Reconceptualising ICT Policy Implementation in Secondary School Education in Zimbabwe: A Theoretical Criticism

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Abstract

Most countries in the Global South struggle to meaningfully integrate information and communication technologies (ICT) for pedagogy in education. While there are policies in place and in some cases, ICT tools, implementation remains challenging. This theoretical paper joins the ongoing narrative and debate on the state of ICTs in the Zimbabwe secondary school education context. It suggests a novel innovation that makes the teacher the critical element in policy implementation. By combining key elements of the social cognitive theory (SCT) and those of the Spillane, Raiser, and Reimer model of the integrative cognitive framework of policy implementation (ICF), this paper advocates a reconceptualization of policy implementation to address meaningful ICT integration in resource-strapped pedagogical environments of the Global South. We argue for the adoption of available resources in mitigating the dearth of technology integration in education for poor economies. We conclude by proposing a model for the adoption of the smart phone as an ICT tool for teaching and learning for secondary school classrooms.

Keywords: Reconceptualisation, ICT, Integration, Policy implementation, Pedagogy.

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Introduction

Quality education for citizens is priority for nations globally (Bervell and Umar, 2017; Bosio, 2023; Burns, 2023). Issues of technology integration in education have become pivotal in academic discourses. The race by member states towards the United Nations (UN) Agenda 2030 gives impetus to the need for technologically integrated pedagogy. At the centre of Agenda 2030 are the 17 Sustainable Development Goals which scholars agree that Goal 4 (Education) is the stepping stone towards achievement of the 16 other goals (Giangrande et al., 2019; Cernev & Fenner, 2020; Rad et al., 2022). This global agenda is premised on the reality of the 21st century fourth industrial revolution (4IR) that has turned the world into an information driven global village (UNICEF, 2020). Technology integration in education carries a huge promise for former colonial states in the Global South as it has indications of equality (Cernev & Fenner, 2020), quality and access, especially for the younger generation in the 21st century (Bosio, 2023).

The development of the world into a global village has ensured that sub-Saharan Africa is a significant partner in the holistic wellbeing and developments of the whole world and this was evidenced by COVID-19, which, as a global pandemic proved that infection in one country spelt doom for the rest of the world (UNICEF, 2020). However, participation in this global information economy means equipping citizens with requisite skills that are compliant to the 4IR and this is possible through offering an education that is bathed in ICTs (Cernev & Fenner, 2020). Six years away from the target date for Agenda 2030, sub-Saharan Africa countries are still grappling with infrastructural challenges, tools and lack of efficacy among educators (Barakabitze et al., 2019; Agyei, 2021). It is important that sub-Saharan Africa, like the rest of the world be in a position to meet the UN 2030 SDG number 4 which spells inclusivity and quality education, promoting lifelong learning for all, through ICTs.

Kenya developed policies that recommend the use of ICTs in education early in the century and since then, the battle for practical integration at all levels of her education system is on, with limited success (Bariu, 2020). While both teachers and students have a positive attitude towards use in teaching and learning, the adoption

rate remains low and research cite low investments in technology infrastructure as ICT hardware, software and accessories costs are quite high for public schools (Machaira, 2022). Another challenge for the country is the lack of new skills as well as competences among stakeholders especially educators. Given these challenges, UNICEF (2020), called developing countries especially so to those in the sub-Saharan region to double efforts in scaling challenges that are aggravating the digital divide with the developed world and among their own citizens.

Like the rest of the sub-Saharan region, Tanzania has frequent challenges for integration in its secondary school education. These are sighted as poor technology infrastructure, lack of technical support and training for teachers (Joseph, 2021), which is the same rhetoric from the region for most countries. However, for Tanzania, while the challenges are there, all stakeholders in education are reported to have a positive attitude and wish to gain the ability and resources to integrate ICTs in pedagogy (Graham et al., 2020). The greatest challenge that the country is facing in public schools is lack of resources which is a result of the poor economic status of the country itself (Wariomba, et al., 2022). According to World Bank reports, Tanzania is rated as a low income and low economy country and as such, this status impact negatively on the schools' ability to implement modern models of education despite the presence of policies demanding the inclusion and implementation of ICTs in pedagogy (World Bank, 2020).

