



Innovation in Education: A Technical Report

March 2016

Researched and compiled by Lynn van der Elst

Table of contents

EXECUTIVE SUMMARY	1
1. INTRODUCTION	3
2. BACKGROUND	5
3. METHODOLOGY	7
3.1 PRIMARY RESEARCH	7
3.1.1 Interviews	7
3.1.2 Roundtable discussion	7
3.1.3 GELP consultancy sessions	7
3.2 SECONDARY RESEARCH	7
3.3 FINDINGS	7
3.4 RECOMMENDATIONS	8
4. OVERVIEW OF FINDINGS	9
4.1 INNOVATION FOR 21 ST CENTURY LEARNING	9
4.1.1 What does “innovation” mean?	9
4.1.2 What does “21 st century learning” mean?	12
4.2 THE CASE FOR INNOVATION IN EDUCATION	14
4.2.1 The case for innovation worldwide	14
4.2.1 The case for innovation in South Africa	15
4.2.2 Priority areas for intervention	17
4.3. CREATING AN ENABLING ENVIRONMENT	22
4.3.1 Enabling innovation at the school level	23
4.3.2 Enabling innovation at the system level	28
4.4 PROMOTING INNOVATION IN EDUCATION: EXAMPLES FROM AROUND THE WORLD	30
4.4.1 South African examples	31
4.4.2 International examples	32
5. CONCLUSIONS AND RECOMMENDATIONS	37
5.1 PROPOSED INNOVATION UNIT: RATIONALE	37
5.2 PROPOSED INNOVATION UNIT: DESCRIPTION	37
5.2.1 Function	37
5.2.2 Design	37
5.2.3 Location	38
5.2.4 Governance and management	39
5.2.5 Financing	40
5.2.6 Partnerships	40
5.3 CONCLUSION	40
6. REFERENCES	41
ANNEXURES	44
ACKNOWLEDGEMENTS	45

Executive summary

In terms of the National Development Plan 2030 and the United Nations Sustainable Development Goal Declaration, South Africa has made a commitment to accelerate development over the next fifteen years. Meeting this challenge depends fundamentally on the ability of our education system to equip today's children for high levels of achievement and active participation in a global 21st century society and economy.

Yet that system is inadequate in several ways, be it in terms of its teachers, teaching practices, curricula, management and the skills it imparts to graduating youth. The growing consensus is that the state of the system presents an urgent case – a “burning platform” – for doing things differently. And while there are innovations taking place in South African education, they are scattered in isolated pockets that currently benefit the few rather than the many.

What is called for is a means of supporting and coordinating innovation for 21st century learning so that it has the potential to impact, at scale, the basic education system in South Africa.

To examine how this might be accomplished, the National Education Collaboration Trust, the Global Education Leaders' Partnership, Tshikululu Social Investments and the FirstRand Empowerment Foundation commissioned this study towards building an informed framework for innovation in education in South Africa. It has set out to understand:

- What “innovation” and “21st century learning” mean.
 - Innovation, in the context of education in South Africa, is defined as “making sustainable changes to the public education system by implementing new ideas, approaches and/or products that create new value at scale”.
 - Twenty-first-century learning prepares children for a world characterised by complex political, business, health, environmental, scientific and technological issues, by promoting values and skills that enable them to communicate effectively; collaborate across diverse cultures; appreciate different ideas, perspectives and values; manage information; solve complex problems; and produce new knowledge, whilst valuing traditional knowledge.
- Why the need for innovation.
 - To enable our learners to compete and succeed in a rapidly changing world our entire education system needs to be geared towards 21st century learning. Yet, despite gains made since 1994, we have a less than optimal system based on an outdated 20th century model of learning.
 - The National Development Plan 2030, the country's guiding framework for attaining the overarching goals of eliminating poverty and reducing inequality by 2030, places the *transformation* of the education system at the centre of sustained and equitable development and identifies the need for research and innovation by all role players to improve South Africa's global competitiveness.
- Where innovation could make the most impact.

- Given the complexity of education in South Africa, the question is: What areas will simultaneously leverage the greatest levels of change whilst minimising the risk of disruption? This study suggests that immediate priorities for innovative intervention include: teachers (capacity development, professionalisation and recruitment); leadership and management; learner support; and efficiency of the system.
- How the conditions can be created to promote and support innovation.
 - Schools require appropriate leadership, a culture embracing innovation and an innovative-friendly learning environment.
 - This in turn hinges on the ability of the national education system to promote, resource, drive and support changed practices by schools. In short, it requires the crafting of a shared vision and the operationalisation of a comparable culture of innovation within the national and provincial education systems.
- What we need in order to operationalise an innovation strategy for basic education.
 - Successful innovation depends on strong cross-sectoral partnerships, networks of innovators as well as communities of adopters.
 - The NECT provides a platform for facilitating both collaboration between key stakeholders in education as well as promoting innovation across the education sector.
 - Operationalising the strategy can best be met by establishing a vehicle – an Innovation Unit – within the NECT, mandated to promote, coordinate and resource innovative practices and ensure they are scaled up in systemic policy and programme changes.
 - The Innovation Unit could act as an intermediary between innovators and the system, using “challenge fund” principles co-financed through public and private funds.

This report examines the statements above, explores their implications, highlights useful local and international case studies, and concludes by making a number of key recommendations for consideration in a further in-depth design process.

1. Introduction

"We cannot solve our problems with the same thinking we used when we created them."

Albert Einstein

The learners of the 21st century live in a complex and rapidly-changing world where increasing access to connectivity – even in far-flung rural areas - enable them to interact and access knowledge on a global scale. They require an education that will allow them to thrive and survive; that meets their individual and collective needs; connects them to what is happening around the world; and provides learning opportunities that are exciting, challenging and rewarding.

According to the Global Education Leaders' Partnership (GELP), the result is that "the coming decades will see the most radical changes in education since the invention of education systems in the industrial era. Changes will be driven by technologies, by finance, and by shifting demands both of users and societies. 'Systems' will need to expand and alter fundamentally" (GELP 2015).

South Africa's future stability and economic growth depends on the ability of our education system to help learners attain higher levels of achievement so that they are prepared for active social and economic engagement in a global, 21st century context. Yet, despite gains made since 1994, our system is characterised by low levels of learner achievement; an under-prepared teaching corps; large numbers of youth ill-equipped for the workplace; and an outdated model of school improvement and 20th century learning. This is exacerbated by extreme poverty and inequality as well as the lingering impact of apartheid education.

We have a "burning platform" that demands we do things "differently": the search for innovative approaches to education is therefore an imperative.

In the face of these challenges, South Africa has committed, in terms of the United Nations Sustainable Development Goals (SDG) Declaration and the National Development Plan 2030 (NDP 2012), to achieve and sustain development in the next 15 years. Both initiatives place education, and more specifically the transformation of the education system, at the centre of sustained and equitable development.

The National Development Plan (NDP) 2030 charts the national course for attaining the overarching goals of eliminating poverty and reducing inequality by 2030. It presents a long-term strategy to increase employment and broaden opportunities through education, vocational training and work experience, public employment programmes, health and nutrition, public transport and access to information. This is to be achieved "through uniting South Africans, unleashing the energies of its citizens, growing an inclusive economy, building capabilities, enhancing the capability of the state and leaders working together to solve complex problems" (NDP 2012).

