

Chapter 2

FINANCING E-EDUCATION AND ACHIEVING POLICY GOALS IN PUBLIC ORDINARY SCHOOLS IN SOUTH AFRICA

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2.1 Introduction

This chapter presents the key issues for consideration with respect to financing e-education and lays the foundation for further research to be conducted for the next Annual Submission (2014/2015). Furthermore, in posing important questions about the financing of e-education in South Africa, this chapter contributes to a ten-year review of the White Paper on e-Education: Transforming Learning and Teaching through Information and Communication Technologies (South Africa, 2004).

The world is shifting to a knowledge-based economy. South Africa's ability to promote inclusive growth depends on producing successive generations of well-educated young people contributing to socio-economic development. A South African society with a large, well-educated population will overcome more easily the many obstacles to social and economic equality experienced by the majority of households. One of many approaches to building the necessary long-term capacity is e-education, which uses Information and Communication Technologies (ICTs) to enhance the quality of the learning and teaching experience. The result is potentially greater completion rates and better educational outcomes, as learners can have access to a more complex knowledge base and engage in more self-learning, with the guidance of teachers.

This chapter reviews only the financing of e-education in public ordinary schools, which fall under the Department of Basic Education (DoBE). Financing of e-education has occurred mainly through the national budget and through two provincial budgets, Gauteng and Western Cape. Furthermore, a number of e-school initiatives and projects (Isaacs, 2007) are being run, including those promoted by the DoBE, the Department of Communications (DoC) and the Department of Science and Technology (DST). While cross-governmental collaboration on e-education is necessary and to be encouraged, the main focus of this chapter is financing of e-education from the DoBE budget.

2.2 View of the Problem: Schooling, e-Education and Financing

During their schooling years, the majority of the 12.1 million learners in 24 681 public schools in the nine provinces (DoBE, 2011) acquire only limited knowledge, and a very large proportion fail to complete 12 years of schooling (FFC, 2011):

In South African schools, gross enrolment rates are quite high at primary levels of education, which shows that the country has expanded access (not necessarily quality) to basic education and is on track to meet the MDG2 of achieving universal primary education (Jansen, 2008). The challenge facing basic education in South Africa is that completion rates are low at secondary level, where fewer than 20% of youths drop out before Grade 9 (Gustafson and Morduchowicz, 2008). Analysts support this point, noting that over 1.3 million learners began Grade 1 in 1999, but less than half of them reached Grade 12 and became the "2010 matriculants" (Bowie, 2011). This is due to various reasons including but not limited to high drop-out rates and high grade repetition levels. There is thus a critical and urgent need for attention by the developmental state.

This low level of education negatively affects South Africa's capacity to develop. It limits the ability to create economic value and to ensure that an increasing proportion of the population participate in economic production at reasonable rates of reward, often referred to by government as 'decent jobs'. The basic education systems requires many

interventions to increase capacity, including leadership, good school governance and greater access to knowledge for both teachers and learners.

South Africa does not have a comprehensive life-long learning programme for teachers. After their teacher training, most teachers are confined to the classroom and have limited access to new knowledge, based on changes in the curriculum and/or teaching guides and/or learner materials. As a result, opportunities are limited for teachers to become conversant with important educational content in a particular subject area or to stay abreast of trends in teaching language, science or mathematics.

The limitations affecting the knowledge base of the teaching fraternity also have a negative impact on learners, who are thus poorly prepared for further and higher education and for the world of work. Introducing and integrating ICTs, electronic and visual media into the educational process and culture can provide a platform for increasing access to knowledge for teachers and learners. This includes textbooks and other learner materials available online, free download of content, and access to text, visual media (graphs, maps), and audio-visual media (video, film, music). Devices such as electronic tablets and e-books can bring knowledge to the classroom and to the learner's desk. Many private schools and colleges have introduced e-books and tablets (the 'new blackboard') as learning devices in the classroom. E-books are a "game-changer" (Gray, 2011), and failure to make this shift over the next three to five years will further disadvantage and entrench the knowledge divide among South African learners, reducing their chances of becoming professionals, job creators and the next generation of teachers in a digital knowledge era.

Introducing e-education as a way of improving the quality of education does not require the most sophisticated and expensive equipment. An e-education business model can be designed that makes the widespread introduction of technology affordable. However, inhibiting factors in the public sector may include inefficiency and corruption in the delivery chain. A systematic approach is required, with a strategy, plan and adequate financing and risk management, to ensure that e-education is alive and makes an impact in schools. In reality, despite generally well-expressed policy goals, e-education is largely dormant and appears to be poorly financed, with only limited management and evaluation.