South Africa has a unique situation slightly different from the other sub-Saharan African countries in that it has a better economy than most of them and technology infrastructure is better (UNESCO, 2023). However, while other sections of the country have a significant implementation rate, for other sections, the digital divide in widening in the same country along former apartheid lines (Pramjeeth et al., 2023) South Africa also faces challenges in the alignment of graduate skills to the requisites of the 4IR as a result of limited educators' skills in the integration of technology to pedagogy (Ramnund-Mansingh,A & Reddy, 2021). Many public schools especially those in rural areas and townships, still use traditional modes of instruction due to lack of both infrastructure and skilled teachers (Costa & Ntsobi, 2022). It is clear that sub-Saharan Africa is

challenged in terms of technology integration for its education and more innovative approaches are called for to avert the disaster of never being able to fully participate in the global 4IR driven information economy.

Zimbabwe is one of the few countries in Africa that has a whole government ministry with the purpose to oversee information communication technologies (ICTs). This speaks to the level of cognizance by government on the importance of ICT in education for participation in the Fourth Industrial Revolution (4IR). The research landscape on ICT integration in education is characterized by findings that indicate very low uptake (Rubaya & Chademana, 2020; Matongo, 2022; Dzinoreva et al., 2023). Given Zimbabwe's early uptake, evident in its active ICT policy-making since 1999 it is expected that schools would currently reflect government ambitions, however, ICT uptake is still low (Dzinoreva et al, 2023; Jeche, 2023).

Various studies have been conducted on the state of ICT integration in teaching and learning in secondary schools in Zimbabwe and most of them have lamented government's seeming lack of commitment to provide equal and quality education for all its citizens (Dondofema & Shumba, 2018; Dzinoreva et al., 2023; Kangara et al., 2022; Manyeredzi & Mpofu, 2022). Studies indicated a gap in teachers' ICT knowledge and efficacy in integration and recommended teacher training focused on subject specific pedagogical integration as opposed to mere digital literacy (Dzinoreva et al., 2023; Rubaya & Chademana, 2020; UNICEF, 2020). According to Kangara et al., 2022, secondary schools in Zimbabwe should be equipped with technology infrastructure as a matter of urgency as most teachers were still using traditional methods of teaching. Manyeredzi & Mpofu (2022), using a survey on suggested improvisation with the smartphone for teaching and learning, determined that secondary school teachers would rather enlist the use of smartphones for off-campus or out-of-school use in online lessons and research instead of for classroom-integration activities as they viewed them as disruptive.

The above studies have contributed to the study of ICT integration for teaching and learning in secondary schools in Zimbabwe. However, none presented innovation to alleviate the resource shortages and to improve teacher efficacies in ICT

integration for pedagogical practice. In this paper, we argue for the adoption of smartphones for use in Zimbabwean classrooms through a reconceptualization of the ICT implementation policy, as decades after the formulation of a national ICT policy in 2005, secondary schools are still grappling with resource shortages (Zimbabwe. Ministry of Information Publicity and Broadcasting Services, 2020). The paper presents a model for the intended adoption. In this context, we attempt a plausible solution to ICT-resource shortages in secondary school classrooms in Zimbabwe, which is a serious cause of an extraneous education for participation in the global village created by the 4IR.