The NDP is predicated on educational transformation through collective innovation.

With regard to improving education and training, the NDP specifically identifies the need for research and innovation by all role players – public and private - to improve South Africa's global competitiveness and emphasises the importance of coordination between the different role-payers. "The single most important investment any country can make is in its people. Education has intrinsic and instrumental value in creating societies that are better able to respond to the challenges of the 21st century. Lifelong learning, continuous professional development and knowledge production alongside innovation are central to building the capabilities of individuals and society as a whole" (NDP 2012).

But our diverse challenges cannot be addressed sufficiently by the efforts of small projects that innovate in isolation of one another and benefit only the few.

What is needed instead – and what is proposed here – is a well-planned, collaborative and coordinated innovation-in-education strategy aligned with the shared vision of a 21st century education that benefits all learners.

2. Background

"Addressing global challenges requires a collective and concerted effort, involving all actors. Through partnerships and alliances, and by pooling comparative advantages, we increase our chances for success."

Ban Ki-moon, UN Secretary-General

This study has arisen from a collaboration between the National Education Collaboration Trust, the Global Education Leaders' Partnership, Tshikululu Social Investments and the FirstRand Empowerment Foundation.

The National Education Collaboration Trust

The National Education Collaboration Trust (NECT) is dedicated to strengthening partnerships among business, civil society, government and labour in order to achieve the NDP's education goals. It strives both to support and influence the agenda for reform of basic education.

The Education Collaboration Framework (ECF) is the partnership strategy that gave rise to the NECT and continues to shape its work. The organisation was formed in a process of consultation that began in December 2012 and which represents a model of how government and civil society (in the term's broadest sense) could collaborate in seeking better educational outcomes for the country as a whole.

The NECT has a clear vision, case for change, and theory of change for improving the education system in significant ways. Moreover, its governance structure ensures that stakeholders at the highest level are collectively enrolled in this endeavour. The NECT's activities include district, local and systemic interventions as well as education dialogues and innovation; together they hold the promise of making true impact in South African schools.

Tshikululu Social Investments

Tshikululu Social Investments (Tshikululu) is a leading manager and advisor on social investment funding in South Africa. Led by a team of thought-leaders and development experts, Tshikululu provides clients with a one-stop service to undertake comprehensive social investment and community grantmaking in line with national and international development trends.

Tshikululu offers financial management, risk and legal services, and expertise in education, health, social development, job creation, agricultural livelihoods, bursary management, the environment, arts, culture and heritage, and capital projects. Its vision is to achieve deep and sustainable social change for the greater good.

FirstRand Empowerment Foundation

Established in 2005, the FirstRand Empowerment Foundation (FREF) is a BEE-ownership trust dedicated to improving education in South Africa. It is primarily interested in bringing about systemic change in education through a variety of means and with an emphasis on innovation.

Global Education Leaders' Partnership

The Global Education Leaders' Partnership (GELP) is a community of education-system leaders, policymakers and thought-leaders collaborating to transform education. Its aim is to equip every learner with the skills, expertise and knowledge to survive and thrive in the 21st Century. At the heart of GELP's vision is the fostering of new pedagogies, curricula and assessment methods that enable every learner to develop higher-order capabilities. Its work focuses on systemic intervention and innovation at local, national and global levels.

South Africa joined the GELP community in 2013, initially through the involvement of the province of KwaZulu-Natal (KZN) and with financial support from FREF and the Anglo American Chairman's Fund. This first phase of GELP participation was facilitated by MIET Africa, a regional NGO committed to improving the lives of children and youth through quality education (www.miet.co.za). Milestones in the country's three-year GELP journey include:

- Aligning GELP's activities with those of the OECD's Innovative Learning Environments (ILE) project, which resulted in strengthened capacity and optimised use of resources. (The focus of the ILE project in which South Africa participated is aligned with GELP's focus on innovation and transformation for 21st century teaching and learning.)
- Increasing South African education leaders' knowledge and understanding of systems transformation through access to the GELP network of innovators and thought-leaders in education.
- Strengthening partnerships critical for addressing the challenges confronting education by extending the reach of GELP beyond the province of KZN.
- Co-hosting, with GELP and the OECD, an international GELP/ILE event in Durban in April 2015¹. Its theme was "Building future learning systems: From exceptional innovations to systemic transformation".

In 2015, several activities involving the collaborating partners served to raise awareness of the importance of innovation in education. Among them were:

- facilitating technical support visits by GELP experts to South Africa;
- engaging with senior national and provincial education officials on issues of education transformation; and
- co-hosting a breakfast meeting of education leaders in Johannesburg that focused on the concept of an innovation-in-education strategy/programme for the basic education sector.

This study is one of the outcomes of these activities.

¹ MIET Africa was the local organising partner for the GELP event

3. Methodology

Adopting a two-pronged approach, the study utilised both primary and secondary research. The former included face-to-face and telephonic interviews, a roundtable discussion with identified experts, and consultancy sessions with delegates attending an international GELP event in New Zealand. The latter involved a desktop review of literature encompassing, among other things, material accessed through networks, in particular GELP and OECD.

3. 1 Primary research

3.1.1 Interviews

Twenty one interviews were conducted to canvass the perspectives of both local and international experts in innovation and education. Interviewees were drawn from a range of sectors, such as government, business, foundations and civil society.

3.1.2 Roundtable discussion

A roundtable discussion, hosted by IQ Business, brought together 17 thought-leaders and innovators from different sectors to engage with the concepts of “21st century education” and “innovation for transformation” and consider how they could be applied in South Africa.

3.1.3 GELP consultancy sessions

The international GELP event, held in Auckland, New Zealand in November 2015, provided an opportunity to gain the perspectives and insights of several international innovation experts into a potential innovation in education strategy for South Africa.

Annexure 1 provides details of the interviewees and roundtable participants.

3.2 Secondary research

A review of literature related to innovation in education brought to light a substantial and diverse body of information, with much of the literature reflecting experiences in developed countries. Indeed, the most useful and comprehensive sources were embodied in reports and publications produced under the auspices of the OECD and GELP. Several issues and experiences considered relevant in this review have been highlighted accordingly.

3.3 Findings

The study has four thematic components. Each is underpinned by a number of questions that seek an expanded understanding of educational innovation and redesign. The components and supporting questions are:

- **Innovation for 21st century learning**
 - What do we mean by “innovation”? What is our understanding of “21st century education”?

- **The case for innovation**
 - Why innovate? What is the value of innovation in education, generally and for South Africa in particular? Where is it likely to make the greatest impact in the education system? What are the priorities?
- **Creating an enabling environment**
 - How can the conditions be created to promote innovation? What kind of interventions can encourage innovators to take risks and go beyond conventional wisdom? What sort of leadership is needed for creating a culture of innovation? How can small-scale innovative pilots impact on the system more widely?
- **Operationalising an innovation-in-education strategy**
 - What is needed to operationalise an innovation-in-education strategy, taking into consideration issues such as function, structure, location, governance and resourcing? What examples can be used to inform such a strategy for South Africa?

3.4 Recommendations

On the basis of an analysis of the study findings, this report presents a proposed innovation-in-education strategy for the basic education sector in South Africa. The strategy has been reviewed by several groups, including the study's core and reference groups and international and local groups of innovation-in-education experts. The recommendations will be taken forward into a detailed design process for an innovation strategy for the basic education sector.