2.3 Policy Goals: e-Education and Quality in Basic Education

The Department of Education (DoE) was one of the first government departments to introduce public policy for integrating ICTs and to consider transforming the sector through the introduction of new technology. The policy goal of the White Paper on e-Education (South Africa, 2004, Section 2.23) states:

Every South African learner in the general and further education and training bands will be ICT capable (that is, use ICTs confidently and creatively to develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community) by 2013.

This policy goal is supported by the Information Society and Development (ISAD) Plan 2006, which includes e-education as one of three priorities (DoC, 2006, Section 4.1.1) and states:

The education system of this country, therefore, has an obligation to support the development of a citizenry that can actively participate in this new (information) society and deliver on public expectations of delivering quality education for economic growth and social development.

Two of the main targets for e-education (DoC, 2006, p 58) are:

- All schools connected and using ICT for teaching and learning.
- All provinces have budget allocated for e-education.

Furthermore, the policy goal for e-education is in line with the strategic outcomes of the current administration for (a) improved quality of basic education and (b) a skilled and capable workforce to support inclusive growth.

The policy foundation for e-education appears to be relatively comprehensive and is located in various components of the government machinery. As the policy anniversary of 2014 approaches, this foundation will need reviewing and updating, as technology and digital content production has advanced considerably in the past decade, and many innovations are now available that can bring e-learning to schools at a lower cost.

2.4 Some Perspectives on Financing e-Education

The value of e-education is not contested, as shown by the adoption of the White Paper on e-Education with its focus on e-school development. This chapter looks at the financing of the e-learning component of e-education (the other component being e-administration). Financing of e-learning has been left to the discretion of provinces, which are in charge of the education function. Government has not yet introduced a specific intergovernmental financing mechanism for funding e-learning content and e-education infrastructure (DoBE, 2012). Schools differ widely across provinces, from those that have relatively good infrastructure to those where mud huts are used as classrooms. Given the great diversity of learning environments, an intergovernmental financing mechanism must address specific components of e-learning across all provinces. A gradual, progressive approach would encourage the evolution and equitable development of e-learning across provinces.

The e-learning components that require funding need to be clearly defined, so that funding allocations can be prioritised to ensure well-resourced e-learning. Virtual learning centres, such as computer laboratories, have advantages and disadvantages (Morse, 2010). Ideally e-learning should take place in the classroom, so that every subject area benefits from access to knowledge through online materials or electronic media. Some forms of e-learning require minimal expenditure of public funds, for example sending key learning points via sms or podcasts to mobile phones. E-learning can be introduced within the constraints of a particular budget allocation, emphasising low-cost initiatives where appropriate and more costly and beneficial approaches in the medium to long-term. For more advanced forms of e-learning, the design of future funding models will need to take into account the need for (a) broadband access to download or upload large documents, video or music files and (b) local content production and dissemination, to promote greater availability of, and access to, South African languages, culture and knowledge alongside global culture and knowledge.

As the majority of Internet connections are too slow for downloading useful content, the private's sector historical investment in providing Internet access to public schools may soon become obsolete. Traditionally, investment has been through universal access and service obligations that the telecoms sector regulator, ICASA, set for approximately 17 500 schools. The 'last mile' is broadband connectivity to the classroom, to facilitate access to web-based learner materials, e-books, e-education applications and/or Internet Protocol TV (IPTV).

Therefore, national, provincial and local governments will need to facilitate broadband connectivity across the country, through a combination of public and private initiatives, including funding. Linking schools to the government virtual private network (VPN) is one approach being considered in the DoBE feasibility study (DoBE, [Sa]). Another approach is to make use of the broadband networks built by the metropolitan municipalities of Cape Town, Ekurhuleni, Johannesburg and Pretoria, and the provincial government of Gauteng. The billions of rands invested in these broadband initiatives have been justified by referring specifically to schools as important users of the network infrastructures. These investments need to be made to work for South African schools. A third, possibly parallel, approach would be to make available, and give access to, mobile broadband networks (small WiFi or WiMax networks), especially in rural areas.

