Towards a Resilience Framework for Integrating and Using Mobile Technologies in South African Public Rural Schools: Theoretical Considerations

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Abstract. South Africa has seen research and development (R&D) efforts in Information and Communication Technologies for Development (ICT4D) to provide rural schools with mobile technologies for improving the quality of teaching and learning. The challenge however is that most of the interventions fail when the project team withdraws from the beneficiary schools. The failure of the ICT initiatives in public rural schools has led to studies that aim to understand the problems related to the sustainability of these interventions, however, despite all that, ICT initiatives continue to fail in these schools. While sustainability studies have historically focused on the ICT initiatives and factors impacting on their sustainability, in contrast, this study focuses on building resilience of the education system in a way that enables the school to thrive when using ICTs. Using a Design Science Research Method, the overall study seeks to identify existing sustainability and resilience frameworks for purposes of developing a resilience framework and guidelines for South African rural schools. This conceptual paper presents the theoretical building blocks for such a resilience framework.

Keywords: Resilience, Sustainability, Rural Communities, ICTs, ICT4D, ICT4E

1 Introduction

This paper aims to address the importance of building resilience at a school level as a measure for tackling challenges inherent in the introduction of mobile technologies in South African rural schools. The introduction of Information Communication and Technologies (ICTs) in South African rural schools is part of a broader need to provide educational resources to resource constrained environments. The provision of these mobile technologies was intended to create multiple benefits, including the provision of learning resources to enhance learner participation [1] and create an enabling environment that will prepare learners to take part in the knowledge economy by, for example, equipping the learners with 21st century learning skills [2-4].These skills are particularly essential for creating an enabling self-learning environment in a school context.

The motivation for undertaking this study emanates from the failure of Information and Communication Technology for Education (ICT4E) initiatives, which have proven to be unsustainable in most rural schools. Despite the noble intentions of introducing mobile technologies at rural schools, such projects usually become unsustainable following the withdrawal of project teams [5, 6]. The issue of sustainability has been lingering on for long periods of time now. For this reason, research studies were undertaken to explore and understand factors impacting the sustainability of ICT interventions at schools, particularly those located in the rural areas. Despite continued research on the sustainability of these projects, serious challenges resulting in the failure of ICT initiatives at rural schools still persist. On a positive note, a particular limitation associated with previous sustainability studies has been identified; focus was previously directed towards the sustainability of the initiative and not on the education system being practiced at school level. To date, very few (if any) of these studies have looked at whether resilience can provide insights and enable schools to thrive when using mobile technologies. There appears to be a strong relationship between sustainability and resilience when identifying existing and relevant theory for developing the resilience framework that is relevant for South African rural schools. It is for this reason that we have elected to take a resilience stance in this paper.

What makes this study unique is the attention given to community resilience. In this study, community resilience is central to the development of both the theoretical contemplation and the development of the actual framework. The attention given to the community emanates from the perspective that a school is part of a bigger system (i.e., a community), which is viewed as a key role player when building the resilience of the school. It is envisaged that the resilience framework that will be developed in this study will have community resilience as one of the essential building blocks. It is worth noting that while many studies have been conducted to understand sustainability challenges of ICT4D interventions in rural schools, very limited work considering the role of community resilience as part of a community's ability to sustain such interventions has been undertaken. Heeks [7] is one of the few scholars in the Information Systems (IS) discipline that has focused on the resilience of members of communities. While the exploration of the notion of resilience is not new, previous studies were carried out in fields of ecology [8], sustainability [9, 10], decision making and support [11], and enterprise development and information systems [12]. Albeit, limited research has been undertaken in IS with a specific focus on resilience of education within a rural community setting, particularly with respect to the exploration of humans as a subject. In a response to this need, a study has been scoped with the aim to develop a resilience framework integrating and using mobile technologies in rural South African public schools. This paper forms part of an overarching study, and is aimed at presenting the theoretical building blocks that are relevant for developing a resilience framework. The research question for the overarching study is: "*What constitutes the components of a resilience framework for rural public schools in South Africa that will guide the integration and use of mobile technologies?*" This paper contributes to the overarching study by providing theoretical considerations that will be used to build the resilience framework for rural South African schools. Anoth-

er contribution of the study is to explore existing resilience frameworks that will be used to build the envisaged artefact.

