration leadership existing to meet specified needs. The theoretical reflections in this section represent the contribution to the study.

In Chapter 1, leadership influence was defined as a force an individual exerts on others. This force induces a change in behaviours, opinions, values, and attitudes and meets the needs to accomplish set goals (Nikoloski, 2015). The findings showed that the leadership influence shown

at Herons was ICT integration leadership meeting school needs in ICT integration. Needs are gaps that result from what is being done and what should be done or a state of what must continuously prevail (Igaab, 2010). A needs-based approach is a systematic and comprehensive evaluation of holistic necessities and the coordination of appropriate action to undertake to achieve them (Anderson et al., 2012).

These needs were divided into people-based, curriculum-based, school-functionality and change-based. For example, curriculum-based needs were the ICT needs that had to be met by an ICT integration process that examined how the school curriculum was delivered, what was crucial to do and how ICT integration could be optimised in teaching and learning. Table 7.1 depicts a needs-based approach to ICT integration leadership based on the findings.

**Table 7.1** *A Needs-based Approach to ICT Integration Leadership*

	<b>Curriculum-based needs</b>	<b>People-based needs</b>	<b>School functionality needs</b>	<b>Change-based needs</b>
<b>Examples of instances of meeting the needs</b>	- ICT integration in active teaching and learning, - ICT integration in remote teaching and learning	- Professional development in ICT skills - Distributing decision-making, responsibility and autonomy in ICT integration	- In meeting school expectations in information management and communication tasks -For efficiency and effectiveness in executing tasks and duties	-Remote teaching and learning -Imposed and desired change to teaching, learning and school interaction
<b>Leadership dimensions involved</b>	-Developing ICT skills -Challenging the current situation -Creativity -Innovating -Social responsibility	-Engaging stakeholders -Supporting empowerment -Decision making -Problem-solving	-Resolute about expectations -Affirming through ICT support -Time management -Communicating	-Leading change -Inspiring -Adaptability to change

The last row in Table 6.1 contains the operational leadership dimensions required to meet the different needs.

### 7.4.1 Curriculum-based Needs

ICT integration leadership must meet curriculum needs. The findings showed that ICT integration influenced curriculum implementation, judging from how teachers and students mentioned that ICT tools impacted their teaching and learning. Themes on how ICT influenced active and remote teaching and learning provided evidence on how the school planned for curriculum coverage in the official curriculum, extra-curricular and co-curricular activities. To ensure that students were given the chance to experience and acquire knowledge from various contexts, the school provided technology-infused environments for optimum teaching and learning experiences. If the facilities were insufficient, requests were entertained to add to software or hardware. Curriculum needs stipulated by IB and CAIE were part of why the school enacted ICT in the way it did. In this case, the school needed to follow international examination bodies' guidelines for IB and IGCSE examinations and thrive on offering a balanced and holistic curriculum that catered to young people's developmental and societal needs. Students were expected to participate actively in the curriculum and develop skills, attributes and knowledge through ICT integration. The curriculum promoted community service, and students developed skills in social responsibility that helped them relate to each other and take charge in group projects.

Because of the curriculum needs (and the support of ICT tools), the school leadership challenged students and teachers to be innovative and creative to have stimulating learning environments. Development of such abilities elevated their leadership skills. The school leadership promoted collegiality as a force that helped skill and knowledge-sharing to meet curriculum needs. ICT integration leadership that meets curriculum needs is not limited to school leadership alone. According to (Cambridge International Examinations, n.d), teachers need to be viewed as leaders. As evidenced, in this study, they act as curriculum leaders who strategise teaching, decide on what ICT to use, instigate change and foster skills in students and fellow teachers. Curriculum-based needs must be recognised in conjunction with a multi-layered approach to leadership.

### **7.4.2 People-based Needs**

People are arguably the most significant resource in any organisation because they are the ones that get things done. People-based needs are the requirements that the school leadership meets so that ICT conditions are suitable for the end-users. The findings showed that the school leadership met students' and staff's needs. Themes on developing ICT vision; professional development programmes; and decentralisation of ICT responsibilities and decision-making involved analysing what people wanted and how best they could be empowered to serve the school. The school leaders formulated the ICT vision based on the human resources that could be needed.

Furthermore, successful school systems develop skills in teachers who become creative professionals for collaborative working cultures (Cambridge International Examinations, n.d). Thus, professional development was constantly needed at Herons to bring the relevance of technology to teachers' repertoire of functions. The school leadership engaged staff members to determine where professional development programmes were required. The leadership used their judgement to train teachers, for example, preparing for online teaching during the lockdown. In this case, transformational leadership was exhibited, allowing the development of skills and showing organisational support for such endeavours. Students were not left out in the technology equation, and they got assistance from the IT centre and from teachers on how to use specific tools. Meeting people's needs similarly meant providing ICT resources that made ICT integration possible.

The school leadership permitted individual/departmental autonomy in ICT integration decisions. This decentralisation of decision usually gives people a more accessible environment and freedom to choose effective ways of operation. The principal mentioned that teachers were at liberty to use ICT, and teachers supported this assertion by adding that their HODs gave them the latitude to use ICT in fitting ways. Crucial ICT-related decisions were delegated to ICT specialists who were thus empowered to make worthwhile and informed decisions. These cited aspects point out that a distributed form of ICT integration leadership is facilitative in ICT integration and should encourage decision-making and problem-solving to be centred on the end user.