4. Overview of findings

4.1 Innovation for 21st century learning

4.1.1 What does “innovation” mean?

Defining innovation

The Oxford dictionary defines the verb “innovate” as meaning to “make changes in something established, especially by introducing new methods, ideas, or products”. A further definition is found in *Innovation Training*, in which Hattori and Wycoff (2004) define “innovation” as “people creating value by implementing new ideas”.

Examining the definition in closer detail, Hattori and Wycoff unpack its four critical elements:

- **People:** innovation is only by people, and usually people collaborating in groups.
- **Creating value:** the purpose of innovation is to add value.
- **New ideas:** innovation requires new ways of looking at opportunities and challenges.
- **Implementation:** innovation is finished only when an idea has been put into action and there is a result that has added value.

For the purpose of this study, the following definition of “innovation” is employed in the context of education in South Africa:

- *“to make sustainable changes to the education system by implementing new ideas, approaches and/or products that create new value at scale”.*

Innovation in education thus involves finding new and sustainable ways for all schools to create educated, innovative and productive citizens – that is, citizens who are able to generate and apply new knowledge and who have the capacity to contribute both socially and economically to a rapidly-changing world; furthermore, this task is supported by policies and investments that develop human capital, technological innovation and entrepreneurial skills.

Invention versus innovation

It is important to draw a distinction between the purely technical component of innovation and the contexts in which innovation occurs. In other words, we need to distinguish between invention and innovation, where invention is the “discovery of new processes, tools, or ideas”, and innovation is “the application and development of an invention for utilitarian purposes” (de Beer 2004).

Hence, an invention becomes an innovation only once it is applied or used. For example, the invention of a new tool for assessing learners’ competency in Mathematics becomes an innovation only when it is used by teachers.

A common misconception in South Africa is that innovation is “anything that is done outside of government”. Instead can be about doing things in new or different way with the clear intention

of creating change; it is about something that has not been done before, for example, introducing an induction programme for new teachers.²

In a presentation on the role of innovation in education, Alex Cirillo highlights two important points: first, something cannot be considered innovative unless it is transformational (creates a change); and, second, innovation does not happen by accident – it is driven by principles and practices that encourage people to combine systems and creativity in order to solve problems (www.lasallian.info/doc/Cirillo).

Sustaining innovation versus disruptive innovation

Innovation can range from (at one end of the spectrum) continuous improvement of existing practices to (at the other) a complete transformation of how we achieve our goals or define them in the first place.

In *Learning from Extremes*, Leadbeater and Wong draw a distinction between “sustaining” and “disruptive” innovation: the former entails improving an existing organisation, product or approach by making it more effective, whereas the latter involves radical changes, such as reinventing schools (Leadbeater & Wong 2010). Similarly, the South Australian Department for Education and Child Development (DECD) describes sustaining, or incremental, innovation as involving minor modifications to existing products: a case of swimming with the tide, of starting with the present and working forward. By contrast, radical innovation produces significant breakthroughs and major shifts in design – here, it is a case of swimming *against* the tide, and starting with the *future* and working backwards (OECD 2013).

The same distinction is made in a further contrast between “creeping” and “leapfrog” innovation.³ “Creeping” innovation is likened to “staying on your own island but discovering more of the island”, while “leapfrog” innovation is about “discovering a completely new island”.⁴

Sustaining (or creeping) innovation

Sustaining innovation involves slow, consistent pressure in which numerous small innovations or “mininations”⁵ result in change over time. It is often argued that, to prevent matters from becoming chaotic, this is a more suitable approach to take in achieving change in large systems. Nevertheless, even though innovations can be small and build on the past, they must be new and cause at least some degree of disruption if change is to happen. After all, inescapably, “if you throw the pieces up in the air, they will come down in a different way”.⁶

It is important to identify and exploit opportunities for small changes (marginal gains) so that benefit can be drawn from their cumulative effects. Japan offers a good example of this approach: the continuous improvement of teaching practice, undertaken through small, innovative activities, is a key contributor to the high standard of instruction in Japanese schools (OECD 2012).

² Gail Campbell, personal communication

³ Term advanced by David Harrison.

⁴ Analogy advanced by Vineet Bewtra.

⁵ Term advanced by Sizwe Nxasana.

⁶ Concept advanced by Michael Stevenson.

Disruptive (or leapfrog) innovation

Despite radical changes to learners' experiences and attitudes outside the classroom, education systems have remained largely on a journey of incremental improvement. In its white paper *Equipping every learner for the 21st Century*, the company Cisco Systems, Inc. advocates for a "disruptive shift", arguing that "incremental and evolutionary approaches have not worked for most learners or most countries" and that the complexity of the challenge demands "a bold and timely response – one that requires extraordinary leadership and a holistic transformation of education systems" (Cisco 2008).

However, there is often reluctance to consider disruptive innovation as a means to achieving change. This is especially true for large systems or organisations, such as governments, where disruptive innovation is commonly seen as too risky. In *Learning from Extremes*, Leadbeater and Wong argue that although school improvement is still an important goal, greater emphasis should be placed on innovation that transforms learning, and that ways have to be found to support and encourage it instead:

Improvement in our current school systems, on its own, will not be enough to meet the growing and changing demands of governments, parents and children ... Education needs more powerful sources of disruptive innovation, to create different kinds of schools and to create alternatives to school – in other words, to create entirely new ways to learn (Cisco 2010).

In a similar vein, Nick Taylor, in his research on the priorities to be addressed in South Africa's training and education crisis, proposes that school reform can be undertaken in one of two ways – incrementally or transformationally. Since incremental reform could prove a long and inefficient process, he questions whether taking this route would make any real difference. In contrast, he suggests "a transformational approach" that seeks more radical change, for example, changing recruitment policies and teachers' conditions of service in the interests of building a culture of expertise throughout the school system (Taylor 2011).

Indeed, Halbert and Kaser, writing about the development of innovative learning environments in British Columbia, suggest that the act in itself of weighing up and choosing between competing arguments for disruptive innovation versus incremental improvement can become an exercise in distraction:

Although reformers may like to argue the relative merits of improvement, innovation and accountability, these distinctions are not particularly helpful for practitioners struggling to make learning more engaging and relevant ... New approaches to learning *are* necessary and new designs for learning *are* required (Halbert and Kaser 2013).

In large systems or organisations there are likely to be many more incremental than disruptive innovations (for every 99 incremental innovations, there is probably one disruptive innovation),⁷ but mechanisms need to be in place nonetheless to encourage and support both types. Ideally, even while continuing with school improvement, the architecture of the system needs to allow space for transformational activities to take place – a space that supports innovative ideas,

⁷ Concept advanced by Dean Villet.

enables them to be tested on a small scale and, if they are successful, migrated into the system. Here, the cost of failure is limited and does not cause chaos in the system at large.

One option is for the government to outsource innovation activity to external partners. In this way, it is able to play a powerful role in disruptive innovation in a situation where public money is matched with private funding.⁸

4.1.2 What does “21st century learning” mean?

“The world faces global challenges, which require global solutions. These interconnected global challenges call for far-reaching changes in how we think and act for the dignity of fellow human beings. It is not enough for education to produce individuals who can read, write and count. Education must be transformative and bring shared values to life ... It must give people the understanding, skills and values they need to cooperate in resolving the interconnected challenges of the 21st Century.”

