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# Enhancing ICT readiness of schools in South Africa

## Summary

The Information Communication Technology (ICT) Readiness Maturity Tool is used to determine the ICT readiness maturity of a school to support the transformation of classrooms by introducing digital technology. The decision support tool was initially developed by the DSI in a paper-based format with the aim to be tested, refined, piloted and further developed into a digital tool. The Centre for Community Technologies (CCT) at the Nelson Mandela University in the Eastern Cape, was tasked to test, refine, pilot and further develop the paper-based tool into a digital tool that can be used for the assessment and evaluation of the ICT Maturity of schools in South Africa. It is a collaborative project between the DSI, the CCT and Technology Innovation Agency (TIA). The study was aimed at using the Schools ICT Maturity Assessment tool to assess and evaluate the schools' ICT maturity level before any intervention to enable ICT-based education, can be deployed. The results generated by the

tool furthermore assist in identifying schools' maturity improvement plans based on the material conditions in each school. The results reveal that even though schools are aware of the need for ICT use and integration into the curriculum, they have yet to reach a stage where ICT is entrenched in the leadership and vision of their schools. ICT is used in teaching and learning, but the extent of this use needs to be interrogated more. The results furthermore reveal a marginal increase in the overall connectivity maturity of schools that were surveyed in specific provinces. It is suggested that access is more readily available to educators and administrators. However, access for learners is still lacking in most instances of those who participated in the pilot. It is noteworthy that both the organisational and infrastructure enablers to foster an enabling environment for ensuring the ICT readiness of a school are generally lacking in the majority of provinces. In terms of leadership and management, the results emphasise that more should be done to encourage educators to

integrate the use of ICT in the curriculum. Moreover, dedicated and adequately trained ICT educators should be identified and supported to strengthen the ICT readiness of a specific school and as such embed digital technology in the educator sector of South Africa.

### **Policy Implications**

The goal of South Africa's 2004 White Paper on e-Education was for every learner in the country to be ICT capable by 2013, and for teachers to use ICT to enhance teaching and learning. One of the key priorities in the new development strategy for South Africa, the National Development Plan (Vision 2030) (NDP), is "improving the quality of education, skills development, and innovation" (NDP 2012:16). The role of ICTs in rural education is not described in detail as an enabler of teaching and learning. A call is made for sufficient support for schools, which would presumably include ICT support. The strengthening of the accountability chain from top to bottom is considered a prerequisite for improving education outcomes, emphasising the importance of improved management of the system as a whole.

South Africa will need to exploit the increasing convergence, sophistication

and reach of ICT. The NDP, in particular, sees ICT underpinning a dynamic, inclusive and prosperous knowledge economy, in which seamless information infrastructure and systems will meet the needs of citizens, business and the public sector. Such a situation, in which advances in ICT are used to strengthen economic competitiveness, generate youth employment and enable an enhanced quality of life, can be described as a "digital advantage". The attainment of digital advantage is crucial if South Africa is to participate effectively in the 4IR. ICT is already playing an important role in transforming the educational system. More changes are expected in terms of new models for open-access, mobile, lifelong and ubiquitous learning beyond the traditional classroom. Integrating digital technologies into the provision of government services (e-government) and the management of cities (smart cities) has the potential to transform the scope and efficiency of public services.

A supportive policy environment and vibrant technological innovations are required to translate into meaningful access to and use of ICTs in all South African schools.

### **What is ICT Maturity?**

Every school needs an ICT plan to achieve its vision, but evaluation is usually the weakest component of ICT plans. There are several factors involved, but an important one is that policy makers often have unrealistic expectations about the learning improvements that will result from ICT initiatives. For example, when you consider that it takes an average of four to five years for most teachers to reach a level of technological proficiency at which they can use computers fluidly and effectively, then an impact on student learning will not occur any sooner.

On the other hand, the degree of success that a school has in implementing ICT will depend, in part, on the quality and maturity of its ICT plan. Therefore, the school needs to monitor its progress towards ICT integration and use the evaluation results to plan its ICT program, e.g., identifying needs, problems, and opportunities as well as specific aspects of the program such as professional development, technical assistance, and resources. It is clear that schools need a periodical evaluation mechanism to know where they are. Such a mechanism indicates how to advance (more rapidly) towards the correct direction (roadmap) without losing time, efforts or resources. Evaluation is necessary, but unfortunately there are no standardised approaches. The choice of an evaluation method would depend on what aspect of ICT and education is to be evaluated; consequently, there is a wide range of

assessment tools in ICT and education.