### **7.4.3 School Functionality-based Needs**

School functionality was mainly about how daily tasks and operations incorporated ICT integration. In this regard, more ICT usage facilitated the carrying out of information management tasks and school communication. Other related themes to school functionality were that ICT integration sustained efficiency and effectiveness in performing school operations. The findings showed that participants used ICT effectively and efficiently to meet school expectations and deadlines. The school had standards that needed to be kept. The school leadership set some, whilst others were conditions expected of an international high school affiliated with organisations like IBO and XYZ. It was a school expectation for everyone to use e-mailing and ADAM for communication and functions like student registration and generating school reports. The school's functionality needs were encapsulated in wishing to have standard procedures and ensuring that the school operated as expected. The school leadership provided ICT resources and opportunities for training so that the school system was known and operational.

In school-based needs, ICT integration leadership manifested through the school leadership being resolute on expectations and valuing time management. The leadership helped create an information society that efficiently reached out to parents and other essential stakeholders through apt communication and school-based support systems. In a school endowed with ICT resources, technology can be used to enable effective and efficient functionality. However, this need comes with apt planning to visualise what can be done.

### **7.4.4 Change-based Needs**

ICT integration leadership must address change. Schools, like any other organisations, are faced with challenges whose inevitability must be met head-on to thrive. Whilst many changes were mentioned by the participants. The main difference occurred when the school was compelled to teach online full-time because of the COVID-19 pandemic. This change meant that how teachers met their students for class sessions and assessments had to change drastically and with little preparation. The need to make sure that lessons continued despite the distance barrier was met by leadership that led in the change process, was adaptable and constantly offered inspiration.

The novelty of RTL led to the school leadership initially leading blindly, encouraging their teachers that teaching could still be done. The leadership was adaptable, sourcing the belief from the fact that the school had resources that could be used to bring change and the will to succeed even if people were not in one place. An existing website, ADAM, and e-mailing facilitated communication and passing instruction so that students and staff got the instruction, training, feedback and inspiration at opportune times. The presence of an ICT coordinator and IT department was worthwhile in offering online training and guidance. This information shows that change is best dealt with when schools have structures and resources that can be used. Since change can be unforeseen, it does not mean that everything can be put into perspective but investing in ICT resources seems the way the world must prepare.

In summary, a needs-based approach to ICT integration leadership can be viewed as an extended dimension of TL because it attempts to categorise school aspects that deal with the purpose of transformation. However, unlike TL, it is not always individually centred but places more value on decision-making.

#### **7.4.5 Application of the Need-based Approach**

The need-based approach described above described the four needs prevalent in a particular international high school context. It highlighted major findings that favoured meeting the needs at the school. The approach can be applied to other school setups (international or not) and whether the school is introducing ICT or already operating with it. The explanation of the need-based approach did not mention some aspects that were not done right regardless of meeting the needs at Herons. This section exposes these weaknesses about how the system could be used better in a school setup.

ICT is a curriculum imperative in the 21-st century learning. Schools can no longer deprive students of a learning experience that involves ICT. Hence, ways of funding ICT provision must be sought for less-resourced schools. Herons was a resourced school. However, a significant weakness was seen in the school leadership not evaluating resource use and how impactful ICT was on student learning. The school ICT policy must have guidelines on how ICT tools and ICT integration in learning can be evaluated. ICT integration goes beyond teacher use of ICT in lesson



delivery. Therefore, school leadership must ascertain that teachers interpret curricular documents accurately and that their teaching is based on educational strategies that put students at the centre of learning. A change in the belief system in the leadership is also necessary to validate that their opinions on ICT integration do not hinder ICT integration in the classroom.

People-based needs impact the stakeholders in the school in terms of resource provision and ICT professional development. Professional development at Herons was done to instil ICT skills in the teachers. Essential skills in computer literacy were developed. However, the development programmes were not frequently done and were reported to be ineffective. They could not cover all technology deficiencies and were not specific to offering skills in actual teaching. Such programmes should provide subject-specific ICT integration ideas (An & Reigeluth, 2011).

Moreover, the school leadership did not evaluate the skills developed after the training. However, ICT integration leadership is not just about school leadership actions. Teachers should evaluate their pedagogical skills with ICT, how they suit teaching and how they can collaborate with others. Offering ICT professional development programmes does not necessarily lead to ICT integration. Teachers must be supported in clearing the intrinsic and extrinsic barriers to integrate successfully.

ICT skill development can work as a panacea in other areas of the school. Teachers would not have debilitating challenges when using ICT in school operations and responding to ICT-based change if they had the right skills. Autonomy in an individual's decision-making in ICT matters represents a higher level of ICT integration leadership that comes with competence with ICT.

## **7.5 Limitations of the Study**

DePoy and Gitlin (2016) describe limitations as potential weaknesses or problems within the study. The interview was the main instrument of data gathering. However, it was difficult to ascertain how much information was filtered through the responses and to what extent the researcher's presence could have affected the responses (Creswell & Creswell, 2018). There were no observations of contact lessons done due to the COVID-19 pandemic. Access to the online class

was not granted. Direct lesson observations would have enabled the gathering of first-hand data on ICT integration at the classroom level. Another drawback was seen with conducting Zoom cloud meetings with interviewees. It was not possible to capture non-verbal data because participants preferred to mute their videos.

## **7.6 Recommendations for Future Studies**

Every purpose and process in education requires an evaluation to justify practices, resource allocation and sustainability of programmes. A lack of an evaluation system to gauge the effectiveness of ICT integration and the leadership influence in professional development created gaps in understanding ICT integration leadership. It was one area the researcher found awkward when carrying out this study. Perhaps, in similar schools, mechanisms have been put in place to evaluate all aspects of ICT integration leadership. This evaluation would be based on teacher ICT competence and overall student educational outcomes. A comparative study of international schools in different countries could yield more comprehensive results in ICT integration leadership. Further still, a comparative analysis with other schools in Eswatini that use different curricula could produce a different perspective on the phenomenon.