UN Secretary-General's Global Initiative on Education

Twenty-first century education is the driver – and not merely an output – of sustainable social, economic and environmental stability. Accepting this proposition demands that we reappraise our approach to education. The entire system needs to be geared towards equipping learners with skills that will allow them to compete and succeed in a world challenged by a multitude of complex issues, and towards developing learners who can communicate effectively, manage information, work collaboratively, produce new knowledge and solve difficult problems. What, then, is “21st century education”?

According to Andreas Schleicher, Director for Education and Skills, Organization for Economic Co-operation and Development (OECD), “...the world no longer rewards people just for what they know—search engines know everything—but for what they can do with what they know, how they behave in the world, and how they adapt. Because that is the main differentiator today, education is becoming more about creativity, critical thinking, communication, and collaboration; about modern knowledge, including the capacity to recognize and exploit the potential of new technologies; and, last but not least, about the character qualities that help fulfilled people live and work together and build a sustainable humanity....” (Fadel *et al* 2015).

There are several frameworks that attempt to organise the dimensions of 21st century education. This section introduces three such frameworks.

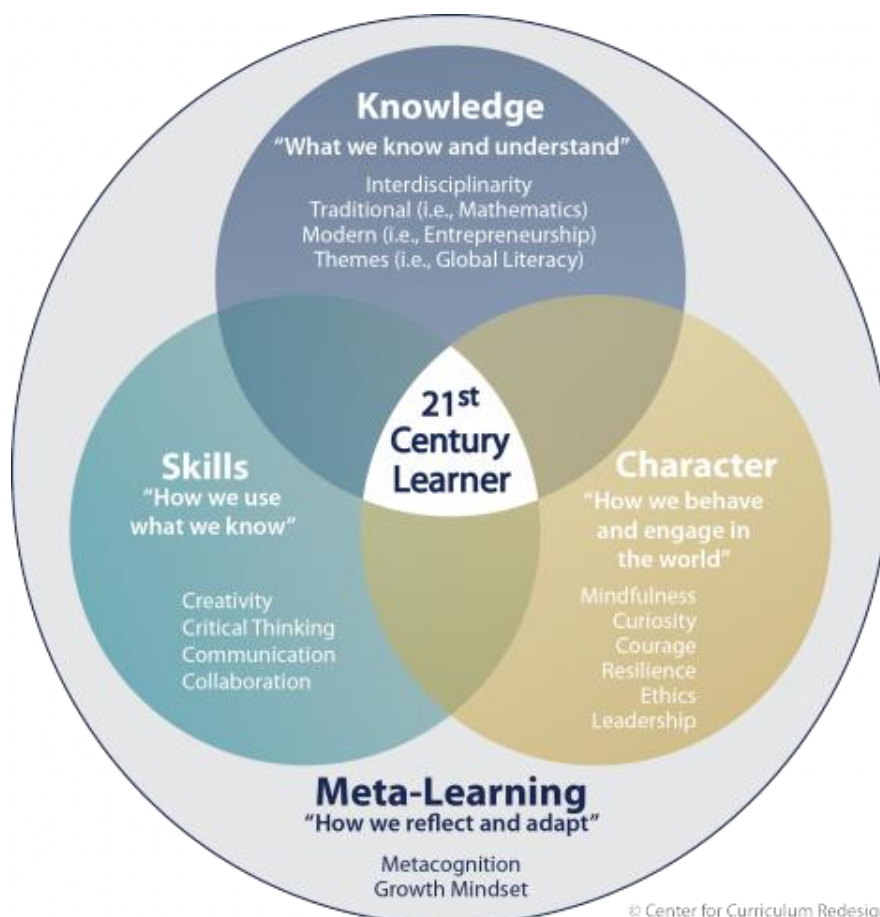
The OECD provides a demanding framework comprising seven transversal “principles” to guide the development of learning environments for the 21st century:

1. Recognizes the learners as its core participants, encourages their active engagement, and develops in them an understanding of their own activity as learners (“self-regulation”)

⁸ Vineet Bewtra, personal communication.

2. Is founded on the social nature of learning and actively encourages group work and well-organised co-operative learning
3. The learning professionals within the learning environment are highly attuned to the learners' motivations and the key role of emotions in achievement
4. Is acutely sensitive to the individual differences among the learners in it, including their prior knowledge
5. Devises programmes that demand hard work and challenge from all without excessive overload.
6. The learning environment operates with clarity of expectations and deploys assessment strategies consistent with these expectations; there is strong emphasis on formative feedback to support learning.
7. Strongly promotes "horizontal connectedness" across areas of knowledge and subjects as well as to the community and the wider world (OECD 2015).

In *Four-dimensional Education: The Competencies Learners Need to Succeed*, the Centre for Curriculum Redesign outlines a framework in which education is conceived as developing four dimensions of learner competency: knowledge, skills, character and metacognition. The OECD has described the framework (illustrated here) as "providing a clear and actionable first-of-its-kind organizing framework of competencies needed for this century". (Fadel *et al* 2015).



A third useful framework is that provided by the Partnership for 21st Century Skills, which sets out several examples of 21st century skills:

- thinking critically and making judgments;
- solving complex, multidisciplinary, open-ended problems;
- creativity and entrepreneurial thinking;
- communicating and collaborating;
- making innovative use of knowledge, information and opportunities; and
- taking charge of financial, health and civic responsibilities (P21 2008).

These skills are located within a framework for contemporary learning that includes:

- Core Subjects and 21st Century Themes;
- Learning and Innovation Skills;
- Information, Media and Technology Skills;
- Life and Career Skills; and
- 21st Century Education Support Systems (Standards and Assessments; Curriculum and Instruction; Professional Development; Learning Environments).

4.2 The case for innovation in education

4.2.1 The case for innovation worldwide

"The thrust for constant innovation has long prevailed in sectors such as technology and healthcare, but education has generally lacked this approach in both policymaking and the classroom. We face unprecedented global challenges – poverty, conflict, unemployment, inequality, environmental sustainability and others. Education is the route to short and long-term solutions, yet today's learning systems are not coping with the task."

WISE initiative (www.wise-qatar.org)

In the competitive world of the private sector, innovation is considered a non-negotiable. A company's sustainability depends on innovation; this helps to make it "future-proof", and is seen as critical for:

- improving processes;
- serving end-users better;
- engaging and empowering staff;
- driving performance;
- creating opportunities for individuals; and
- staying one step ahead in terms of trend prediction and product development.⁹

⁹ Fathima Dada, personal communication

Here the dual value of innovation is recognised:

- It can reduce the cost of doing what is currently being achieved, thereby increasing the efficiency of existing outcomes. This does not necessarily change the outcomes, but it does release resources for achieving other priorities.
- It can push the outcomes further, and though this might also improve cost-effectiveness, the focus is on changing the outcomes.¹⁰

Yet, while innovation is accepted as essential in the commercial world, there is general agreement that, when it comes to innovation in education, the education sector is lagging behind.

Outside of school, young people worldwide are “increasingly reliant on social networking technologies to connect, collaborate, learn, and create” (Cisco 2008). In this interconnected world, the individual interests, needs and experiences of learners are catered for.