This paper seeks to answer the following two research questions:

- What existing resilience approaches can be adapted into a framework and guidelines for building resilience in rural South African public schools?
- What can existing community resilience body of knowledge contribute towards a resilience framework for rural South African public schools?

This paper is structured as follows. First, a background section is presented that contextualizes the notions of sustainability as well as resilience in the IS as well as ICT4D domain. Following this, the research plan for the overarching project is presented, with an indication of where this study fits in. Thereafter, existing theoretical bodies of knowledge that respond to the two above-mentioned research questions are discussed. The paper concludes with a reflection on how the existing theories can contribute towards a preliminary resilience framework for rural South African public schools for purposes of guiding the integration and use of mobile technologies.

2 Background

The term resilience is used to imply different things in different contexts, and due to its recent overuse, some have coined it a buzzword. The use of the word resilience underpins elements such as stability [13] equilibrium [14], withstanding shock and developing functional structures [15]. There is a lack of clarity on the philosophical stance on resilience [16]. Often the term is used without taking cognizance of the social dynamics and complexities whereby things are reduced to technically defined frameworks that are 'based on unchallenged assumptions of society'[7]. For the purpose of this study, a resilience definition has been adopted from Heeks [7], which states that "resilience is the ability of vulnerable systems – countries, regions, communities, value chains, organisations – to withstand, recover from, adapt to, and potentially transform amid change and uncertainty." The reason for adopting this definition is that it includes elements that are essential for building community resilience. The adopted definition also contains the term "system" and in this context it is conceptualised based on Checkland [17] adopted from Turpin [18] which states that "a system is a complex whole, the functioning of which depends on its parts and the interactions of these parts." This definition of a system indicates elements of interdependency between different components within the system itself. However, according to Daellenbach and McNickle [19] the interdependency (between the different components of the system) "does not deny the importance of the individual elementary parts", which also calls for recognizing the importance of the individual parts and their relationship to the other components that make up the system.

Resilience, unlike sustainability, takes a different focus and perspective. Resilience takes a Systems Thinking perspective that all complex systems are, by nature and

definition composed of numerous interacting parts that are sometimes dependent on each other. Using this perspective, the rural school in this case is viewed and perceived in relation to the complex system in which it is found. In this case, the complex system is the community which is composed of households, citizens, businesses, interests groups, and cultural groups, political and other structures that are critical for making the community thrive.

The limitation that comes with sustainability is that the focus has mainly been on the sustainability of the project or initiative and not the sustainability of the change that is brought by the initiative. Resilience takes a holistic approach in a sense that the sustainability of the change brought by the initiative is dependent on how the different structures of the community embrace and support it.

3 Research methodology

Since a Systems Thinking approach was adopted for this study, it was essential to use a research methodology that will be able to deal with complexity in a systematic way. Design Science Research Methodology (DSRM) was therefore chosen for this study. This methodology originates from engineering and architecture, and it is concerned with the science of design such as physical artefacts as structures. DSRM was developed as a problem-solving research paradigm that can be incorporated in research to answer questions that are relevant to people and how their problems can be solved [20].

3.1 Design Science Research Methodology

DSRM [21] was selected as a suitable methodology for the overarching study of which this paper forms part. Since the overarching study is conducted in the IS domain where the focus is placed on factors such as humans, organisations and technology, DSRM is well suited to studying the application of IS in a community context that comprises all these factors. In the bigger research study, DSRM is used for the purpose of building an artefact, which is the resilience framework for the introduction of mobile technologies in rural South African schools. In this way, DSRM is regarded as the building block of IS research, and is concerned with the development of new artefacts of products through which IS can be used [22].

Figure 1 illustrates the manner in which DSR guides the research study that this paper is part of. This paper is aligned with the second column in **Figure 1**, namely "Develop resilience framework and guidelines for integration of mobile technologies for rural schools in South Africa".