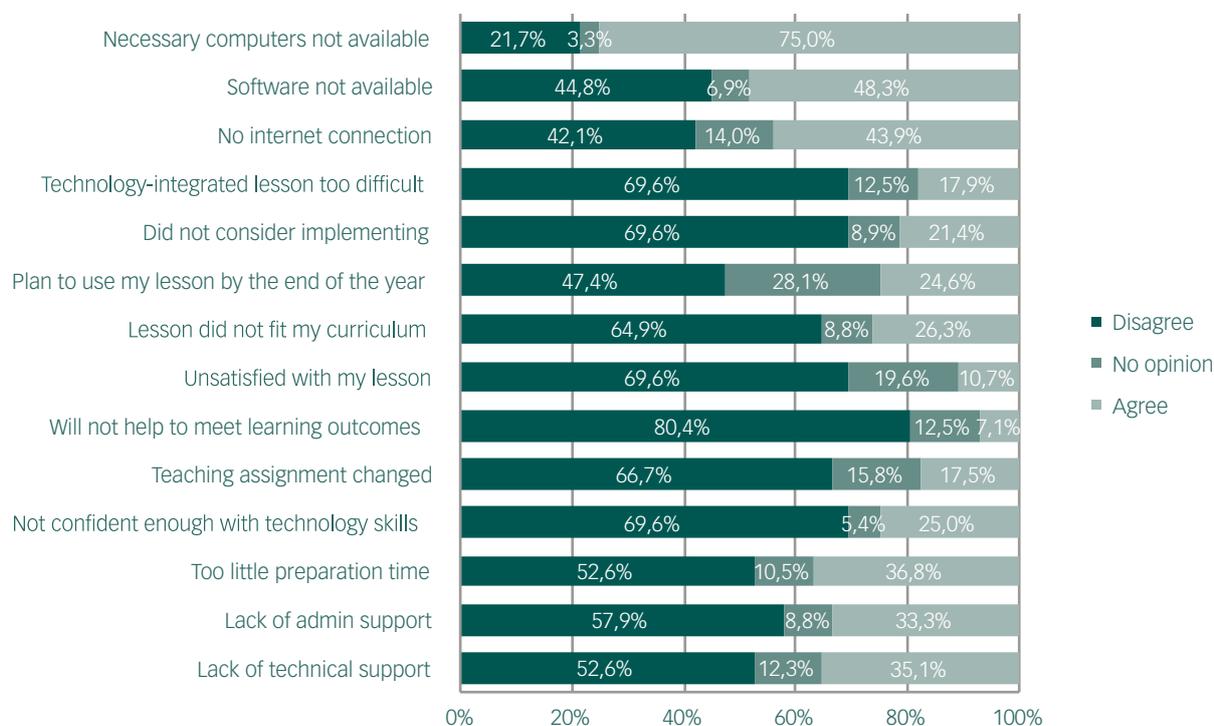
Various methods can be considered for the financing of e-learning (Intel Corporation, 2007), but these are merely measures supporting government financing:

- Combining education funding sources: the costs of educators' electronic equipment can be funded using both salary budgets and treasury funds, where teachers help to offset technology costs by sacrificing a small portion of their salaries.
- Public-private partnerships (PPP): private financing and risk management can be incorporated into the funding mix for e-learning. However, this model mainly applies to infrastructure components and is not a traditional PPP where the private sector gets a financial return.
- Forming consortia: schools can pool their purchasing power in order to get favourable prices from the suppliers.
- Philanthropy and grants from development agencies: grants can contribute to funding e-learning.

In South Africa, using public funds to fund the introduction of e-learning has proved difficult. The private sector's contributions to infrastructure financing and availability (based on regulated universal access and service obligations placed on the fixed and mobile telecoms operators) has led to limited Internet connectivity (BMI-Techknowledge, 2010) but has had little or no positive impact on ICT usage (Wilson-Strydom & Thomson, 2005).

Therefore, the funding of e-education must target aspects that hinder the delivery of e-education to schools and the integration of technology into everyday learning. Research by Wilson-Strydom and Thomson (2005) reveals the reasons for poor adoption of e-learning in the early years following adoption of the White Paper:

Figure 2.1. Reasons for not implementing technology-integrated lessons



Source: Wilson-Strydom and Thomson, 2005

An analysis of Figure 2.1 helps to identify the areas that need funding, so that e-learning can spread throughout ordinary schools. An important line item relevant to all budget allocation is computing hardware and software, using suitable electronic devices, possibly e-books or electronic tablet devices (often cheaper than laptops or desktops). Other requirements include adequate and relevant curriculum content, and adaptation to using electronic media and technological devices in the classroom — all of which need appropriate budget allocations. Too many e-education initiatives in South Africa have focused on technology as the solution, rather than the medium. Budgets have been exhausted building computer labs that are under-utilised. Electronic media for educational purposes should be about the daily application and use of educational technologies, which are continuously adapted by teachers and learners to their particular uses and needs. Hence, budget allocations should tend towards a learning-intensive rather than a technology-intensive approach. Financial modelling for e-education should take into account the whole school budget.