ICT infrastructure in Zimbabwe

From the foregoing, public secondary schools in Zimbabwe are not exposing learners to ICT tools for a 4IR relevant education in the global village. However, the same students come in contact with a variety of ICT tools that include smartphones, computers and other mobiles in their homes and the communities they come from. According to the World Bank (2020), statistical report on Zimbabwe revealed a very high household ownership of mobile phones, at 89.4%, and a low prevalence of other ICT tools. With the incessant presence of load shedding and power outages in the country, even schools that have access to electricity from the national grid are going for long hours without, affecting internet connectivity, while individual families have alternative power through solar energy (Dzinotyiwei & Taddese, 2020). Table 1 presents information on the household ownership of technology in Zimbabwe.

Table 1 Access of Zimbabwean households to technologies

Technology	%
Radio	40.2
Television	5.7
Telephone – fixed	2.2
Telephone – mobile	89.4
Computer	15.2
Internet at home	30.3

Adapted from UNICEF (2020)

The implications of the data presented above is that secondary school learners in the whole country are exposed more to mobile phones than they are to any other technological tool available to them (UNICEF, 2020). From a logical perspective, we the superior and more probable solution in mitigating resource shortages and make positive moves towards integration of ICT with pedagogy at classroom level lies within the abundance of phones as opposed to the scarcity of computers, radios, or television. This assertion is reinforced by the data presented in Table 2.

Table 2 indicates a very low computer: learner ratio, presenting an unhealthy ICT integration environment for teaching and learning. Given the economic meltdown in Zimbabwe, schools would do well to find sustainable solutions around issues of control mechanisms by adopting the mobile phone for classroom use. According to Dzinotyiweyi & Taddese (2020), the budget for non-salary expenditure for the education system in Zimbabwe is too little compared to what it needs to achieve for a functional ICT situation in schools. Consequently, improvising with mobile phones is a cost-effective and sustainable innovation to mitigate resource shortages in public schools in Zimbabwe since the generality of learners already have access to them.

Table 2 Secondary school ICT infrastructure

Proportion of secondary schools with access to electricity	71.5%
Proportion of schools with access to alternative power sources (solar, generators, etc.)	5%
Proportion of secondary schools with internet connectivity	42.76%
Average number of computers per secondary school	18
Average number of learners per computer in secondary schools	36

Adapted from Zimbabwe Ministry of Primary and Secondary Education Annual statistics report (2021)

Zimbabwe has always reported a very high percentage of trained teachers at secondary school level (Dzinoreva et al., 2023; UNICEF, 2020; World Bank, 2020). However, the MoPSE (Zimbabwe Ministry of primary and secondary education annual statistics report, 2021) reported a very low level of computer skills for the secondary school teachers, with only 2% listed as specialist computer teachers and the rest as having basic to none ICT skills. Therefore, we acknowledge the need for an inquiry-based approach to sustainably introduce the mobile phone for classroom use as an ICT integration tool. We thus explored two guiding questions: (1) what are the challenges of incorporating the smartphone as an ICT tool for the secondary school classroom in Zimbabwe? (2) How can theory in policy interpretation and implementation be conceptualized to address this innovation in education?

The idea in this paper is to first evaluate how the Zimbabwe ICT policy implementation is what it is through the lens of the cognitive framework as suggested by Spillane et al. (2002), and then to merge both the theory (SCT) and the framework (ICF) to come up with a conceptual framework for the adoption of smartphones for teaching and learning in the classroom. Therefore, both the theory and the framework inform the outcomes of this study. This study was intended as a contribution to the existent body of knowledge on the potential of smartphones in mitigating ICT tool shortages in Zimbabwe's public secondary schools.