## **7.7 Summary**

ICT integration is not an easy feat that schools pull off with minimal effort. From generating research objectives, questions, and focus and carrying out the research, it has become more apparent that ICT integration is a well-planned process tied to ICT integration leadership. In this study, the school enacted ICT integration for operations linked to teaching and learning, information management and school communication. ICT integration leadership facilitated meeting curriculum-based and school functionality-based needs in this enactment. School functionality-based needs are essential in meeting optimal operation in a school. People-based needs were established from the findings on how the school leadership influenced ICT integration in an international high school. In this case, it was discovered that ICT integration leadership should address peoples' needs in terms of professional development, in developing vision and the need for accommodative decision-making in ICT matters.

The reasons why the high school enacted ICT the way it did were centred mainly around responding to stakeholder expectations as well as the school's need to function fittingly in current times. The school capitalised on the benefits of ICT in terms of effectiveness and efficiency in working. The last need that emerged from the analysis was change-based. In this regard, school leadership prepares for change that eventually comes, as it did with the onset of COVID-19 and remote teaching and learning. In summary, this study suggests that instigating ICT integration leadership is to meet these needs through school leaders working with appropriate school stakeholders to explore and ascertain how best each can be fulfilled. With an extension of ICT integration leadership with a needs-based approach, the writer could indicate with confidence that the study conclusions and recommendations clearly show the study's original contribution to knowledge about ICT integration in curriculum delivery and other schools' operations.

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## Appendices

### Appendix A Ethical Clearance



23 May 2019

**Mr Shepherd Fato 218042590**  
School of Education  
Edgewood Campus

Dear Mr Fato

**Protocol reference number:** HSS/0242/019D

**Project Title:** Successful information and communication technology integration leadership in a Deprived High School Science Classrooms in the Kingdom of eSwatini.

#### **Full Approval – Expedited Application**

In response to your application received 02 April 2019, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

**Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.**

**The ethical clearance certificate is only valid for a period of 1 year from the date of issue. Thereafter Recertification must be applied for on an annual basis.**

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

  
.....  
**Dr Shamila Naidoo (Deputy Chair)**

/px

cc Supervisor: Dr T Chirikure  
cc. Academic Leader Research: Dr A Pillay  
cc. School Administrator: Ms S Jeenaarain, Ms M Ngcobo, Ms N Dlamini and Mr SN Mthembu

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**Humanities & Social Sciences Research Ethics Committee**  
**Dr Rosemary Sibanda (Chair)**

**Westville Campus, Govan Mbeki Building**

Postal Address: Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email: [sibanda@ukzn.ac.za](mailto:sibanda@ukzn.ac.za) / [roymar@ukzn.ac.za](mailto:roymar@ukzn.ac.za) / [mohump@ukzn.ac.za](mailto:mohump@ukzn.ac.za)

Website: [www.ukzn.ac.za](http://www.ukzn.ac.za)




Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville



## Appendix B Permission to do Research in Eswatini

The Government of the Kingdom of Eswatini



**Ministry of Education & Training**

Tel: (+268) 2 4042491/5  
Fax: (+268) 2 404 3880

P. O. Box 39  
Mbabane, ESWATINI

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03<sup>rd</sup> January, 2020

Attention:  
**Head Teacher:**  
[REDACTED]

THROUGH  
Hhohho Regional Education Officer

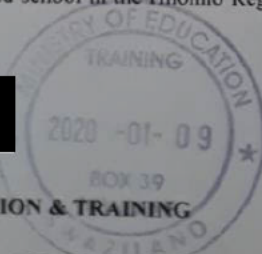
Dear Colleague,

**RE: REQUEST FOR PERMISSION TO COLLECT DATA FOR UNIVERSITY OF KWAZULU NATAL STUDENT – MR. SHEPHERD FATO**

1. The Ministry of Education and Training has received a request from Mr. Shepherd Fato, a student at the University of KwaZulu Natal that in order for him to fulfill his academic requirements at the University he has to collect data (conduct research) and his study or research topic is: *“Integration Leadership in an International Curriculum Context: An Eswatini case study”*. The population for his study comprises of the principals, deputy principals, HODs teachers from the above mentioned schools. All details concerning the study are stated in the participants’ consent form which will have to be signed by all participants before Mr. Fato begins his data collection. Please note that parents will have to consent for all the participants below the age of 18 years participating in this study.
2. The Ministry of Education and Training requests your office to assist Mr. Fato by allowing him to use above mentioned school in the Hhohho Region as his research site. Data collection period is one month.

[REDACTED]

**Dr. Ntombenhle Dlamini**  
**DIRECTOR OF EDUCATION & TRAINING**



Cc: Regional Education Officer – Hhohho  
Chief Inspector – Secondary/High  
1 Head Teacher of the above mentioned schools  
Dr. T. Chrikure – Research Supervisor

## Appendix C Permission to do Research in the Selected School

[Redacted]

17 November 2020

To Whom It May Concern:

This letter serves to confirm that Mr Shepherd Fato was allowed to carry out educational research at our school. The school was willing to help him in his data collection process in a topic entitled: **ICT Integration Leadership in an International Curriculum Context: An Eswatini Case Study.**

Yours sincerely

[Redacted Signature]

[Redacted Name]

Deputy Principal: Academic

[Redacted]

[Redacted]

## Appendix D Informed Consent (for Teachers)

P.O. Box 7043  
Mbabane  
Eswatini.