Funding e-learning is a challenge, as most funds are targeted at teaching and not at technology-integrated learning. According to the OECD (2005), the two main challenges for e-learning are (a) pricing and costing of e-learning and (b) sustainable funding for e-learning.

In the case of pricing and costing, most institutions have not clearly defined what e-learning entails and what aspects of e-learning need to be funded. The DoBE's feasibility study to better understand the costing and funding of e-learning found (DoBE, [Sa]):

1. Insufficient experience of e-learning to make a judgment on relative costs.
2. Considerable experience, but no firm evidence on relative costs.

3. Experience to date suggests e-learning is fundamentally more expensive than face-to-face delivery, but this is offset by other benefits.
4. Experience to date suggests that initial development and delivery costs are often more expensive than face-to-face delivery, but other factors have shown or suggest that e-learning will prove less expensive across the product cycle.

Funding e-learning sustainably is a challenge in many countries. To reap the benefits of e-learning, South Africa needs to find long-term, sustainable ways of financing e-learning in public ordinary schools. One way is to look at how each sphere of government can contribute to financing the required infrastructure (including broadband connectivity) and electronic content production to supplement the already available learner materials. For the purpose of this report, only the DoBE programme-level budgets have been examined, as data on provincial budget allocations for e-education and e-learning is limited and still needs to be compiled into a comprehensive report to facilitate analysis.

2.5 An Overview of Historical and Projected e-Learning Expenditure

Targeted funding will help to implement the goals set by the White Paper on e-Education. In addition to understanding the evidential basis for the successful introduction of e-learning (see Wilson-Strydom and Thomson, 2005), the historical expenditure on e-learning also needs to be considered in the context of total basic education expenditure (see Tables 2.1–2.4).

Table 2.1. Basic education expenditure

Programme	Audited outcome			Adjusted appropriation	Revised estimate	Medium-term expenditure estimate		
	2007/08	2008/09	2009/10		2010/11	2011/12	2012/13	2013/14
Administration	106,101	121,429	154,617	257,981	257,981	301,740	320,787	339,977
Curriculum Policy, Support and Monitoring	295,037	540,949	564,228	1,351,950	1,071,950	1,835,137	1,901,347	2,013,482
Teachers, Education Human Resources and Institutional Development	176,126	283,284	497,507	495,026	495,026	521,989	747,195	973,163
Planning, Information and Assessment	2,808,135	3,320,132	4,030,416	4,928,102	3,376,852	6,387,529	8,405,342	11,614,737
Educational Enrichment Services	1,414,118	2,118,201	2,607,518	3,891,203	3,891,203	4,821,739	5,183,265	5,468,265
TOTAL	4,799,517	6,383,995	7,854,286	10,924,262	9,093,012	13,868,134	16,557,936	20,409,624
Administration	2%	2%	2%	2%	3%			
Curriculum Policy, Support and Monitoring	6%	8%	7%	12%	12%			
Teachers, Education Human Resources and Institutional Development	4%	4%	6%	5%	5%			
Planning, Information and Assessment	59%	52%	51%	45%	37%			
Educational Enrichment Services	29%	33%	33%	36%	43%			

Source: National Treasury, 2011

For the 2013/2014 financial year, the total national budget allocation for basic education is scheduled to increase to over R20 billion. Historically, over 80% of the budget has been spent on two programmes: the planning, information and assessment programme (51% in 2009/10) and the educational enrichment services programme (33% in 2009/10). These programmes should collectively contribute in significant ways to the introduction of successful e-learning across all provinces.

The national budget is directed towards policy design and review, while schooling is a provincial function. Therefore, the main budgets that would be used to build e-education lie in the provinces. Ideally, since e-education is a major long-term policy initiative, e-education should be a specific programme and a specific item in the national and provincial budget allocations.