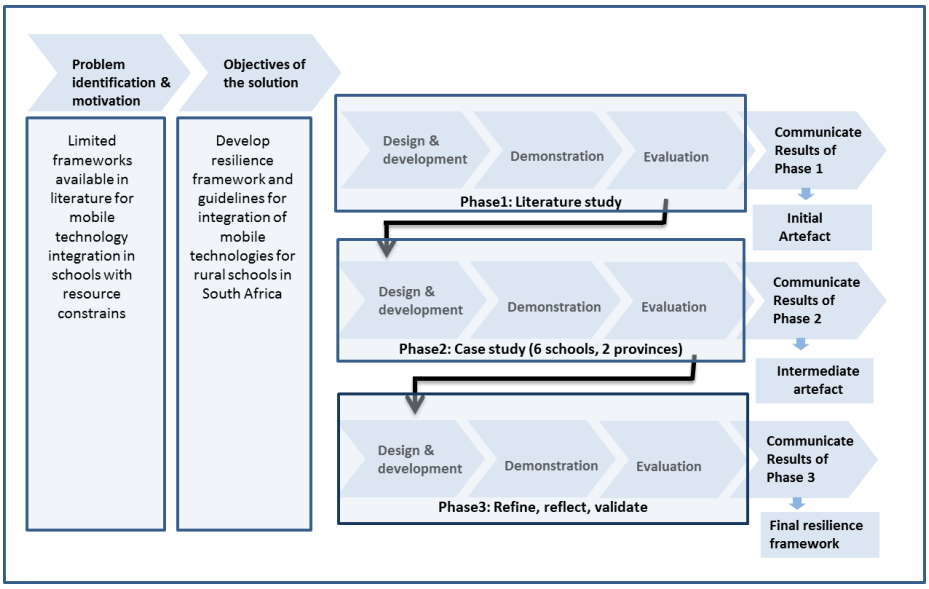

Fig. 1. Design science research methodology used in this study

4 Theoretical building blocks towards a resilience framework

The purpose of this paper is to consider relevant theory that will be used to develop the resilience framework. The study also identified two existing frameworks with elements will be used when developing the proposed framework. In this section, the existing resilience framework are explored and are explained based on how they provide theoretical contribution to the development of the resilience framework and guidelines for the integration of mobile technologies in rural South African schools. Firstly, the use of resilience in IS will be discussed, then the Resilience Assessment Benchmarking and Impact Toolkit (RABIT) framework developed by Heeks [7] and the six foundations for building community resilience by Lerch [23] will be explored. This section also highlights what each of the components of the framework and the foundations contribute to the attempted framework.

4.1 The Resilience Assessment Benchmarking and Impact Toolkit (RABIT)

For the purpose of this study, the RABIT framework developed by Heeks [7] coupled with a personal and community resilience perspective will be used for grounding and conceptualising resilience in this study. It is of great importance that the RABIT framework be explored in the context of community resilience as the study seeks to position an initiative in a school in a manner that recognizes the community context.

Heeks [7] and his colleagues at Manchester University developed the RABIT framework for purposes of practical application of resilience in systems and contexts of all kinds. When developing the toolkit, Heeks [7] started by firstly defining resilience as "the ability of vulnerable systems – countries, regions, communities, value chains, organisations – to withstand, recover from, adapt to, and potentially transform amid change and uncertainty." Unlike most definitions that only focus on recovering from adversity, this definition, provides a broader scope for conceptualising resilience. The reason for broadening this scope is that resilience will play an important role in the realisation of development outcomes [24].

The toolkit by Heeks [7] has identified nine attributes of resilience, which are divided into primary foundations of resilience (three attributes) and enablers of resilience (six attributes). The three primary attributes of resilience are robustness, self-organisation, and learning ability.