Dear Teacher

### Re: Informed Consent

My name is Shepherd Fato. I am a PhD student studying at the University of KwaZulu Natal at the School of Education in the College of Humanities. My research title is: **Information and Communication Technology Integration in an International High School: The Influence of Leadership.**

The study has the following objectives: to explore how an international high school enacts ICT integration for school purposes; to investigate how leadership influences ICT integration in an international high school and to investigate the reasons why an international high school enacts ICT integration in the way it does.

Your input is greatly required in participating in this research. You will be interviewed and be observed during your classroom teaching. Your permission will be sought to examine your lesson plans and schemes of work as well. I will also request photographic images of your class sessions.

Please note that:

- Participation in this research is voluntary and you can stop participating if you decide to.
- The research does not come with any financial benefits.
- Confidentiality of information will be guaranteed by not disclosing names.
- Anonymity will be ensured by using disguised names.
- The data collected is solely for academic purpose and will be stored in a safe place and will be destroyed after five years.
- After data collection, you will be requested to cross-check copies of transcripts of the interviews, audio and video recording if they represent what transpired.
- A copy of the final draft thesis will be made available to you upon completing the research.

Should you need further information please contact the following people:

1. Dr Tamirofofa Chirikure (my supervisor)  
School of Education, College of Humanities  
Cu 135, Main Tutorial Building,  
Edgewood Campus  
University of KwaZulu-Natal  
Private Bag X03

Ashwood 3605, South Africa  
Cell: +27 735 764 572  
Tel: +27 31 260 3470  
Email: [chirikure@ukzn.ac.za](mailto:chirikure@ukzn.ac.za)

2. Research Office: HSSREC – Ethics  
University of KwaZulu-Natal Govan Mbeki Building  
Private Bag X54001,  
Durban 4000  
South Africa  
Tel: +27 31 260 4557  
Fax: +27 31 260 1609

If you agree to participate in this research, do fill in your full names and sign in the attached declaration form. Your participation will be greatly appreciated.

Yours faithfully

Shepherd Fato  
Cell: 76516764  
Email: [ffatoe@gmail.com](mailto:ffatoe@gmail.com)

**DECLARATION FORM** (for Teachers)

**DECLARATION.** I.....do agree to participate in this research entitled: **Information and Communication Technology Integration in an International High School: The Influence of Leadership**

I do understand that:

- I am going to be part of this study because I have volunteered to do so.
- I am free to be part of the study and decide to withdraw from it or any of its activities.
- My confidentiality will be valued and anonymity will be assured by the use of a pseudonym in thematic data analysis if need arises.
- Copies of some of my lesson plans, my scheme of work and other relevant documents will be requested for this study.
- The researcher asks to take pictures from my classes.
- The researcher requests to audio-record interview sessions.

Please tick in the table below the choice you would like to make.

I agree to be photo-recorded	<input type="checkbox"/>	I do not agree to be photo-recorded	<input type="checkbox"/>
I agree to be audio-recorded	<input type="checkbox"/>	I do not agree to be audio-recorded	<input type="checkbox"/>

Name of participant.....

Signature of the participant .....

## Appendix E Informed Consent (for Principal/Deputy Principal)

P.O. Box 7043  
Mbabane  
Eswatini.

Dear Principal

### Re: Informed Consent

My name is Shepherd Fato. I am a PhD student studying at the University of KwaZulu Natal at the School of Education in the College of Humanities. My research title is: **Information and Communication Technology Integration in an International High School: The Influence of Leadership.**

The study has the following objectives: to explore how an international high school enacts ICT integration for school purposes; to investigate how leadership influences ICT integration in an international high school and to investigate the reasons why an international high school enacts ICT integration in the way it does.

Your input is greatly required in participating in this research. You will be requested to fill in a questionnaire, interviewed. I will request to audio- record you during the interview. I will also request school documents like meeting minutes, policies and seculars.

Please note that:

- Participation in this research is voluntary and you can stop participating if you decide to.
- The research does not come with any financial benefits.
- Confidentiality of information will be guaranteed by not disclosing names.
- Anonymity will be ensured by using disguised names.
- The data collected is solely for academic purpose and will be stored in a safe place and will be destroyed after five years.
- After data collection, you will be requested to cross-check copies of transcripts of the interviews and audios if they represent what transpired.
- A copy of the final draft thesis will be made available to you upon completing the research.

Should you need further information please contact the following people:

1. Dr Tamirirofa Chirikure (my supervisor)  
School of Education, College of Humanities  
Cu 135, Main Tutorial Building,  
Edgewood Campus  
University of KwaZulu-Natal  
Private Bag X03  
Ashwood 3605, South Africa

[REDACTED]  
Tel: +27 31 260 3470

Email: [chirikure@ukzn.ac.za](mailto:chirikure@ukzn.ac.za)

2. Research Office: HSSREC – Ethics

University of KwaZulu-Natal Govan Mbeki Building

Private Bag X54001,

Durban 4000

South Africa

Tel: +27 31 260 4557

Fax: +27 31 260 1609

If you agree to participate in this research do fill in your full names and sign in the attached declaration form. Your participation will be greatly appreciated.

Yours faithfully

Shepherd Fato

[REDACTED]  
Email: [ffatoe@gmail.com](mailto:ffatoe@gmail.com)

**DECLARATION FORM** (for the Principal/Deputy Principal)

**DECLARATION.** I.....do agree to participate in this research entitled: **Information and Communication Technology Integration in an International High School: The Influence of Leadership**

I do understand that:

- I am going to be part of this study because I have volunteered to do so.
- I am free to be part of the study and decide to withdraw from it or any of its activities.
- My confidentiality will be valued and anonymity will be assured by the use of a pseudonym in thematic data analysis.
- Copies of minutes of meetings, seculars, policies and other public documents might be requested.
- The researcher requests to audio-record interview sessions I will have with him.