Table 2.2. Computer services expenditure

Programme	Adjusted						
	Audited outcome			appropriation	Medium-term expenditure estimate		
ZAR thousand	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Administration	7,852	7,593	13,859	16,274	15,537	16,461	17,337
Curriculum Policy, Support and Monitoring	2,803	2,686	1,341	2,024	1,798	1,863	1,954
Teachers, Education Human Resources and Institutional Development	1	430	3,486	17	9	11	12
Planning, Information and Assessment	13,162	15,616	20,512	40,732	35,463	36,458	38,550
Educational Enrichment Services	5	5	2	–	4	4	4
TOTAL	23,823	26,330	39,200	59,047	52,811	54,797	57,857

Source: National Treasury, 2011

Expenditure on computer services is much higher in the planning programme than in any other programme. From 2007/08 to 2011/12, expenditure on computer services declined in the curriculum policy, support and monitoring programme. The education human resources and institutional development programmes show very small budgets. Yet a great proportion of the computer services budget would be expected to be allocated to these programmes if e-learning were a funding priority.

Table 2.3. Communications expenditure

Programme	Adjusted						
	Audited outcome			appropriation	Medium-term expenditure estimate		
ZAR thousand	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Administration	1,607	1,738	2,199	1,680	2,289	2,437	2,582
Curriculum Policy, Support and Monitoring	510	775	749	539	687	723	796
Teachers, Education Human Resources and Institutional Development	382	354	424	415	482	512	543
Planning, Information and Assessment	611	616	663	839	846	875	924
Educational Enrichment Services	258	215	267	304	311	311	326
TOTAL	3,368	3,698	4,302	3,777	4,615	4,858	5,171

Source: National Treasury, 2011

Delivery of e-learning pivots around efficient communication systems. The relatively low expenditure on communications indicates an environment in which the e-learning focus is very limited.

Table 2.4. Learner and teacher support material expenditure

Programme	Adjusted						
	Audited outcome			appropriation	Medium-term expenditure estimate		
ZAR thousand	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Administration	625	105	73	87	66	81	90
Curriculum Policy, Support and Monitoring	1,197	12,390	1,061	391	16	17	19
Teachers, Education Human Resources and Institutional Development	–	384	2	–	4	4	4
Planning, Information and Assessment	3	9,892	486	–	–	–	–
Educational Enrichment Services	43	–	–	–	2	2	3
TOTAL	1,868	22,771	1,622	478	88	104	116

Source: National Treasury, 2011

The support material expenditure pattern is not predictable, as over the years this expenditure in the different programmes has seen an overall decline. There is a paucity of data that suggests prioritisation of e-learning. Discussions with the DoBE indicate that, as yet, no dedicated budget exists for the promotion of e-learning or e-education. While policy is made at national level, certain aspects of policy implementation would need to be addressed at the provincial level, particularly the design of budgetary allocations, as a foundation for provincial level implementation.

2.6 Conclusion

The financing of e-education need not be high budget. While the initial investment may appear costly, cost containment measures can be explored within a medium to long-term budgetary perspective. Appropriate scoping of the requirements, contributing parties and budget design can lead to an elegant, yet effective, model for the advancement of e-education, specifically of e-learning. This exercise is vital to the future of e-education, as failure to invest introduces a significant opportunity cost. The DoBE is currently engaged in a relatively comprehensive feasibility study, and the Commission can provide useful comment to government on this study, its strengths and weaknesses.

It is necessary to understand why the e-education challenge is not being met, in order to present options for remedy. There are a few possible reasons, which require action: (a) the need for concerted cultural and technological adaptation; (b) the need for specific e-education knowledge and leadership at both national and provincial levels, as education is a concurrent function between national and provincial government; (c) a requirement for explicit budget allocations for e-education at national and provincial levels; (d) supporting strategies and funding from institutions such as the DoC and ICASA; (e) building public accountability for policy implementation into the education ecosystem.

2.7 Recommendations

With respect to financing e-education and achieving policy goals in public ordinary schools in South Africa, the Commission recommends that:

- The e-education policy should be funded as a part of government's operating budget for the programme, just like teacher salaries, school buildings and other teaching aids.
- A well-structured, inter-governmental financing mechanism should be established with explicit guidelines to provincial departments of education regarding the budget line items that must be prioritised in their annual budget allocations, as well as those budget line items that will be contained in the national budget allocation. Decisions

on the particular line items can be informed by a review of policy documents and various studies conducted on e-education over several years (Abrahams, Akinsanmi & Zimri, 2012; DoBE, no date; DoC, 2006; Isaacs, 2007; OECD, 2005; South Africa, 2004; Wilson-Strydom and Thomson, 2005), and by a broader review of the available knowledge of e-education financing across the globe. An initial set of line items can be extracted from Table 2.5.