Yet, argues Valerie Hannon, a leading innovation thinker, schools still reflect the industrial age and are mostly “organised like quasi-custodial factories”. “[T]hose practices and ideas that characterise successful 21st century workplaces and enterprises,” she says, “are, for the most part, absent from school environments.” The largest disconnection is “in relation to the skills, knowledge and dispositions which young people will actually need in the coming century” (Hannon 2009).

The Australian institute for Teaching and School Leadership (AITSL) attributes this disconnection – between education, on the one hand, and, on the other, the needs of young people and employers in the digital age – to the fact that “the world has changed, the needs of learners have changed, but our education system hasn’t. It is long past its due date” (AITSL 2014).

The result of these disconnections are low levels of learner engagement, with the key reasons, as identified by teachers participating in the AITSL’s Learning Frontiers programme, being that education is disconnected from student’s reality; schoolwork is boring; teachers are disengaged; and there is too much focus on the “exam agenda” (AITSL 2014).

Although it is widely accepted that school systems need to change how they operate, around the world they are struggling to improve educational standards for meeting the needs of 21st century learners (GELP 2014). The challenge is to create an approach which is adaptable, flexible and in sync, both with the workplace and the lives of learners outside of the classroom.

The answer lies in innovation – but of what kind, and how should it be implemented?

4.2.1 The case for innovation in South Africa

“Creating an aligned, 21st century public education system that prepares students, workers and citizens to triumph in the global skills race is the central economic competitiveness issue for the next decade.”

Partnership for 21st Century Skills (2008)

¹⁰ Vineet Bewtra, personal communication.

There are compelling reasons why educational transformation is essential for South Africa to thrive in the 21st Century. Together, they make up a “burning platform” for change:

- The education system is challenged by poor learning outcomes.
- Compliance, conformity and complacency are valued above innovation.
- Youth have high expectations yet we have high levels of unemployment.
- South Africa’s unique position in Africa holds special challenges and opportunities.
- South Africa’s tradition of innovation equips it to join a global movement for change.

Poor learning outcomes

In its education report for 2015, the OECD ranks South Africa 75th out of 76 countries in terms of standard of education (Hanushek & Woessmann 2015). This is despite the fact that the country spends 20% of its budget – or 6.4% of its gross domestic product (GDP) – on education, an allocation considerably higher than in many other emerging market economies (Activate Growth.co.za, Spring 2015).

The following statistics are indicative of a poorly performing education system:

- At the end of Grade 4 more than half our learners could not read for meaning and interpretation, while a third were completely illiterate in any language (Mullis *et al* 2012).
- In 2011, 76% of Grade 9 learners could not recognise basic facts from the Life and Physical Sciences (Spaull & Kotze 2015).
- In 2014 the matric pass rate was 76%. However, of every 100 students who started school in 2003, only 49 actually reached matric in 2014, only 37 passed, and only 14 qualified to go to university. So, the “real” matric pass rate is 37% and not 76% (Activate Growth.co.za, Spring 2015).

Compliance, conformity and complacency

Although we often recognise that the skills, behaviours and knowledge that schools are teaching are not those learners need to succeed in the working world of the 21st century, our education system tends to value compliance, conformity and complacency over innovation. In the majority of schools, the greatest proportion of teaching time is spent on managing learners through an industrial-era model with a standardised one-size-fits-all curriculum disconnected from the more positive learning experiences learners have outside the classroom.

This view is supported by Professor Jonathan Jansen, Vice-Chancellor at the University of the Free State, who warns that South Africa’s global competitiveness hinges on investment in quality education “built around innovative cultures of open-minded, inventive and courageous thinking”. For this to happen, what is required is a paradigm shift, because “innovative cultures do not emerge from teaching and learning environments that are risk-averse, test-driven, teacher-centred, authority-based and that value rote learning over experimental thinking” (Jansen 2015).

High youth expectations and high youth unemployment

South Africa has one of the highest youth unemployment rates of all developing countries. According to World Bank data, youth unemployment – defined as youth between the ages of 15 and 24 without work but available for and seeking employment – has risen in South Africa from 50.1% in 2011 to 53.6% in 2015 (www.data.worldbank.org).

In researching the link between education and employability in South Africa, Kruss concluded that the tacit skills, knowledge and attitudes previously developed through work experience are now expected to be an integral part of education programmes and curricula, so as to provide “soft”, “transverse”, “life”, or “high” skills (Kruss 2004).

South Africa's unique position in Africa

South Africa is widely recognised as “different” from its sub-Saharan neighbours in that it is a mix of a strong, developed economy and a struggling, developing one. The special characteristics of our economy and society present unique challenges and opportunities that, some may argue, demand unusual, disruptive responses.¹¹

International recognition of the value of innovation

Internationally, there is a growing recognition that innovation is critical for taking us forward in the 21st Century. The focus is on new capabilities for new challenges.

According to James Anderson “....governments are thinking more and more about how to create innovative solutions to their most pressing problems. It makes sense given the challenges governments face – dwindling budgets, increased citizen expectations, morphing societal needs” (Puttick *et al* 2014).

South Africa is, and needs to be part of, the mainstream innovation agenda. We have a proud history of driving innovation, not only politically but across many spheres. It is one of the legacies of our country, and provides a rich foundation for generating further innovation.¹²

4.2.2 Priority areas for intervention

The plan for achieving the Department of Basic Education's vision of all young South Africans receiving quality schooling is articulated in *Schooling 2025* (www.education.gov.za). It states that by 2025 the following should be evident in every South African school:

- **Learners** who attend (and want to attend) school every day and on time because: the school is accessible; encourages technology-based learning; provides an environment where everyone is respected; provides a good meal; has teachers that can be depended on for advice and guidance; and makes sporting and cultural activities available.
- **Teachers** who have received the training they require; are continuously improving their capabilities; are confident in their profession; and are satisfied with their remuneration and conditions of service.

¹¹ Vineet Bewtra, personal communication.

¹² Rob Taylor, personal communication.

- **School principals** who lead the teaching and learning according to the national curriculum, in addition to promoting harmony, creativity and a sound work ethic in the school community and beyond.
- **Parents** who are well informed about what happens in the school, receive regular reports about how well their children perform, and are listened to.
- **Learning and teaching materials** that are in abundance and of a high quality, including ICT as an important medium through which learners and teachers access information.
- **School buildings and facilities** that are spacious, functional, safe and well maintained, with learners and teachers taking pride in their school.

However, numerous constraints hinder translating the strategic intent of *Schooling 2025* into operational reality, and call out to be engaged by a concerted programme of innovation interventions. It is important, therefore, to identify the priority areas for intervention – that is, the areas in the system where the change levers are and where innovation will have the greatest impact.

In his research on addressing South Africa's training and education crisis, Nick Taylor says that "fixing schools" is the single most important goal for the next two decades: "[I]t is the inefficient school system that produces around 300,000 ineducable young adults annually, that is responsible for low numbers of school leavers possessing an NSC of insufficient quality to enter science and technology programmes, and it is the school system which carries the largest responsibility for very low throughput rates in all the country's colleges and universities." Within the ambit of schools, he identifies capacity development, governance and management, and recruitment processes as key areas requiring intervention (Taylor 2011).