Theoretical framework

The theory is social cognitive theory (SCT) by Bandura, developed in 1977 from his social learning theory (SLT) of the 1960s (Bandura, 2001). We chose SCT as it addresses the major issues of this study, which deal with policy implementation at secondary school level, and for its compatibility with the Spillane et al. (2002) ICF model of policy implementation. The SCT concept of human learning behaviour founded not only in their cognition but also in their environment as well as within the factors of the influence of significant others, resonates well with the ICF for innovation challenges. Together, SCT and ICF serve as a lens for building a conceptual framework for introducing smartphones into the classroom. Bandura's SCT applies to policy implementation and

revolves around mutual interactions among behavior factors, personal/cognitive factors and environmental factors (see Figure 1) (Schunk & DiBenedetto, 2023). This is called a triadic reciprocal determinism, which is the uninterrupted reciprocal interface among behavioural, personal, and environmental determinants for learning to take place (Devi et al., 2017), for policy, implementation it takes place as the positive outcome of personal interrogation of policy decrees within the triadic factors.

Fig 1 Bandura's social cognitive theory
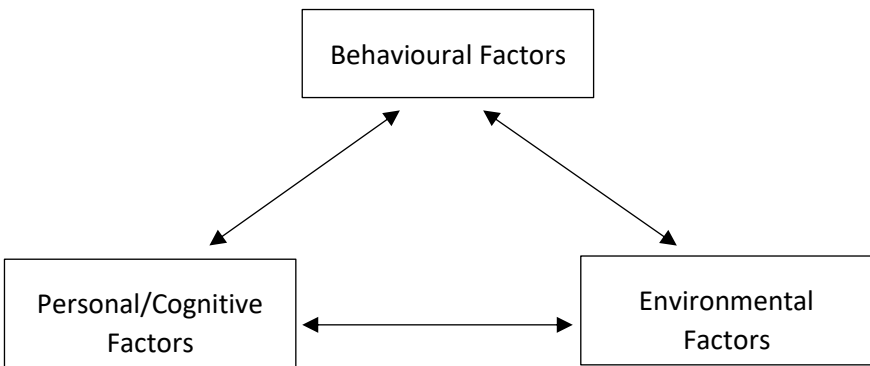
Adapted from Bandura (1986)

The outcome if positive should satisfy four components that Bandura suggested, namely goals, outcome expectations, social structural variables, and self-efficacy (Devi et al., 2017). The emphasis is on how the individuals are influenced by their experiences, acts of others, and factors within the environment for learning to take place (Lee & Bong, 2023; Mcleod, 2023). In this theory, both the individual's acquisition of the policy knowledge and how they maintain the behaviour in a given social environment where past experiences determine whether the acquired behavioural action will occur, are important in explaining policy implementation. However, the theory leaves the individual in the position where they are still able to control personal feelings, thoughts, and actions.

SCT explains in six constructs how individuals achieve goal-directed behaviour after learning has occurred. The first is the aforementioned *reciprocal determinism*, which explains the outcome of the interplay between individual learned experiences (person),

the external social context (environment), and response to achieve goals (behaviour) (Johnson & Johnson, 2015; Schunk & DiBenedetto, 2023; Mcleod, 2023). The second construct is the *behaviour capability*, which explains that in order to be able to perform, people must possess the actual skill and be able to use it. Then comes *observational learning*, where people learn from observing others perform the desired skill, particularly when modelled by experts.

Fourth, *reinforcement* refers to how internal (personal) and external (environmental) responses to a person's behaviour determine the permanence of that behaviour (Conner, 2015; Sutton, 2015). This explains the ideology of incentives and rewards to encourage or maintain behavioural change. The fifth SCT construct, the *expectations* concept, explains anticipated value or consequences of intended behaviour before one engages in it, influencing adoption or non-adoption of the behaviour (Schunk & DiBenedetto, 2023). Finally, *self-efficacy* explains that individuals engage in behaviour in which they are generally confident they can perform well and have control over (Bandura, 1986). Bandura encourages observational learning and believes that transmission of information to many learners can be achieved through just one model (Devi et al., 2017).