### **ICT Maturity Assessment**

The development of ICT Maturity Assessment models has been a strong trend in various technological and organisational areas. These models are proving to be useful because they allow individuals and organisations to self-assess the maturity of various aspects of their processes against benchmarks. The best-known models are those belonging to the Capability Maturity Model Integration family developed by Humphrey at Carnegie Mellon University (CMMI, 2006). These models are typically constructed with five levels, where each maturity level provides a new foundation of practices on which subsequent levels are built. Although they were developed for the software products and services, their capability maturity level structure and the mechanisms for determining those levels have been replicated by many other models in other areas. All these proposals were developed as an E-learning Maturity Model to provide a means by which educational institutions can assess and compare their capability to develop, deploy and support e-learning (focused on learners rather than teachers and institutions) by providing appropriate structures to deliver effective educational experiences through ICT use.

Table 1 shows the five areas and associated elements used to determine the digital (ICT) maturity of schools.

**Table 1:** Areas and indicators of the ICT Maturity of schools

Area	Indicators
<b>Leadership and Vision</b>	<ul style="list-style-type: none"> <li>• Vision, strategic guidelines and objectives of ICT integration</li> <li>• Plan and programme of school development from the perspective of ICT</li> <li>• Managing the integration of ICT in learning and teaching</li> <li>• Managing the integration of ICT the school's business activities</li> <li>• Managing data collected by means of information systems</li> <li>• Regulated access to ICT resources</li> <li>• Use of ICT in teaching students with special educational needs</li> </ul>
<b>ICT in learning and teaching</b>	<ul style="list-style-type: none"> <li>• Awareness</li> <li>• Planning</li> <li>• Use</li> <li>• Digital content</li> <li>• Evaluation of students</li> <li>• Students' experience</li> <li>• Special educational needs</li> </ul>
<b>Development of digital competencies</b>	<ul style="list-style-type: none"> <li>• Awareness and participation</li> <li>• Planning</li> <li>• Purpose of professional training</li> <li>• Self-confidence in the use of ICT</li> <li>• Digital competencies of students</li> <li>• Digital competencies of educators</li> <li>• Professional Development</li> <li>• Informal learning</li> </ul>
<b>ICT culture</b>	<ul style="list-style-type: none"> <li>• Access to ICT resources by educational staff</li> <li>• Access to ICT resources by students</li> <li>• Network presence</li> <li>• Communication, information and reporting</li> <li>• Netiquette</li> <li>• Copyright and intellectual property</li> <li>• Projects</li> </ul>
<b>ICT resources and infrastructure</b>	<ul style="list-style-type: none"> <li>• Planning and procurement</li> <li>• Network infrastructure</li> <li>• ICT equipment in the school</li> <li>• ICT equipment for educational staff</li> <li>• Programme tools in schools</li> <li>• Connectivity</li> <li>• Technical support</li> <li>• Equipment maintenance</li> <li>• Central repository of digital documents and educational content</li> <li>• Information security system and licensing control</li> </ul>

## The ICT Maturity Levels

The tool measures the readiness level of a school to allow the school to provide access to the use of digital technology to not only enhance the teaching and learning process but to also improve the skills sets of learners whilst engaging with the curriculum.

The eReady tool measures the levels of ICT readiness using a framework of 39 indicators organised in five areas (or constructs). The five constructs aimed at assessing the extent to which:

- the school offers an enabling environment for the use of digital technologies;

- the school management provides leadership and support for the use of digital technologies;
- individual teachers learn and expand on their digital technology capabilities;
- digital technologies is regarded as important for the school's activities and processes;
- teachers are empowered to use digital technologies in the teaching of the formal curriculum.

Table 2 outlines the eReady tool maturity level descriptions.

**Table 2:** Maturity level descriptions

<b>Maturity level 1</b>	<b>Maturity level 2</b>	<b>Maturity level 3</b>	<b>Maturity level 4</b>	<b>Maturity level 5</b>
<i>Digitally Unaware</i>	<i>Digital Beginner</i>	<i>Digitally competent</i>	<i>Digitally advanced</i>	<i>Digitally mature</i>
Limited, if any awareness of the possibility of using ICT in learning and teaching or in business activities. ICT infrastructure not provided yet and computers are used only in some school rooms.	Some awareness of the possibility of using ICT in learning and teaching, but not yet in practice. Limited staff use ICT in learning and teaching. ICT infrastructure undeveloped. Internet access available only in some school rooms.	Aware of possibility of using ICT in all the aspects of activities. Directs development of its strategic documents and practical work accordingly. Staff develop their digital competences, digital content and begin introducing innovative teaching styles. Access to different ICT resources is provided in most school rooms.	ICT integrated in all aspects of activities. Staff use ICT for advanced teaching styles and the evaluation of knowledge. Develop own content housed on a shared repository which can be used by the staff and students. Access to ICT resources is provided in most school rooms.	ICT entrenched in strategic documents and planning. Learning and teaching use digital technologies extensively. Systems integrated to strategically position school. Digital content repository for use by staff and students. Access via own devices is provided in all rooms.