Further, the NDP 2030 identifies the following as areas in need of attention:

- The role of teachers, principals, other stakeholders, parents and districts.
- Infrastructure and information and communication technology (ICT).
- Curriculum incentives, inclusivity and language issues.
- Sports, school health, arts and culture (NDP 2012).

This study has identified several priority areas for intervention:

- teachers;
- leadership;
- recruitment processes;
- the efficiency of the system;
- high repetition and drop-out rates (socioeconomic barriers); and
- language

Teachers

Topping the list of priorities is the capacity of teachers. Research conducted by McKinsey in more than 50 countries over a ten-year period revealed that "[a]bove all – above class sizes, above investment, above technology – it turns out that what matters most ... is getting and keeping good teachers". In this respect, it was found that three things matter the most:

- getting the right people to become teachers.
- developing teachers to become effective instructors.
- ensuring that every child succeeds (McKinsey 2013).¹³

These points are echoed in a paper by John Hattie of Auckland University, who observes that “investing in the quality of teachers has a significant positive effect because aside from what students bring to school, teachers and teaching have the biggest impact on learning outcomes” (Hattie 2003).

Japan, a country with one of the highest standards of education in the world, places enormous value on its teaching force:

- teachers are amongst the highest paid civil servants;
- the teaching profession is highly respected, with teaching being a sought-after job;
- teaching practice is an important part of the teacher training programme;
- once qualified, apprentice teachers are taken through a full year’s intensive induction programme before they teach full-time;
- continuous improvement is carefully planned throughout a teacher’s career; and
- all teachers are expected to take additional training every ten years (OECD 2012).

Similarly, in an effort to retain the best teachers and attract new ones, the NDP 2030 makes the following recommendations:

- that teachers be recognised for their efforts and professionalism;
- that teaching should be a highly valued profession;
- that the pay structure for teachers should encourage them to stay in the profession;
- that bursary programmes for continuing professional development be promoted;
- Attention should be given to the continuing development of teachers and promotion of professional standards. (NDP 2012).

At the level of basic education, short-and long-term gains need to be considered.

Short-term gains refer to the development needs of teachers already in the system. In South Africa, teacher unions can play an important role in changing the mindset of teachers, fostering a culture of exploration and development, rather than viewing professional development as being externally imposed as a form of ‘punishment’.¹⁴

An example of a new approach to in-service teacher training that may yield different results is the introduction of intensive residential training during which substitute teachers are hired to take the classes of teachers on course (JET 2011). The advantages of technology should also be harnessed in the provision of ongoing teacher development, with teacher resource centres serving as hubs of teacher development.¹⁵ Access to ICT can also facilitate sharing and learning amongst teachers – locally, nationally and globally. A successful example of this is the society of principals that has been established in Kroonstad in the Free State.¹⁶

¹³ See <https://pragmaticreform.wordpress.com/2013/01/05/mckinsey>, accessed October 2015.

¹⁴ Basil Manuel, personal communication

¹⁵ Mathanzima Mveli, personal communication.

¹⁶ Nkosana Dolopi, personal communication

A shortage of teachers in scarce subjects such as Mathematics and Science poses a challenge. One possible solution is to replace the traditional model of teachers located within every school with a new approach where the available Mathematics or Science teachers within a circuit/district are housed centrally, and from there they circulate between schools.¹⁷ In addition,

In Hong Kong, successful innovations in quality in-service teaching include:

- increased use of teacher peer-review;
- more external evaluations/observations of teachers' classroom practices;
- introduction of remedial Mathematics into secondary school;
- use of teacher observations in Science lessons;
- increased computer use in teaching reading; and
- relating school lessons with every day life (OECD 2014).

Another example of an intervention with the potential to bring about change in the classroom is creating communities of teacher-innovators, for instance in Mathematics.¹⁸ Called 'Communities of Practice for Discovery and Innovation' by the City University in Hong Kong, this approach has been adopted with positive results.¹⁹

For long-term gains, innovation is required in pre-service teacher training. This could include:

- redesign of the teacher training curriculum, in collaboration with the Higher Education and Training sector;
- the introduction of an internship programme for teacher trainees similar to programmes found in the accounting, legal and medical professions; and
- strengthening the teaching profession, including revisiting the role of the South African Council of Educators (SACE).²⁰

Leadership

If learning is the core business of education, then it is the key purpose of leadership – with the focus on creating and sustaining learning environments conducive to learning. Innovation assists the leadership in seeking out new directions. According to the OECD, "Learning leadership puts creating the conditions for 21st century learning and teaching at the core of leadership practice" (OECD 2013).

Most respondents in this study believe that building leadership capacity among the country's approximately 26,000 school principals is an area where significant impact could be made. As a case in point, the current practice of promoting an exceptional teacher into the post of school principal often means not only losing a good teacher in the classroom but gaining a principal who lacks the necessary leadership skills and attributes.

¹⁷ Gail Campbell, personal communication.

¹⁸ Ahmed Bawa, personal communication.

¹⁹ See <http://www.cityu.edu.hk/copdi/aboutus.htm>, accessed October 2015. In this report, see also section 4.3.1 Enabling innovation at the school level.

²⁰ Mathanzima Mveli, personal communication.

One way of ensuring that South Africa has 21st century learning leaders is to introduce leadership training as part of the curriculum for all teacher trainees and to provide those who exhibit exceptional leadership qualities with additional training in order to equip them for school leadership positions.²¹ Appointing an excellent principal is crucial for a school to function well. In this regard, a recommendation linked to effective recruitment is to ensure that the school governing body has the relevant skills both to select the right person for the job and then to support him or her going forward (JET 2011).

Recruitment processes

The two priorities discussed above – teachers and leadership - have a clear bearing on recruitment practices across all levels of the education system. In his research, Taylor recommends that proficiency tests be devised for every job and strictly applied in recruiting and promoting staff for all positions in the system (Taylor 2011). In Hong Kong, the introduction of incentives to attract and retain quality teachers has yielded positive results (OECD 2014).

The efficiency of the system

The use of technology for a more efficient and effective system needs to be increased and strengthened.²² There are numerous examples of how innovative use of technology could add value to the system. A few include:

- Business processes could be improved and administration, streamlined.
- An electronic monitoring tool for curriculum coverage in schools would yield numerous benefits, among them savings on time and travel costs.
- Strengthened data management – at all levels of the system - would enable data to be used in driving transparency and accountability.²³

Language

The current language policy, the language competencies of teachers, and language application all pose severe barriers to learner achievement, making the issue of language an important lever for changing learning outcomes.²⁴ On the role of African languages in education, Heugh suggests that, despite the policy statements, the challenge of language in South Africa is not adequately addressed. He argues that "...curriculum and language-in-education policy changes which came into force in 1997, whilst based on the goal of an equitable school system, are unfortunately flawed both in the conceptualisation process and implementation strategy (Heugh 1999).

High repetition and drop-out rates (Socioeconomic barriers)

The socioeconomic and health-related barriers preventing learners from realising their right to education are addressed through the Department of Basic Education's Care and Support for Teaching and Learning (CSTL) programme.²⁵ However, innovative measures are required for

²¹ Sizwe Nxasana, personal communication.

²² Mathanzima Mveli, personal communication.