Integrative cognitive framework (ICF) model

Spillane et al. (2002)'s cognitive framework model of policy implementation explores how implementing agents (teachers), understand policies that come to them as reform initiatives, a process which they call the sense-making process. They argued that policy implementation should be understood as a cognition process. They outlined an integrative framework involving three core elements: the teacher as implementing agent, the situation where sense-making occurs, and the policy message (Spillane et al., 2002). The framework was born from their hypothesis that while general beliefs are that failure of reforms in education are a result of poor principal leadership, poor incentives, or simple rebellion by teachers, the teacher is being central to implementation success or failure may genuinely not understand the policy demands (Hudson et al., 2019; Spillane et al., 2002).

Drawing from the learning cognitive theory, Spillane and his colleagues present a proposition that an intended policy becomes

one of the situations surrounding the teacher, who is an implementing agent; thus, policy does not come to fill a vacuum readily there for its successful implementation (Compos & Reich, 2019). Sense-making becomes the result of the interrogation of the interplay between and among an agent's experiences, the environment, and the policy itself (Lee & Bong, 2023). Policy-makers are called upon to realize that policy messages are not a fixed body of knowledge that is diffused into the teacher's mind and is modified or accepted to fit local needs, but rather, the teacher as implementer constructs meaning from the policy messages influenced by other elements not necessarily in the realm of understanding of policy-makers (Schunk & DiBennedetto, 2023; Spillane, et al., 2002). Hence, there is an overarching need for an inquiry-based approach to policy implementation that takes the agent through the process of how and why policy should evolve the way it does.

Challenges in Policy Implementation

In their study of policy implementation, Spillane et al. (2002) concluded that for the implementing agents, the meaning of a given policy is a result of the interaction among the agent's prevailing cognitive structures, which include beliefs, knowledge and attitudes, their situation, and the policy indicators. The first part of the framework deals with the individual agent's beliefs, knowledge, and attitudes. In policy implementation, this concept is termed reciprocal determinism by Bandura's SCT in relation to the implementing agent, also called the environment (Johnson & Johnson, 2015). The notion explains the interface between the agent's experiences and the policy. Here, it is observable that the theory resonates with the ICF. What then are the experiences and attitudes of the secondary school teachers (agents) in Zimbabwe towards implementation of the ICT policy?

Values and beliefs spectrum challenges

People's sense-making of their environment does not take place in a vacuum, but this happens rather in thought situations, where teachers may include, among other aspects, their profession, values, myths, and organization (Spillane et al., 2002). Bandura in SCT refers to the same as expectations and these denote the anticipated

outcomes before one embarks on the process of embracing the behaviour (Schunk & DiBenedetto, 2023). Teachers' professional beliefs are such that tried and tested methods of instruction are dependable and yield anticipated results of passing learners, where it is every teacher's disgrace to fail learners (Sen, 2019). Before adopting ICTs in ways that impact the traditional 'normal' classroom, they have to be interrogated within their thought community to determine whether they are profitably adaptable for the classroom (Manyeredzi & Mpofu, 2022). Research has shown that ICTs have not had the chance to prove their usefulness for classroom activities in the generality of secondary schools in Zimbabwe, as these schools are not well equipped to integrate according to the policy (Dondofema & Shumba, 2018; Kangara et al., 2022). While learners lack ICT preparation for full participation in the 4IR, still, they are performing well enough to enter higher education institutions.

The Zimbabwean education policy intention is to make an almost complete overhaul of the traditional classroom system, where the teacher ceases to be the source of knowledge but facilitates learning. The teacher then assumes the role of providing resources and an environment for discovery by learners themselves, while they become a part of the learning community within the classroom (Ginny, 2012). The teachers' prior knowledge does not equip them to understand these ways in which ICTs overhaul the classroom order. This explains findings by Mandoga et al. (2013) and Sibanda et al. (2016) that secondary schools that have ICT tools are mostly using them for office work and sometimes for PowerPoint presentations of notes while maintaining the traditional classroom mode. This is what reciprocal determinism in SCT explains about prior knowledge of the agent in making sense of the policy before implementation, which informs the resultant implementation patterns in Zimbabwe (Johnson & Johnson, 2015).