Please tick in the table below the choice you would like to make.

I agree to be audio-recorded	<input type="checkbox"/>	I do not agree to be audio-recorded	<input type="checkbox"/>
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Name of participant.....

Signature of the participant .....



## Appendix F Informed Consent (for HODs)

P.O. Box 7043  
Mbabane  
Eswatini.

Dear HOD

### Re: Informed Consent

My name is Shepherd Fato. I am a PhD student studying at the University of KwaZulu Natal at the School of Education in the College of Humanities. My research title is: **Information and Communication Technology Integration in an International High School: The Influence of Leadership.**

The study has the following objectives: to explore how an international high school enacts ICT integration for school purposes; to investigate how leadership influences ICT integration in an international high school and to investigate the reasons why an international high school enacts ICT integration in the way it does.

Your input is greatly required in participating in this research. You will be requested to fill in a questionnaire, interviewed. I will request to audio- record you during the interview. I will also request school documents like meeting minutes, policies and seculars.

Please note that:

- Participation in this research is voluntary and you can stop participating if you decide to.
- The research does not come with any financial benefits.
- Confidentiality of information will be guaranteed by not disclosing names.
- Anonymity will be ensured by using disguised names.
- The data collected is solely for academic purpose and will be stored in a safe place and will be destroyed after five years.
- After data collection, you will be requested to cross-check copies of transcripts of the interviews and audios if they represent what transpired.
- A copy of the final draft thesis will be made available to you upon completing the research.

Should you need further information please contact the following people:

1. Dr Tamirofa Chirikure (my supervisor)  
School of Education, College of Humanities  
Cu 135, Main Tutorial Building, Edgewood Campus, University of KwaZulu-Natal  
Private Bag X03, Ashwood 3605, South Africa

Tel: +27 31 260 3470

Email: [chirikure@ukzn.ac.za](mailto:chirikure@ukzn.ac.za)

2. Research Office: HSSREC – Ethics  
 University of KwaZulu-Natal Govan Mbeki Building  
 Private Bag X54001, Durban 4000  
 South Africa  
 Tel: +27 31 260 4557  
 Fax: +27 31 260 1609

If you agree to participate in this research do fill in your full names and sign in the attached declaration form. Your participation will be greatly appreciated.

Yours faithfully

Shepherd Fato



Email: [ffatoe@gmail.com](mailto:ffatoe@gmail.com)

**DECLARATION FORM (for HOD)**

**DECLARATION.** I.....do agree to participate in this research entitled: **Information and Communication Technology Integration in an International High School: The Influence of Leadership.**

I do understand that:

- I am going to be part of this study because I have volunteered to do so.
- I am free to be part of the study and decide to withdraw from it or any of its activities.
- My confidentiality will be valued and anonymity will be assured by the use of a pseudonym in thematic data analysis.
- Copies of minutes of meetings, seculars and other public documents might be requested.
- The researcher requests to audio-record interview sessions I will have with him.
- The researcher requests to photo-record some sessions in my classes (if there is a need)

Please tick in the table below the choice you would like to make.

I agree to be photo-recorded	<input type="checkbox"/>	I do not agree to be photo-recorded	<input type="checkbox"/>
I agree to be audio-recorded	<input type="checkbox"/>	I do not agree to be audio-recorded	<input type="checkbox"/>

Name of participant.....

Signature of the participant .....

## Appendix G Informed Consent (for Students)

P.O. Box 7043  
Mbabane  
Eswatini.

Dear Student

### Re: Informed Consent

My name is Shepherd Fato. I am a PhD student studying at the University of KwaZulu Natal at the School of Education in the College of Humanities. My research title is: **Information and Communication Technology Integration in an International High School: The Influence of Leadership.**

The study has the following objectives: to explore how an international high school enacts ICT integration for school purposes; to investigate how leadership influences ICT integration in an international high school and to investigate the reasons why an international high school enacts ICT integration in the way it does.

Your input is greatly required in participating in this research. You will be requested to fill in a questionnaire, interviewed. I will request to audio- record you during the interview. I will also request school documents like meeting minutes, policies and seculars.

Please note that:

- Participation in this research is voluntary and you can stop participating if you decide to.
- The research does not come with any financial benefits.
- Confidentiality of information will be guaranteed by not disclosing names.
- Anonymity will be ensured by using disguised names.
- The data collected is solely for academic purpose and will be stored in a safe place and will be destroyed after five years.
- After data collection, you will be requested to cross-check copies of transcripts of the interviews and audios if they represent what transpired.
- A copy of the final draft thesis will be made available to you upon completing the research.

Should you need further information please contact the following people:

1. Dr Tamirirofa Chirikure (my supervisor)  
School of Education, College of Humanities  
Cu 135, Main Tutorial Building, Edgewood Campus, University of KwaZulu-Natal  
Private Bag X03|Ashwood 3605, South Africa  
[REDACTED] +27 31 260 3470|Email: [chirikure@ukzn.ac.za](mailto:chirikure@ukzn.ac.za)
2. Research Office: HSSREC – Ethics  
University of KwaZulu-Natal Govan Mbeki Building| Private Bag X54001, Durban 4000, South Africa  
Tel: +27 31 260 4557|Fax: +27 31 260 1609

If you agree to participate in this research do fill in your full names and sign in the attached declaration form. Your participation will be greatly appreciated.