²³ Dean Villet, personal communication.

²⁴ Gail Campbell, personal communication.

²⁵ See <http://www.education.gov.za/Programmes/HealthPromotion/CSTL/>, accessed October 2015.

scaling up the various interventions to impact on 26,000 schools and the 12 million learners nationwide. The introduction of an automatic promotion and progression policy is a salutary advance, but capacity is required in order to provide additional support to learners with identified weakness.²⁶

Although there are many areas that could be considered for innovative intervention, it is generally agreed that it is best to begin with a manageable number of innovations that can be designed, implemented and measured under carefully planned and controlled conditions, with the potential for scale in-built from the outset.

4.3. Creating an enabling environment

Innovation in education is difficult under any circumstances, but this is especially the case in post-apartheid South Africa, with its administrative and procedural complexities, education bureaucracy, high cost of personnel (Jansen 1998) and constraints of language policy (Heugh 1999).

Fear of change and/or failure is arguably one of the key barriers to innovation. Change, and the tendency to embrace or resist it, seems always to have been a part of the human condition. Change leads to consternation for some, indignation for others, shock for still others, and hope for a few (Hall *et al* 1975). Evans highlights the human dimension of difficulties in implementing classroom-level innovation, suggesting that one of the main reasons why school reforms stall is that educators resist change because they feel burdened or conflicted by it. He stresses the need for realistic expectations about the pace of reform and performance (Evans 1996).

A case in point is the implementation of an outcomes-based curriculum in South Africa in 1997. The high expectations surrounding this innovative endeavour were not met, and what should have been seen as innovative instead drew hugely adverse reaction – and pointed to a potential barrier to future innovation. Analysis of the programme concluded that the demands of innovation should not exceed existing practice by too wide a margin (Rogan 2007).

It can be argued that the education system itself is the biggest barrier to innovation.²⁷ Many innovative interventions have failed because they have collided with existing – and sometimes outdated – assessment practices, or because the professional development for teachers and leaders was underemphasised (Roschelle *et al.* 2008). Professional development of teachers in post-apartheid South Africa presents specific challenges for the historically disadvantaged, while the physical, social and political environments in which teachers work impose a more limited repertoire of behaviour than in-service training might imagine.

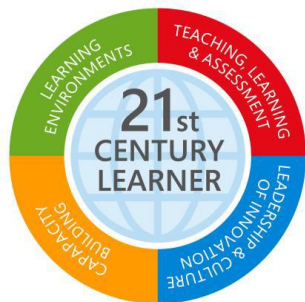
This section examines the conditions necessary for innovation to thrive, first at the school level and, secondly, at the level of the system.

²⁶ Mathanzima Mweli, personal communication.

²⁷ Clyde Maurice, personal communication.

4.3.1 Enabling innovation at the school level

A useful framework for achieving school-level change has been developed by the Microsoft Innovative Schools Program.²⁸ The Innovation Framework, adapted from the work of Knapp, Copland and Talbert (2003), consists of four critical dimensions that together create an enabling environment for change at the school level. They are:



- leadership and a culture of innovation;
- teaching, learning and assessment;
- capacity-building; and
- learning environment.

Leadership and a culture of innovation

This dimension addresses questions related to developing, sustaining, and scaling innovation.

- ***How can the school develop an innovative culture conducive to innovation?***

Cultures may be intangible but they are real. Creating a culture of innovation can be likened to getting innovation into the DNA of a system or school.²⁹ It is about reaching the hearts and minds³⁰; when innovation shifts from isolated examples to something entrenched in the learning culture and values of the school, sustainable innovation becomes possible. In *The Six Secrets of Change*, Michael Fullan observes: "Learning is not workshops and courses and strategic retreats. It is not school improvement plans or individual leadership development. These are inputs. Rather, learning is developing the organization, day after day, within the culture" (Fullan 2008).

It takes time to create a common vision of a culture that embraces diversity; respects the views and ideas of others; creates a safe space for failure; and is free from fear. However, considering that "culture always trumps strategy",³¹ creating a culture of innovation is a worthwhile investment – after all, it is of little use having great strategies and plans if there is no enthusiasm for positive change.

There are a number of prerequisites for creating an appropriate culture, and the following questions serve to highlight what they are.

²⁸ See <http://www.pil-network.com/schools>, accessed October 2015.

²⁹ David Istance, personal communication

³⁰ Clyde Maurice, personal communication

³¹ Sizwe Nxasana, personal communication

- ***How does the management of a school relate to its ability to implement innovative practices?***

Getting innovation into the school system requires a carefully planned process of change involving the following actions: create a shared vision; facilitate change management processes; develop a strong implementation plan, driven and championed by senior leadership; guide disciplined execution; identify quick wins which demonstrate impact, to sustain interest and generate excitement; identify internal champions with clout and credibility to convince the others; and manage relationships across the school and beyond.³²

This demands strong leadership, with a focus on leadership development at all levels within the school, including at the level of the learner. An innovative example of developing leadership amongst learners is the values-based leadership programme run by Columba Leadership. A grounding in values and two years of practical action-learning develops a strong sense of purpose and determination to achieve long term goals. Skills such as problem-solving, teamwork, communication and personal mastery are developed, improving prospects for academic and professional success as well as the culture of learning in schools.³³

Additional activities that have been successful in promoting innovation at school level, and that rely on strong leadership, include reorganising the school in terms of structures, facilities and timetabling as well as providing time for collaboration between staff and networking between schools, for example by establishing communities of practice.

- ***How can a school measure its success? What system of metrics should it employ?***

Continuous evaluation is necessary for developing and sustaining a culture of innovation. The ability to measure innovation is therefore essential to any improvement strategy in education. This allows not only for the individual evaluation of particular innovation strategies but for comparisons to be made between them. According to the OECD,

Knowing whether, and how much, practices are changing within classrooms and educational organisations, how teachers develop and use their pedagogical resources, and to what extent change can be linked to improvements would provide a substantial increase in the international education knowledge base (OECD 2014).

- ***How can the school as a whole be involved in designing new processes and procedures?***

A school-wide learning community is one in which all stakeholders work together towards a common vision of learner achievement. Learners, teachers and parents must be central in the redesign of education, with supportive systems that encourage a range of new players to help create value, an example of which would be engagement between the school and local business or community-based organisations.

³² Fathima Dada, personal communication.

³³ Rob Taylor, personal communication

The concept of a learning ecosystem, or of 'shared-value thinking', demands involving a wider set of actors – 'a coalition of unusual players'³⁴ – in a process whereby everyone comes together because they see individual as well as collective benefit to innovation.

"I love the metaphor of the ecosystem ... for it speaks to issues of interdependency and sustainability; in other words, multiple stakeholders are required, from funders to NGOs and from government and teachers, to make such innovations possible, visible and durable within the education-change landscape."

Jonathan Jansen - South African Education Innovator's Review, Bertha Centre, 2015

Collaboration also strengthens a shared responsibility to create a better learning environment in which learners can thrive. Michael Stevenson, writing about the development of innovation ecosystems for education, promotes the power of technology-enabled collaboration, stating that digital technology offers "enormous opportunities for powerful and effective collaboration" (in Hannon *et al.* 2011). Importantly, successful collaboration depends on the capacity of the school leadership to manage partnerships.