Situation and sense-making challenges

After looking at the challenges surrounding implementation born from the experiences of the agent as the first feature in sense-making for implementation, we go on to the second aspect in the ICF, which is the situation in which sense-making is taking place. According to

Spillane et al. (2002), sense-making of policy is influenced or affected by aspects of the situation and the agent's interpretation of that situation. Just after the unveiling of the Zimbabwe education ICT policy (2019–2023), Covid-19 made its appearance and schools closed for an extended period from March 2019 until September 2020 (UNICEF, 2020). During the pandemic, those learners who could be reached by government e-learning programs used their own tools and infrastructures. When schools re-opened, teachers were pressured into closing learning gaps and government provided bridging programs (Dzingirai & Musemburi, 2021). Studies have shown that although government availed teacher ICT training programs, these were about basic computer operating skills and not integrating skills (Nyagadza et al., 2022; Yingi, et al., 2023).

While the ICF asserts that social interactions within the agent community potentially shape implementation (Spillane et al., 2002), in SCT, it is called the observational concept (Johnson & Johnson, 2015). Where ICTs were available, teachers continued to teach their learning areas the traditional way, with some replacement of the chalkboard notes with PowerPoint.

The perceived complex idea of integration without knowledge by the teachers, led to the scaffolding of ICTs on the basic computer skills training teachers received and the resultant implementation was the present situation in public secondary schools (Spillane et al., 2022). In the generality of secondary schools, there were no ICT tools and infrastructure, when smartphones were suggested as innovation to meet policy requirements, prior experience said they would be disruptive, as teenagers would multi-task during lessons, affecting learning time and performance (Manyeredzi & Mpofu, 2022). Observational learning said schools generally do not use smartphones, as both teachers and parents agree that they are not compatible with the serious business of education. According to Spillane et al. (2002), when one accesses schema from memory, it subsequently affects comprehension:

Retrieving a schema from memory affects comprehension by activating collections of expectations that are used to fill the gaps in what is explicitly said or observed, driving the "top-down" nature of comprehension, so that much of what is understood is in fact inferred from input that is only partially explicit. (p. 394)

This opaque gap-filling strategy by teachers resulted in the maintenance of the traditional classroom tinted with ICT in the form of learner homework where search engines were used to find information on given work (Dzinotyiweyi & Taddese, 2020). Observational learning by those teachers in schools without ICT resources indicated a not much different classroom environment even with ICT tools. A response that tallies with Bandura's SCT concept of reciprocal determinism on what he calls external social context that the agent makes sense of contends with, evaluates, and then engages the policy (Schunk & DiBenedetto, 2023).

Challenges with policy sense-making

The third aspect of the ICF in sense-making is the policy itself, in SCT referred to as behavioural practice or the response to achieve goals. The message and the design of a policy influence the agent's sense-making (Spillane et al., 2002). The wording of a policy either increases or decreases the discretion of the implementing agency in the implementation process, if it is perceived as inconsistent or ambiguous (Campos & Reich, 2019). Another aspect of the policy is the extent of the change that it is demanding, whether superficial or fundamental, and its manageability at grassroots (classroom) level. According to Spillane et al. (2002), there are three levels of social change that a policy may demand, namely incremental change, growth of implementing agents, or loss for the implementing agent which is discrediting existent agent schemas and frameworks. This third level is identified as the most difficult to achieve. Zimbabwe's ICT policy involves all three levels of change, for some teachers, administrators, and parents needed to unlearn myths and experiences about instruction using the smartphone (Hudson et al., 2019). On this aspect of schema change, SCT includes efficacy as key to third-level sustainable policy implementation (Conner, 2015). The policy can be said to be supplanting the implementers' prior experience of educational instruction (Hudson et al., 2019).