Robustness. Robustness is regarded as "the ability of the system to maintain its characteristics and performance in the face of external fluctuations, including shocks [25]. In this case, robustness refers to the integrity and preparedness of the system to absorb shock. Heeks and Ospina [16] acknowledge the following illustrative markers of robustness: "physical preparedness, institutional capacity, and multilevel governance". These attributes are essential, from a systems perspective, when looking at a school as a system and how these attributes can be applied when creating a resilient institution, in this case a school.

Self-organisation. Self-organisation as a primary attribute of resilience refers to the system's ability to self-correct in case of external disruption [26]. In resilience, external measures for enabling the shocked system to recuperate is often mentioned. However, in this case, self-organisation is seen as a means through which the system can self-restore without external interventions. Self-organisation reflects the system's ability to self-correct in case of external disruption [26]. The notion of self-organisation also includes the state of preparedness of the system to absorb shock. Thus, this means that the level through which the system may be ready to reorganise itself is highly dependent on how well is the system being organised prepared for disaster. Self-organisation is perceived as a thread that holds the system together thus creating a dependency between the various components of the system. According to Folke, Carpenter, Walker, Scheffer, Chapin and Johan [13] self-organisation (of a system) is not only collectively illustrated by the internal workings of the system but also by the enablers of those processes such as social capital and trust. The indicators of a strong sense of self-organisation are collaboration and consensus, the use of social media and the contribution of the system towards trust building [13]. Self-organisation in an education system is the ability of the schools to organise themselves within a broader social system comprising of the wider community, business, and other institutions in society. Markers are collaboration and consensus, the use of social media and the contribution of the system towards trust building [13]. Social

capital is also a critical indicator of self-organisation as it emphasises the notion of collective identity and understanding the strength of the system in relation to the relationships between the different components of the system.

Learning. The third primary attribute of resilience is learning, which mirrors a system component as well as a human dimension retrospectively. From a systems perspective, learning is understood as the capacity of the system to generate feedback that can guide the designer to experiment and innovate [13]. It is important that a management information system provides feedback about its own efficiency and effectiveness. The reporting enables an early detection or identification of flaws and hazards in a system and creates a pre-emptive environment that may even prevent disaster. This attribute is crucial as it has a human element in it and that element can play a vital role in strengthening preventative measures from learning from past experiences. Heeks and Ospina [16] have listed capacity building, new and traditional knowledge and reflective thinking as markers of this attribute.

Other than the above-listed attributes, Heeks and Ospina [16] have listed six secondary attributes of resilience in a system. Unlike the primary attributes, the six are what they coin enabling attributes or enablers of resilience. The six secondary attributes are: redundancy, rapidity, scale, diversity and flexibility, equality, and alignment.

Redundancy. Redundancy is the extent to which components within a system are substitutable or are ready to interchange in the event of collapse or loss of quality of one or more of the components that make up a system [27]. In the same way, [16] identified functional overlaps and interdependency, and resource substitutability and sparseness as markers of redundancy in a system. Redundancy as an attribute will play an important role in assessing the school in relation to other units of the community i.e. churches, interests groups, business and other government programs and departments in the communities. The practical use of redundancy at the school would be having complementary technologies which can serve the same purpose or used to fulfil the teaching and learning practice when the other technology fails (i.e. replacing tablets with laptops or *vice versa*).

Rapidity. Rapidity is concerned with the management of assets in a broader system, especially taken the interdependence of various units due to the redundancy in the system. According to [28], rapidity means how rapidly assets can be accessed and organized to achieve goals in a way that ensures efficiency. Rapidity is fundamental in ensuring the system's ability to respond to external stressors in a timely manner [28]. In this research study, rapidity is viewed in the context of a school that has never had any technology which then organises itself by integrating mobile technology to make teaching and learning much more efficient and effective while at the same time equipping the learners with 21st century skills. According to [29], rapidity is the “capacity to meet priorities and achieve goals in a timely manner in order to contain losses, recover functionality and avoid future disruption”. Although this view of rapidity

has been adopted from an Engineering discipline, its elements are applicable in IS and in this study since it is concerned with how resources are mobilised to meet end goals.