A key consideration in the use and roll-out of digital technologies in the Basic Education Sector, is the capabilities of educators and departmental officials and the maturity of schools to learn, identify and implement digital technologies in order to ensure sustained integration into learning and teaching. organisational growth. To make this a reality, appropriate measurement tools are required to obtain reliable, timely and meaningful information about the readiness capabilities of schools. It is against this background that the eReady tool was developed by the CCT as a tool to assess and develop the ICT readiness capabilities in the education sector. The aim of this policy brief is to outline the extent to which schools develop their ICT readiness capabilities.

The process of developing the eReady tool involved several steps starting with baseline studies at selected schools, iterative adaptations of paper-based tools, desktop research to determine the relevance of other ICT Maturity Assessment models and the digitisation of the eReady tool and piloting the tool in schools (Veldsman, Van Greunen, Botha 2020).

### **eReady pilot results**

To assist with the completion of the data for schools across all nine provinces, 2894 data capturers received training on the use of the tool. Table 3 shows the number of schools per province that completed the survey. The sample represents 20% of all schools in South Africa.

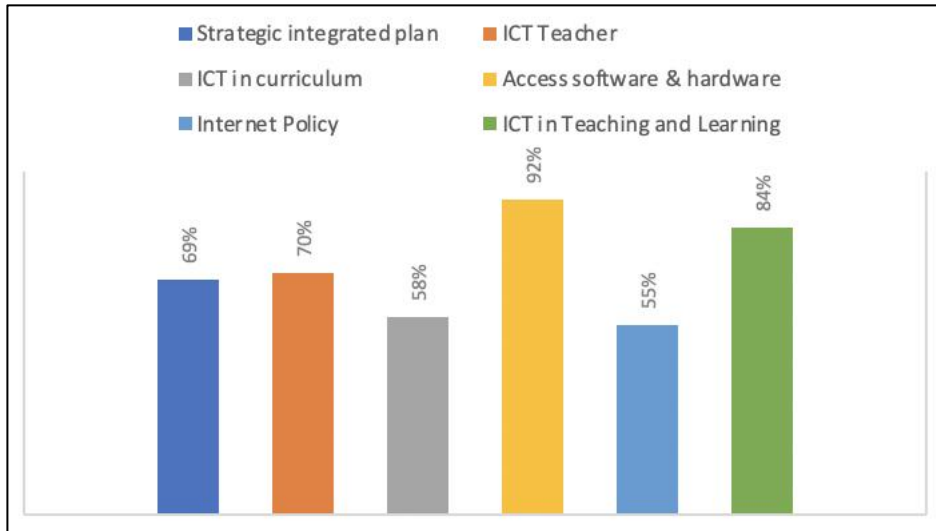
**Table 3:** Number of schools in pilot

EC	FS	GP	KZN	LP	MP	NC	NW	WC	TOTAL
276	373	127	670	2662	163	142	101	615	5199

Figure 1 shows the average scores for the area Leadership and Vision. The scores indicate an awareness of the need to include digital technologies and the planning for the integration thereof in the leadership and vision documentation.

In terms of access to the Internet, the average scores indicate a high percentage of access provided to administrators and educators. Access to the Internet by learners is very low at an average of 32%. This can be attributed to the lack of infrastructure that includes digital devices, dedicated facilities and basic electricity.