According to the ICT policy for primary and secondary education (2019–2023) (Dzinotyiei & Taddese, 2020), government committed itself to the use of ICT as an empowerment tool for

education. The aim here was to encourage, generate, and sustain the development of an innovative, well-informed, and creative society which ultimately would support the national agenda of attaining a knowledge-based citizenry (Zimbabwe. Ministry of Information, Publicity and Broadcasting Services, 2020). The policy further described the action areas in four spheres: (a) technical infrastructure – connecting all schools to the wide area network (WAN), (b) high-quality e-resources provision for all learners, enabling ICT-integrated learning across the entire curriculum, (c) administrator and teacher capacitation – to enable daily proficient use of ICTs in the work place, and (d) sustainability – cost-effective sustainable provision of ICTs in all schools.

In SCT, for implementation to take place, out of the six constructs, there are three most aligned to it: behaviour capability, reinforcement, and efficacy (Schunk & DiBenedetto, 2023). Data on teacher capacitation have shown that a paltry 2% of teachers are ICT literate (World Bank, 2020), with the computer: learner ratio given as 1:36 (Dzinotyiweyi & Taddese, 2020). These were indicators of poor policy implementation, as resources are inadequate and teachers lack behaviour capability and efficacy. Reinforcement in SCT refers to incentives for implementers to sustain their actions. In this regard, the MoPSE holds speech and prize-giving days from school up to national levels to award performance through national examination pass rates.

The most prestigious award is the secretary's Merit Award, where since 2019, the rewards have been ICT tools to the winning schools (Chenyedzai, 2023). However, with lack of efficacy by the generality of teachers and that of resources for integration, as indicated by literature, the incentives are not pointing to the desired actions for ICT implementation (Chigama & Goronga, 2022; Dzinotyiweyi & Taddese, 2020; Mandoga et al., 2013; Yingi, et al., 2022). SCT explains that human actions are resultant from the interaction among behavioural, environmental, and personal influences (Campos & Reich, 2019). When positive influences impact one of these, especially the environment, a positive change is witnessed in the person's actions. However, it is the individual who, after observing own practice through interpersonal influences and cognition, begin to work towards desired behavioural outcomes.

Reconceptualizing Policy for Resource Shortages

The ICF model demystifies human sense-making in policy implementation in education. We will now present it through the SCT lens to suggest a model for integration of smartphones in secondary school classrooms to mitigate resource shortages and teacher efficacy. This is in line with the conclusion that the ICT policy demanded a reform that called for a tremendous reorganization of the agents' existing schema (Spillane et al., 2002), that is, all three aforementioned levels of policy demands applied from the ICT policy.

The model suggests that the individual school takes initiative and institutes a local teacher training program on integration of the smartphone as an ICT tool for the classroom. This speaks to the SCT behavioural factors and the cognitive aspects of the ICF to change beliefs on self-efficacy, on the ability to actually use the smartphone to attain policy goals (Bandura, 2001; Johnson & Johnson, 2015; Spillane et al., 2002). This is done through an inquiry-based approach involving the agents, who in this case become both teachers and learners, in explaining why policy has to be implemented the way it should. The school then goes on to collectively, inclusive of administration, teachers, parents, and learners, design a school-based smartphone policy. The concept aligns with the SCT behavioural factors and the ICF policy aspects. The third and final element is the situation in which this is taking place or the environment in SCT, which is the school with its unique culture, values, myths, and beliefs that need to be addressed in their local policy. This aspect also asks the question, do we have the smartphone? And the answer, according to research data, is yes (Dzinotyiweyi & Taddese, 2020; World Bank, 2020)

Conceptual smart phone integration components

The three SCT defining components

Behavioural factors- beliefs of personal efficacy/group understanding/aspirations

Personal factors – self-organization / proactive / self-regulation / self-reflective