Scale. Scale is closely related to rapidity. While rapidity is concerned with the management of assets in a broader system and how these can be accessed to achieve goals, scale is concerned with the resources that a system can access within itself or from the outside to meet the challenges it may encounter [13]. The resilience or the ability to withstand or bounce back from the shock is strongly dependent on the availability of these resources when they are needed. Heeks and Ospina [16] suggested the following markers for scale: multi-level networks, resource access and partnerships, and cross-level interactions.

Diversity and Flexibility. This attribute has two elements. Whereas diversity refers to institutional assets, flexibility is concerned with actions. According to [13], diversity is the variety of institutional assets (including knowledge, skills and capabilities) that can be accessed to deal with short as well as long term challenges. Flexibility in this case is understood from the perspective that the more diverse the system is, the more it is likely to be resilient as the diversity of the (system's) elements may help with ensuring continuity when the system is stressed. Diversity can also serve as "the basis for innovation, learning and adaptation to slower, ongoing change" [30].

Flexibility refers to the system's elasticity, which is the ability to undertake different sets of measures with the immediate available resource; therefore, not only does flexibility offers fitting solutions to problems, it also capitalizes on opportunities arising from external changes [13].

Equality. Equality is the last attribute of the RABIT toolkit and this element plays a crucial part in how the system is governed and operated. It can be argued that equality takes a socio-psychological stance since it is concerned with inclusivity and equal opportunity. The equality in the system gives every player the opportunity to act without encroaching on the rights of other players and thus ultimately strengthening the resilience of the system.

The RABIT framework has significance in the development of the resilience framework and guideline for the integration of mobile technologies in rural schools. What makes the framework significant are its elements that speak directly to rural schools that the proposed work seeks to transform.

4.2 Community resilience

Unlike resilience in its broader sense, community resilience has to some degree a well-defined perspective. As it stands, community resilience is understood to be a form of resilience that is concerned with the community and looks at what needs to happen for a community to thrive. In a community perspective, resilience is generally understood to be the ability of the community to withstand, mitigate, or adapt to out-

side pressures and shocks [31]. This definition also creates a contestation of what constitutes a community. According to [32], a community is "a group of people living in the same place or having a particular characteristic in common." The word community in this case becomes encompassing; it includes "the geospatial qualities of community, important to programming and intervention implementation and the capacity building component critical to sustainable development" [31]. Lerch [23] defines a community as a "place-based group of people who have some meaningful capacity to influence their basic common needs given their particular social and political context." This definition of community has an element of agency thus making it possible to position resilience in it, particularly since it is inclusive. For the purpose of this research study, the six foundations for building community resilience by Lerch [23] will be used. The reason for selecting these foundations is that they fit well with the RABIT toolkit by Heeks [7]. Lerch [23] has identified two preconditions for a community to be resilient, namely: "the responsibility for resilience building and the power to decide how it is done must ultimately rest with community members" and "the process of resilience building must equitably address both the particular situation of the community and the broader challenges facing society." These pre-conditions are essential and are also aligned with the RABIT toolkit developed by Heeks [7] and Heeks and Ospina [16].

The following section of the paper unpacks the concept of resilience in terms of how it is used in IS and other disciplines. This will be done by firstly defining resilience for the purposes of coming up with a working definition, especially since there is no universally agreed upon definition of resilience. This will be followed by a brief discussion on the use of resilience in IS and ICT4D. The Resilience Assessment Benchmarking and Impact Toolkit (RABIT) as the adopted framework suitable for use in resource constrained environments will then be introduced and explained in more detail. The RABIT framework is one of the critical components for this study since it contains essential elements that will be used in the development of an initial framework for this study. Lastly, personal and community resilience will be introduced and unpacked. The reason for introducing community resilience in this study is to combine it with the RABIT framework for purposes of developing a resilience framework and guideline that will be used when implementing mobile technologies in communities with constrained resources. This holistic approach to resilience is essential as it positions the school in a broader social system and looks at the relationship and dependencies of various elements of the system.