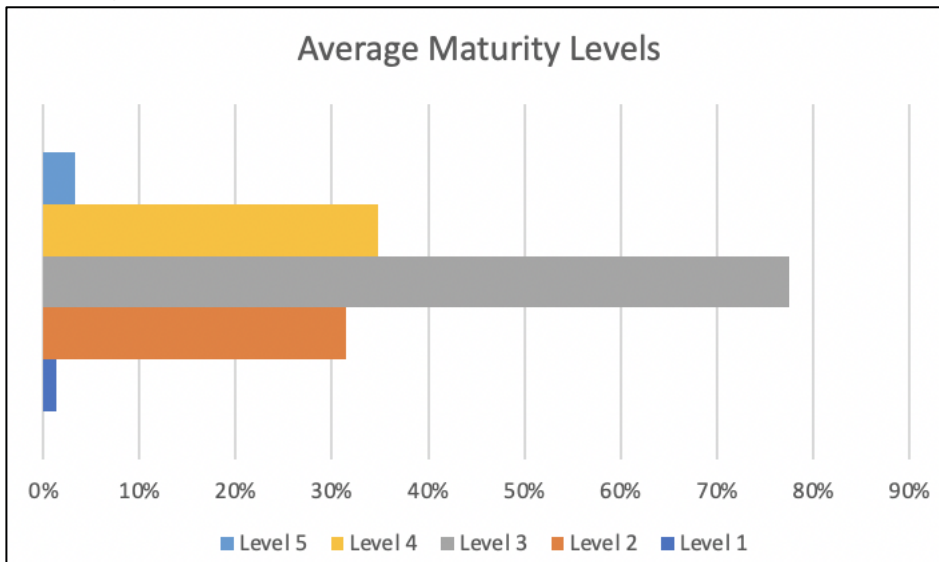
**Figure 1: Average score leadership and vision**



Further analysis was done to indicate the specific items that were scored the lowest or highest in the different provinces. This provides insights into the overall levels of ICT readiness amongst the schools that participated in the pilot. In Figure 2, the total

percentages per maturity level across all participants is depicted. Based on the averages the majority of schools ended up at a Level 3 which indicates an awareness of the role of digital technologies with some level of digital competency in the different schools.

**Figure 2: Average maturity levels across 5199 schools**



## **Conclusions and policy actions**

To improve the integration of digital technologies into the education sector require new and improved ways of doing things. The ICT readiness maturity levels and the extent to which schools and educators learn and improve their ICT readiness capabilities are largely unknown. The findings of the pilot study indicate that while some schools are at a maturity level of awareness and understanding, they have not reached the stage where ICT readiness and the use of digital technologies are entrenched in their schools and the learning and teaching processes. The pilot study shows that school leadership and management should continue to be exposed to projects that involve the use of digital technologies in the formal teaching and learning process. In particular, there is a need to foster participation from schools in shared experiences and reflective learning to accommodate the realities of reaching a high level of ICT readiness maturity.

The pilot study shows that the organisation enablers to create an enabling environment for ICT readiness are lacking in large parts of the country. In terms of leadership and vision, the results indicate that more should be done to encourage educators to make use of digital technologies in the formal curriculum. A key policy insight is the lack of understanding of the benefits of using digital technologies as a tool in teaching and learning. It is recognised that there are broader factors which impact the ICT readiness maturity ability. Findings from the pilot study should be incorporated in future

refinements of the tool to contextualise both the internal and external environments in which schools operate.

## **Recommendation**

The above policy implications take a holistic view on the integration of ICTs into the schooling system. Such a policy is to be informed by the maturity level that will guide decision makers on the maturity of the school and the education system to adopt ICT interventions.

The digital maturity of schools is a concept of the strategic use of information and communication technologies in schools, which is planned and implemented at the level of the school as an organisation, in accordance with local and state policies. The European Commission has recognised the importance of this concept and, through its policies and initiatives, systematically encourages the development of the digital maturity of schools.

As defined in the this document, digitally mature schools are schools on a high level of integration of ICT in their life and work. Digitally mature schools have a systematised approach to ICT use in school planning and management, as well as in their educational and business processes. Such schools operate in a supportive environment, with adequate resources, including not only the financial ones, but also adequate ICT equipment for classrooms, laboratories, teachers and students. Digitally mature schools systematically approach the development of the digital



competences of the educational staff and students, whereas the former use ICT for improving their teaching styles, through which the teaching focuses on the students, for the development of digital educational content and for evaluating the students' achievements, in accordance with the learning outcomes and educational objectives. There is a developed cooperation between the staff and the students, as well as between the school and other stakeholders, realised through the use of online communication tools and e-services, which includes the participation of the school in projects related to the use of ICT.

## References

South African Government (2012), National Development Plan 2030. [https://www.gov.za/sites/default/files/gcis\\_document/201409/ndp-2030-our-future-make-it-workr.pdf](https://www.gov.za/sites/default/files/gcis_document/201409/ndp-2030-our-future-make-it-workr.pdf)

CMMI Project team (2006). *CMMI for Development, Version 1.2*. Software Engineering Institute, Carnegie Mellon University, Pittsburg

Veldsman, A, van Greunen, D, Botha, J (2020) eReadiness Assessment Tool for Schools in *IST-Africa 2020 Conference Proceedings*

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