Yours faithfully

Shepherd Fato

[REDACTED]  
Email: [ffatoe@ukzn.ac.za](mailto:ffatoe@ukzn.ac.za)

**DECLARATION FORM** (for students)

**DECLARATION.** I.....do agree to participate in this research entitled: **Information and Communication Technology Integration in an International High School: The Influence of Leadership.**

I do understand that:

- I am going to be part of this study because I have volunteered to do so.
- I am free to be part of the study and decide to withdraw from it or any of its activities.
- My confidentiality will be valued and anonymity will be assured by the use of a pseudonym in thematic data analysis.
- The researcher requests to audio-record interview sessions I will have with him.

Please tick in the table below the choice you would like to make.

I agree to be audio-recorded	<input type="checkbox"/>	I do not agree to be audio-recorded	<input type="checkbox"/>
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Name of participant.....

Signature of the participant .....

## Appendix H Informed Consent (for Parents)

P.O. Box 7043  
Mbabane  
Eswatini.

Dear Parent

### Re: Informed Consent

My name is Shepherd Fato. I am a PhD student studying at the University of KwaZulu Natal at the School of Education in the College of Humanities. My research title is: **Information and Communication Technology Integration in an International High School: The Influence of Leadership.**

The study has the following objectives: to explore how an international high school enacts ICT integration for school purposes; to investigate how leadership influences ICT integration in an international high school and to investigate the reasons why an international high school enacts ICT integration in the way it does.

My study also requires learner input and I thereby request your permission to allow your child to participate in this research. He/she will be requested to take part in a research interview. I will request to audio-record him/her during the interview.

Please note that:

- Participation in this research is voluntary and you can stop participation of your child if you decide to.
- The research does not come with any financial benefits.
- Confidentiality of information will be guaranteed by not disclosing names.
- Anonymity will be ensured by using disguised names.
- The data collected is solely for academic purpose and will be stored in a safe place and will be destroyed after five years.

Should you need further information please contact the following people:

1. Dr Tamirofa Chirikure (my supervisor)  
School of Education, College of Humanities  
Cu 135, Main Tutorial Building,  
Edgewood Campus  
University of KwaZulu-Natal  
Private Bag X03  
Ashwood 3605, South Africa  
[REDACTED]  
Tel: +27 31 260 3470  
Email: [chirikure@ukzn.ac.za](mailto:chirikure@ukzn.ac.za)

2. Research Office: HSSREC – Ethics  
 University of KwaZulu-Natal Govan Mbeki Building  
 Private Bag X54001,  
 Durban 4000  
 South Africa  
 Tel: +27 31 260 4557  
 Fax: +27 31 260 1609

If you agree for your child to participate in this research do fill in your full names and sign in the attached declaration form. Your permission will be greatly appreciated.

Yours faithfully

Shepherd Fato, Mr



Email: [ffatoe@gmail.com](mailto:ffatoe@gmail.com)

**DECLARATION FORM (for Parent/Guardian)**

**DECLARATION.** I.....do allow my child.....to participate in this research entitled:

**Information and Communication Technology Integration in an International High School: The Influence of Leadership.**

I do understand that:

- He/she is going to be part of this study because I have allowed it.
- He/she is free to be part of the study and can decide to withdraw from it or any of its activities.
- His/her confidentiality will be valued and anonymity will be assured by the use of a pseudonym in thematic data analysis.
- The researcher requests to audio-record interview sessions he will have with my child.

Please tick in the table below the choice you would like to make for your child.

I agree to audio-recording		I do not agree to audio-recording	
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Signature of the parent/guardian .....

## Appendix I Informed Consent (for ICT Coordinator)

P.O. Box 7043  
Mbabane  
Eswatini.

Dear ICT Coordinator

### Re: Informed Consent

My name is Shepherd Fato. I am a PhD student studying at the University of KwaZulu Natal at the School of Education in the College of Humanities. My research title is: **Information and Communication Technology Integration in an International High School: The Influence of Leadership.**

The study has the following objectives: to explore how an international high school enacts ICT integration for school purposes; to investigate how leadership influences ICT integration in an international high school and to investigate the reasons why an international high school enacts ICT integration in the way it does.

Your input is greatly required in participating in this research. You will be requested to fill in a questionnaire, interviewed. I will request to audio- record you during the interview. I will also request school documents like meeting minutes, policies and seculars.

Please note that:

- Participation in this research is voluntary and you can stop participating if you decide to.
- The research does not come with any financial benefits.
- Confidentiality of information will be guaranteed by not disclosing names.
- Anonymity will be ensured by using disguised names.
- The data collected is solely for academic purpose and will be stored in a safe place and will be destroyed after five years.
- After data collection, you will be requested to cross-check copies of transcripts of the interviews and audios if they represent what transpired.
- A copy of the final draft thesis will be made available to you upon completing the research.

Should you need further information please contact the following people:

1. Dr Tamirirofa Chirikure (my supervisor)  
School of Education, College of Humanities  
Cu 135, Main Tutorial Building, Edgewood Campus, University of KwaZulu-Natal  
Private Bag X03|Ashwood 3605, South Africa  
[REDACTED] +27 31 260 3470|Email: [chirikure@ukzn.ac.za](mailto:chirikure@ukzn.ac.za)
2. Research Office: HSSREC – Ethics  
University of KwaZulu-Natal Govan Mbeki Building  
Private Bag X54001, Durban 4000, South Africa  
Tel: +27 31 260 4557|Fax: +27 31 260 1609

If you agree to participate in this research do fill in your full names and sign in the attached declaration form. Your participation will be greatly appreciated.