4.3 The six foundations of building community resilience

The six foundations for building community resilience is informed by recent academic deliberations on resilience, sustainability advocacy, and grassroots activism, as well as Post Carbon Institute's prior work [23]. The foundations were established on the basis that "in resilience science, a community and the ecosystem it makes use of are together considered a unified socio-ecological system." Heeks [7] and Heeks and Ospina [16] are also of the view that an attempt cannot be made to understand the community without having to look at its ecosystem. In addition, adaptability seems to be a key component in the community resilience school of thought since it is seen as

the element that assists with coping during disaster management. The six foundations of building community resilience, which are listed by Lerch [23] are: people, systems thinking, adaptability, transformability, sustainability, and courage. The section that follows explains these six foundations in terms of how they fit into community resilience. The reason for incorporating the six foundations in the RABIT framework is that the elements talk directly to the Heeks [7] framework and both of these are suitable for developing a framework that is suitable for rural South African communities.

People. People make up a community, and there will never be a community without people. People are therefore essential elements in building community resilience. According to Lerch [23], communities are products of human relationships and therefore what the community will become in the future is strongly influenced by the interactions, negotiations and the relationship of its people. The emphasis of the role played by people in building community resilience indicates the importance of social capital, which refers to "the ability and willingness of community members to participate in actions directed to community objectives, and to the processes of engagement, that is, individuals acting alone and collectively in community organizations, groups, and networks" [33]. Building resilience in communities is dependent on how people interact with each other, and the types of relationships that exist among the people [34]. Relationships in communities and decisions on what needs to be done and how it needs to be done involves political and economic processes; that is, the power of the desire of the people is channelled around these institutions. As Lerch [23] argues, when building community resilience, the political and economic processes cannot be ignored because they have an influence on decisions of what needs to be done, for what reason and for whose benefit. People and the institutions they belong to therefore play an important role and these cannot be ignored when building community resilience.

Systems thinking. Communities are complex systems; they are made up of many components and are subject to internal and external forces. According to [23], "communities are thoroughly integrated sub-systems of a single global socio-ecological system" and it is practically impossible to understand the communities without the components that comprise it. According to [19], when using systems thinking, a phenomena to be explained is viewed as a part of the larger sum, a system, and it is also explained in terms of its role in that system. System thinking therefore becomes a methodological approach for understanding how the parts of the system are related to each other and how each of the components influence the bigger structure or a larger system. Communities are complex systems in their own way; they are also made up of components that are constantly evolving while interacting with each other at the same time. Therefore, systems thinking assist in the understanding of the complex crises of the system [23, 35]. The relationships and influences occurring amongst the various components in the system can easily be unpacked using systems thinking as a suitable methodology to deal with complex systems.

Adaptability. When complex systems are resilient towards forces of disruption, it is mostly because they have the capacity to adapt to changing environments [23]. In a community resilience perspective, resilience is generally understood as the ability of the community to withstand, mitigate, or adapt to outside pressures and shocks [31]. Adaptability is a crucial stage towards becoming resilient. In community resilience literature, adaptive capacity is understood as the capacity of communities to cope with, adapt to, and shape the nature of environmental, economic, and social change [36, 37]. Adaptive capacity in resilience is generally is preceded by learning [7] and communicating what has been learned to inform the actions required to become resilient. In community resilience, adaptability is preceded by individuals, stakeholders, or communities learning from and responding to changes precipitated by some hazardous event [38]. Although this is a process that normally involves social learning, it can also have a measureable outcome. Although different authors have different ways of using adaptability to explain resilience, they mostly include the following to explain adaptability: "creative problem solving, coping with uncertainty, learning new tasks and skills, adapting to teamwork and collaboration, changing procedures and developing new procedures, and adapting across cultures" [31]. It is for the abovementioned reasons that adaptability has become a crucial element in building community resilience.

Transformability. Transformability and adaptability have similar characteristics yet they differ in principle. Communities generally adapt when the circumstances require them to [23]. However, if there are circumstances that hinder transformation, the challenge or disaster may progress faster than the efforts to cope with it, which will ultimately hamper the chances of being resilient.