Table 2.5. Guidelines for inter-governmental financing

Financial data (expenditure) on e-education spending by province	Value obtained
<ul style="list-style-type: none"> • School Internet connectivity (dial-up) by province • School broadband connectivity by province • School mobile broadband connectivity by province (eg WiFi) • Learning devices (not necessarily desktops or laptops) • E-learning materials developed nationally and by province, including hosting online content • Accessing online content – nationally and by province • Development of teachers’ e-skills • Adaptation of classrooms to incorporate electronic media • Introduction of lower-cost devices to the classroom/learner • Establishment of computer labs/computer libraries (should be very limited) • Research, monitoring and evaluation of policy goals of the 2004 White Paper on e-Education 	<p>Progress in expenditure on e-learning and e-education in terms of the goals of the White Paper on e-Education</p>

- The national and provincial education sector requires firm and expert guidance on designing e-education, and such expertise should relate to e-education, not merely to information technology. In order to promote advances in e-education, it may be necessary to consider the establishment of an e-Education Commission, constituted of government officials and e-education specialists to act as an advisory body.
- Limited data is available on e-education expenditure and specifically on e-learning expenditure, despite clear policy goals adopted in 2004 and targets established for 2013. This should be remedied through reporting on e-learning budget allocations and expenditure and, more broadly, on e-education in the annual reporting process. Such data can inform national and provincial planning, curriculum design and the development of education human resources. It can also inform the work of an e-Education Commission, enabling such a structure to advise government effectively. Furthermore, explicit reporting on financial data will enable a better analysis of the strengths and weaknesses relevant to achieving the policy goals of the White Paper on e-Education. As a baseline, the data set out in Table 2.6 would be required.

Table 2.6. Guidelines for analysing e-education financing

Broad Data Required	Analysis Required
<ul style="list-style-type: none"> Total ordinary schools' budget by province Total budget spent on e-education by province Total budget spent on learner materials Total budget spent on e-learning materials 	<ul style="list-style-type: none"> e-education spending as a proportion of total spending e-learning spending in comparison to spending on learner materials
<ul style="list-style-type: none"> Key elements of e-education as per DoBE policy Line items of e-education as per DoBE budget/financing plan 	Comparison of policy and financing approaches to e-education
<ul style="list-style-type: none"> Total number of schools by province Number of public ordinary schools with desktop computers Number of public ordinary schools with laptop computers Number of public ordinary schools with e-books, tablets or other content-enabled devices Number of public ordinary schools with email access Number of public ordinary schools with Internet access (indicators for dial-up, total broadband and mobile broadband) 	Analysis of the foundations for e-education in terms of availability of infrastructure and resources
<ul style="list-style-type: none"> Statistics on ICT usage by learners in public ordinary schools per subject per grade Statistics on ICT usage by teachers in public ordinary schools per subject per grade 	Analysis of the educational value created

- In addition to the above, the impact of e-education policy and financing should be continuously assessed, taking into account cross-departmental issues and supporting measures from a range of government departments and relevant public sector bodies (Department of Basic Education, Department of Higher Education and Training, Department of Labour, Department of Science and Technology, Department of Communications, metropolitan municipalities, ICASA and others).
 - Such assessment would consider both school-level and economy-wide impacts. From an analytical perspective, the requirements would be twofold:
 - To understand how e-education affects students' decisions about acquiring ongoing skills in the education system (econometric analysis coupled with case studies, repeated over time);
 - To consider interactions between e-education and the rest of the economy. Quantifying these interactions allows the value of various policy and financing options to be compared.
- When the delivery agreement on *Outcome 5: Build a skilled and capable labour force* is next reviewed, greater emphasis should be given to overseeing the implementation of the e-education policy, noting in particular the sub-output "Enhance research, development and innovation in human capital for a growing knowledge economy". Most of the relevant departments are already signatories to the agreement, and the delivery forum can be expanded to include other relevant role players such as those mentioned in (4) (b) above. Thus, using existing coordination structures, progress on e-education can be reported to Cabinet on a quarterly basis, thereby raising the profile of e-education.

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