Yours faithfully

Shepherd Fato  
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**DECLARATION FORM** (for ICT Coordinator)

**DECLARATION.** I.....do agree to participate in this research entitled: **Information and Communication Technology Integration in an International High School: The Influence of Leadership**

I do understand that:

- I am going to be part of this study because I have volunteered to do so.
- I am free to be part of the study and decide to withdraw from it or any of its activities.
- My confidentiality will be valued and anonymity will be assured by the use of a pseudonym in thematic data analysis.
- Copies of minutes of meetings, seculars and other public documents might be requested.
- The researcher requests to audio-record interview sessions I will have with him.

Please tick in the table below the choice you would like to make.

I agree to be audio-recorded		I do not agree to be audio-recorded	
------------------------------	--	-------------------------------------	--

Name of participant.....

Signature of the participant .....



## Appendix J Turnitin Report



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### Information and Communication Technology Integration in an International High School: The Influence of Leadership

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## Appendix K Interview Guide – Principal

### Principal Interview Guide

This interview guide is intended to collect information from a high school principal on ICT integration and ICT integration leadership in an international high school context. The guide is divided into three sections: biographical information; ICT integration questions; and ICT integration leadership questions.

#### Biographical Information

School identifier: \_\_\_\_\_

Gender:    Male        Female   

Qualifications: \_\_\_\_\_

Total number of years of experience as a teacher: \_\_\_\_\_

Number of years of experience working in an international curriculum context: \_\_\_\_\_

Number of years as principal in an international curriculum context: \_\_\_\_\_

#### ICT integration questions

1. I am aware that your school follows the Cambridge International Examinations and International Baccalaureate Examination curriculum while many schools in Eswatini are doing the Eswatini General Certificate of Education. What is the motive behind this?
2. How does the international curriculum suit your school's vision and mission for ICT integration?
3. Which ICT resources are available for use by teachers and students in this school? Highlight hardware, common software and applications where possible.
4. The curriculums you are implementing require ICT integration across all subject disciplines. How do teachers integrate ICT in their teaching of the various subjects offered in the school?
5. To what extent do teachers and students use the ICT resources available for school operations?
6. How do you use ICT in your administrative work as a principal?
7. How else does the school integrate ICT?
8. Why is ICT important in doing school operations?
9. How is efficiency in carrying out school operations achieved with ICT integration?
10. What challenges, if any, do you face in enacting ICT integration in your school? How do you deal with these challenges as a school?

### **ICT integration leadership questions**

11. How does the school sustain ICT integration in school operations?
12. Does your school have an ICT integration policy? If so, please give me a brief outline of the policy. Can I please have a copy of the policy?
13. How do you ensure effective ICT integration especially in the curriculum?
14. How do you upskill teachers and students for effective ICT integration in schooling? Do you have any staff development programme for upskilling all the teachers to ensure effectual ICT integration? If so, who is responsible for designing and implementing the programme?
15. Do you have any leadership structure for ICT integration? What does your school's organogram look like with respect to ICT integration? Who is responsible for what regarding ICT integration?
16. How are parents and other organisations involved in supporting ICT integration in school operations?
17. How successful have you been, as a school, regarding ICT integration across school operations? What would you attribute your success or lack of success to?

Thank you

## Appendix L Teacher Interview Guide

### Teacher Interview Guide

This interview guide is intended to collect information from high school teachers on ICT integration and ICT integration leadership in an international high school context. The guide is divided into three sections: biographical information; ICT integration questions; and ICT integration leadership questions.

#### Biographical Information

School identifier: \_\_\_\_\_

Gender:    Male        Female   

Qualifications: \_\_\_\_\_

Total number of years of experience as a teacher: \_\_\_\_\_

Number of years of experience working in an international curriculum context: \_\_\_\_\_

Number of years as principal in an international curriculum context: \_\_\_\_\_

#### ICT integration questions

1. I am aware that your school follows the Cambridge International Examinations/ Independent Schools Examination curriculum while many schools in eSwatini are doing the eSwatini General Certificate of Education. What is the motive behind this?
2. How does the international curriculum suit your school's vision and mission for ICT integration?
3. Which ICT resources are available for use by teachers and students in this school? Highlight hardware, common software and applications where possible.
4. The curriculums you are implementing requires ICT integration across all subject disciplines. How do you integrate ICT in the teaching of the various subjects offered in the school?
5. To what extend do you and students use the ICT resources available for school operations?
6. How do you use ICT in other duties or functions?
7. How else does the whole school integrate ICT?
8. Why is ICT important in doing school operations?
9. How is efficiency in carrying out school operations achieved with ICT integration?
10. What challenges, if any, do you face in enacting ICT integration in your school? How do you deal with these challenges as a school?

### **ICT integration leadership questions**

11. How does the school sustain ICT integration in school operations?
12. Does your school have an ICT integration policy? If so, please give me a brief outline of the policy. Can I please have a copy of the policy?
13. How does the school ensure that ICT integration leads to effective teaching and learning?
14. How do the school upskill teachers and students for effective ICT integration in the curriculum? Do you have any staff development programme for upskilling all the teachers to ensure effectual ICT integration? If so, who is responsible for designing and implementing the programme?
15. Do you have any leadership structure for ICT integration? What does your school's organogram look like with respect to ICT integration? Who is responsible for what regarding ICT integration?
16. How are parents and other organisations involved in supporting ICT integration in school operations?
17. How successful have you been, as a school, regarding ICT integration across school operations? What would you attribute your success or lack of success to?

Thank you

## Appendix M Deputy Principal Interview Guide

### Deputy Principal Interview Guide

This interview guide is intended to collect information from a high school deputy principal on ICT integration and ICT integration leadership in an international high school context. The guide is divided into three sections: biographical information; ICT integration in the curriculum; and ICT integration leadership.