Environmental factors – sociocultural influences

The three ICF defining components

Agent – beliefs / knowledge / experience

Situation – environment where sense-making is taking place
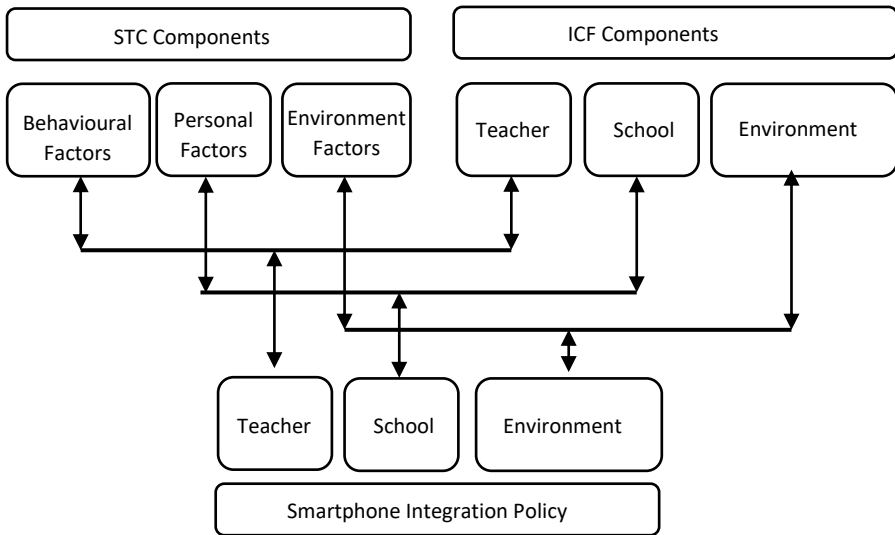
Policy – policy messages / policy-maker's proposals

Smartphone integration

Teacher – school-based training on smartphone use

School – school phone policy and classroom phone policy

Environment – smartphone: pupil ratio

Fig 2 Conceptual smart phone integration model

After the training program, the teacher is empowered to self-organize, reflect, and implement for the classroom (Spillane, 2002). The process begins with a collaborative class smartphone policy derived from the school policy. The classroom policy will, again, incorporate through the same process issues to do with unique myths, culture, and beliefs of that particular class. SCT indicates that as the teachers and learners perceive high efficacy in the use of the

smartphone, they would set higher goals for themselves, increasing the probability of dedicated performance to achieve set goals (Weibell, 2011). The continued replication of integration will increase confidence and efficacy for both teachers and learners, which in turn feeds into the national ICT goals. As self-efficacy perception improves for both the teacher and the learners, their ability to adapt to the change is positively impacted. Bandura placed self-efficacy very high on the causal structure of SCT (Mcleod, 2023).

The conceptual framework presented here is anchored in the belief from both SCT and the ICF that learning takes place through observation within a social setting. The training in smartphone use equips the teacher with skills to be able to model appropriate actions in integration for the learners (Weibell, 2011). The teacher then provides learners in the classroom opportunities for development in social and emotional skills as they engage with the tools for learning and with each other. Due to self-perceived efficacy by the teacher, explicit guidance is provided for the learners as part of policy implementation within the social context of the school and the classroom (Govindaraju, 2021). Finally, the teacher begins to offer a curriculum that is relevant and engaging to the learner.

Conclusion

For sub-Saharan Africa, teachers construct meaning of ICT policies for education under limiting environmental factors that include, among others, resource shortages, teacher efficacy, and limited knowledge of the policy communication. The paper argued for the adoption of available resources in mitigating the dearth in technology integration in education for such poor economies. From this view, we suggested a model we believed can contribute to existing literature on how secondary schools can meaningfully make provision for 4IR-relevant education by using the ubiquity of smart phones as ICT tools to increase relevance in education. Passing learners and promoting them to higher education without ICT literacy is detrimental to the realizing of full participation in the information global village created by the 4IR.

Declaration

This work is declared original and has not been published by another journal.

Conflict of Interest

The author has no public interest in it.

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