According to Lerch [23], building resilience attempts to adapt and manage the basic function and structure of a system in the face of disruption, which ultimately means that transformation happens in the midst of the challenge or disaster. Transformational efforts are purposefully disruptive to the system, and it is also important that the need to transform may result from both the external or internal forces. Transformation may also force part of the system to transform, but it may also require the whole system to transform. The level of resilience required will in one way or the other determine which elements of the system need to transform and to what extent.

Sustainability. Resilience and sustainability are often used interchangeably. Sustainability and resilience are distinct concepts that complement each other [23]. While resilience assists in the understanding of the complexity of how socio-ecological systems work and how adaptability happens, sustainability assists with the understanding of the complexity of the relationships we have with the natural world and what happens if the relationships go wrong [23]. Berkes, JColding and Folke [36] described sustainability as "the use of environment and resources to meet the needs of the present without compromising the ability of the future generation to meet their own needs." Although this definition comes from an ecology point of view, central to it is

the considerate use of resources that is also essential in building community resilience. Sustainability and community resilience fosters a need to think about individual action in relation to common goals that benefit greater society.

Courage. Courage is the sixth foundation of building resilience, according to Lerch [23]. This is quite a distinctive element of the foundation. None of the literature consulted during the review made mention of courage. Although reference has been to social and psychological wellbeing [35, 37, 38], no specific mention of the courage has surfaced in the literature. Lerch [23] has argued that building community resilience does not take knowledge and skill like solving engineering problems, instead it is a social undertaking process that involves many and diverse groups of people. To undertake such a strong task as building community reliance requires a large degree of courage [23]. In this context (of building community resilience), courage is viewed as the ability to do what is deemed difficult yet continue to do it for the benefit of the whole community.

The above conceptualisation of resilience and the RABIT framework coupled with community resilience provides a good perspective on what is essential for building resilience of rural schools in a way that enables these schools to embrace and benefit from using mobile technologies. The intended outcome here is to use these for a development of a framework and guidelines that can be used for building resilience for rural South African schools.

5 Discussion

Table 1 indicates how the various components of the RABIT framework and the foundations for building community resilience will be used for the development of the resilience framework and guidelines for use when integrating mobile technologies in rural South African schools. The reason for merging the components in that fashion is to make sure that the scope of focus is clearly defined, the system and its context is well understood and the approach is representative.

Table 1. Proposed resilience framework

RABIT Framework	**Foundations of building community resilience**	**Contribution made by the merged components**
Robustness.	*Systems thinking.*	Taking a systems thinking view to preparing to deal with shock.
Self-organisation.	*Adaptability.*	Ability to self-restore without external interventions, and generate feedback for better understanding of the systems capabilities and learn and innovate from previous shocks.
Learning.		
Redundancy.	*Transformability.*	System components are substitutable or can be

		redundant in state of chaos and re-organized in the midst of disaster.
Rapidity.	*Sustainability.*	Ease of access and organization of assets to ensures efficiency that is sustainable.
Scale.		Assets available for use within or outside the system.
Diversity and Flexibility.		Availability of resources to deal with short and long term challenges while also taking different sets of measures with the immediate available resource.
Equality.	*People.*	Inclusiveness and representation and understanding the important role played by individuals and groups that are part of the system.
	Courage.	

6 Conclusion

The introduction of mobile technologies in rural South African schools remains a challenge and the studies that have been conducted in the Information Systems domain have only focused on sustainability and sustained benefit. The problem with such studies is that even though the focus was on sustainability, which is an essential element of resilience, the focus was often on the sustainability of the project. Resilience is therefore an approach that needs to be taken into consideration when addressing the challenges accompanied by the introduction of mobile technologies in rural schools. The reason why resilience is appropriate for this exercise is that it takes a holistic view of the community and views a school as a subset in a bigger context, which is the community. The community resilience perspective provides a guideline through which resilience can be studied in a community and indicates what elements should be considered when building the resilience of the community. This study contributes to current state of the art by synthesizing existing theory into a proposed resilience framework for use when integrating mobile technologies in rural South African schools.

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