#### Biographical Information

School identifier: \_\_\_\_\_

Gender: Male  Female

Qualifications: \_\_\_\_\_

Total number of years of experience as a teacher: \_\_\_\_\_

Number of years of experience working in an international curriculum context: \_\_\_\_\_

Number of years as deputy principal in an international curriculum context \_\_\_\_\_

#### ICT integration and ICT integration leadership

1. Your school follows the Cambridge International Examinations/Independent Schools Examination curriculum while most schools in eSwatini offer the eSwatini General Certificate of Education. What is the motive behind this?
2. How does the international curriculum suit your school's vision and mission for ICT integration?
3. Which ICT resources are available for use by teachers and learners in this school? Highlight hardware, common software and applications (where possible).
4. The curriculums you are implementing requires ICT integration across all subject disciplines. How do teachers integrate ICT in their teaching of the various subjects offered in this school?
5. To what extent do teachers and students use the ICT resources available for school operations?
6. How do you use ICT in your administrative work as a deputy principal?
7. How else does the school integrate ICT?
8. Why is ICT important in school operations?
9. How is efficiency in carrying out school operations achieved with ICT integration?
10. What challenges, if any, do you face in enacting ICT integration in your school? How do you deal with these challenges as a school?

### **ICT integration leadership**

11. How does the school sustain ICT integration?
12. Does your school have an ICT integration policy? If so, please give me a brief outline of the policy.
13. How do you ensure effective ICT integration especially in the curriculum?
14. How do you upskill teachers and learners for effective ICT integration in the curriculum? Do you have any staff development programme for upskilling all the teachers to ensure effectual ICT integration across the curriculum? If so, who is responsible for designing and implementing the programme?
15. Do you have any leadership structure for ICT integration across the (international) curriculum? What does your school's organogram look like with respect to ICT integration across the curriculum? Who is responsible for what regarding ICT integration?
16. How are parents and other organisations involved in supporting ICT integration in in the school operations?
17. How successful have you been, as a school, regarding ICT integration across school operations? What would you attribute your success or lack of success to?

**Thank You**

## Appendix N Student Interview Guide

### Student Interview Guide

This interview guide is intended to collect information from a high school student on ICT integration and ICT integration leadership in an international curriculum context. The guide is divided into three sections: biographical information; ICT integration in the curriculum; and ICT integration leadership.

#### Biographical Information

School identifier: \_\_\_\_\_

Identifier \_\_\_\_\_

Gender: Male  Female

Position held: \_\_\_\_\_

Form/Grade: \_\_\_\_\_

Number of years in an international curriculum context \_\_\_\_\_

#### ICT integration and ICT integration leadership

1. I am aware that your school follows the Cambridge International Examinations/ Independent Schools Examination curriculum while many schools in eSwatini are doing the eSwatini General Certificate of Education. Why are you learning a different curriculum?
2. How does the international curriculum suit your school's vision and mission for ICT integration?
3. Which ICT tools are available for your learning? Highlight hardware, software and applications.
4. The curriculums implemented at your school require ICT integration across all subject disciplines? How do your teachers use ICT in their teaching of the various subjects that you do?
5. How do you utilize ICT in your learning process?
6. To what extend do you use the ICT tools available in your school in light of the curriculum demands?
7. How else do you use ICT (besides in learning)?
8. Why is ICT important in doing school operations?
9. How is efficiency in carrying out school operations achieved with ICT integration?
10. What challenges, if any, do you face in enacting ICT integration in your school? How do you deal with these challenges as a school?



## **ICT integration leadership**

11. How does the school sustain ICT integration in school operations?
12. Does your school have an ICT integration policy? If so, how does it impact on your learning?
13. How does your school ensure effective ICT integration in the teaching and learning of the various subject disciplines?
14. How does your school develop students' ICT skills for effective ICT integration?
15. Do you see ICT integration at your school having a different leadership structure apart from principal-led leadership? Who is responsible for what regarding ICT integration?
16. How are parents and other organisations involved in supporting ICT integration in your school?
17. How successful have you been, as a school, regarding ICT integration across the whole school? What would you attribute your success or lack of success to?

**Thank You**

## Appendix O ICT Coordinator Interview Guide

### ICT Coordinator Interview Guide

This interview guide is intended to collect information from an ICT coordinator on ICT integration and ICT integration leadership in an international high school context. The guide is divided into two sections: biographical information; and ICT-related questions.

#### Biographical Information

School identifier: \_\_\_\_\_

Gender:    Male        Female   

Qualifications: \_\_\_\_\_

Number of years in the school: \_\_\_\_\_

Number of years of experience working as ICT coordinator: \_\_\_\_\_

1. What is your understanding of ICT integration in light of the curriculums offered in this school?
2. How is ICT distributed around the school?
3. What do you do in the IT centre? What are your responsibilities?
4. How involved are you in decisions that involve ICT integration in the school?
5. How do you organise ICT around teaching and co-curricular activities? What kind of learning happens in the IT Centre?
6. How is the IT department organised? What is a typical day like in the IT Centre?
7. How do you meet different individual ICT needs and problems?
8. Do you offer training to teachers and other members of staff? If so how?
9. What are the main challenges you encounter in your work?
10. What are the successes you can mention?

Thank you

## Appendix P Editing Certificate



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This is to certify that the following PhD Thesis has been edited by

**Dr Francis Z. Mavhunga PhD(UWC); M ScEd(UZ). B Ed (UZ) Cert Ed (UZ)**

The following issues were corrected: Grammar, Spelling, Punctuation, Sentence structure, Phrasing, and Numbering.

*Contact me for a copy of the edited document that was submitted to the author.*

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