Teaching, learning and assessment

This area of the Innovation Framework deals with *what* and *how* students learn, and so pertains to rethinking curricula. Its guiding questions relate to 21st century skills and standards; the curriculum and the learning paradigm; assessment; and innovative uses of information and communications technology (ICT).

○ How should the curriculum be designed?

Current school curricula are mostly didactic, characterised by teacher-centred transmission of subject-based knowledge and rote learning by learners. Skills that are necessary for life and work are often absent, with learners frequently being disengaged from the learning process. A clear understanding of purpose and priorities, with diverse and rigorous measurements, are required for 21st century learning.

In its white paper *Equipping Every Learner for the 21st Century*, Cisco Systems, Inc. embeds such learning in a set of goals for all learners:

- acquire a range of skills needed to succeed in a modern, globalised world;
- receive tailored instruction that enables them to reach their full potential;
- connect to their communities in person and digitally, and interact with people from different cultures; and
- continue learning throughout their lives.

Furthermore, the paper recommends that every learner should have the motivation to be an independent self-starter, one who is responsible, persevering, self-regulating, reflective, self-evaluating and self-correcting, as well as a flexible, lifelong learner able to adapt to change (Cisco 2008).

○ How should learners be assessed?

³⁴ Michael Stevenson, personal communication.

This question is answered by considering what you are measuring.

The Innovation Framework encourages the use of technology-based analytical tools that help to measure learner outcomes and identify learners who require additional support as well as the areas where they are underperforming. Measures of progress can range from learner attitudes and achievement to overall school metrics such as attendance and drop-out rates.

- ***How can learner-centred learning be encouraged?***

Personalised learning, in which learning is made accessible anytime and anywhere, improves learning outcomes as well as learner satisfaction. Technology should play an increased role in the transformation of learning practice, which necessitates that teachers and learners alike acquire technology skills.

Capacity-building

This dimension of the Innovation Framework focuses on teachers, in particular how to learn and teach and how to build capacity. The guiding questions relate to professional practice and standards; peer coaching and mentoring; and professional development.

- ***How can teacher skills be identified, taught and measured? What kinds of training and development are needed, and how can their effects be measured?***

According to Cisco Systems, the four intersecting elements of 21st century pedagogy are as follows:

- The learner is at the centre, thereby taking into account multiple learning styles and accommodating the individual needs of learners.
- The teacher uses a variety of strategies and skills – instruction, facilitation, guidance and support.
- Work is interdisciplinary and project-based – project work encourages learners to draw on multiple disciplines and recognise the interdependence of various systems.
- The emphasis is on authenticity, which entails taking into account learners' passions and interests of learners as well as integrating real-life experiences into learning opportunities (Cisco 2008).

It is as important for teachers to cultivate a habit of lifelong learning as it is for learners. Nor is ongoing professional development simply about attendance at workshops and teaching in silos: it is about providing lifelong learning opportunities for teachers to develop and practice 21st century skills. Collaborative professional development, involving the establishment of professional communities focused on learning, has proven to be most effective. Also called Communities of Practice (CoP), this approach to professional development is currently being promoted by the Department of Basic Education. Another effective professional development activity is peer-to-peer coaching and mentoring.

- ***How can innovation among teachers be cultivated and nurtured?***

As noted earlier, our education system tends to value compliance, conformity and complacency over innovation.³⁵ One way of shifting this culture of compliance is by incentivising innovation,

³⁵ See section 4.2.1 The case for innovation in South Africa.

using small incentives to promote innovative practices. Examples of incentives include teacher or school innovation awards; time off; and public acknowledgement. Importantly, it is not only the innovators who should be incentivised or recognised but those who adopt an innovation.³⁶

An example of an incentivised innovation programme is the SAILI Target project in the Western Cape. Here, financial incentives are provided to schools to improve their academic output.³⁷

Learning environments

The fourth dimension of the Innovation Framework focuses on *where* and *when students* learn. Questions focus on physical and virtual environments; formal & informal environments; and innovative uses of ICT.

- ***How can schools use technology for management, learning and communication?***

ICT plays an key role in shaping innovative learning environments. It enables learners to gain knowledge when and where they need it, and to acquire higher-order skills such as independent learning, teamwork and problem-solving. ICT is also a powerful tool for teachers, allowing them to adopt diverse teaching methods, facilitating learner-centred learning and extending learning beyond the classroom. Although ICT should be seen as a means to an end rather than an end in itself, its growing influence in the knowledge-based economy makes it a powerful force in its own right (OECD 2013).

In the Innovation Framework, innovative use of ICT is regarded as a cross-cutting enabler, given that “schools need access to technology for all learners and teachers in order to support anytime-anywhere learning, personalized learning and 21st century skills”. Innovative schools create learning environments that reflect the values of the school; provide flexible spaces for their learners; and support learning in and out of school. Technology “provides the opportunity to reimagine physical and virtual learning spaces to support new pedagogies and values the learner and their individual needs” (Microsoft Partners in Learning 2015).³⁸

A word of caution, however, is that solutions to transforming schools are complex. Seeing technology as the only solution will not solve these challenges. Rather, the solution requires a careful approach to integrating technology to support learning goals. Even in schools with the necessary physical infrastructure, the fact that computers have been put in children’s hands will not improve learning unless there are additional changes in the nature of the school’s teaching, learning and assessment practices (Dynarski 2007).

Effective change, in other words, requires a more holistic approach geared towards an overall transformation of the learner’s experience. Although technology has the potential to make a real difference in this regard, it must be deployed carefully. Long-term planning should focus on the cost of ownership of technology and strike an appropriate balance between hardware, software, connectivity and content.

³⁶ Valerie Hannon, personal communication

³⁷ See <http://saili.org.za/website/school-data-analysis/saili-target>, accessed October 2015.

³⁸ See <http://www.pil-network.com/schools>, accessed October 2015.

4.3.2 Enabling innovation at the system level

Based on extensive research in the corporate sector, de Jong *et al.* (2015) outline a series of conditions for successful innovation, as distilled from the experience of the most successful companies. While their study as such places greater emphasis on financial growth, competition and market share than quality and service, lessons drawn from corporate innovation remain applicable to innovation in education systems. The following, then, is a summary of those enabling conditions that are most relevant in the context of education.

Powerful but realistic vision

While a far-reaching vision can be a compelling catalyst for innovation, realism and careful judgment are also essential. So is quantifying an “innovation target” at the outset, one which is measurable and, by implication, achievable – thereby raising the prospect of success.

Every system must decide its own approach to meeting the challenge of 21st century education. As Cisco Systems observes, “Although the vision is global, the path to 21st century education requires a local journey; one that recognizes and responds to specific challenges and opportunities” (Cisco 2008).

Compelling case for change

It is necessary to build consensus around innovation by formulating a powerful case for change (the “burning platform”), including not only the *why* but the *what*. Convincing decision-makers and key stakeholder of the need for change is of particular importance. Equally important is understanding the sources of opposition to the case for change – who is objecting and why – so that they can be effectively countered.

Willingness to change

A successful process of innovation is driven by a desire to improve, as reflected in the aspiration and commitment of its stakeholders, including their willingness to change. Innovation leaders are tasked with allocating distinctive responsibilities to elements and people, further to which they use appropriate incentives and rewards; their task is also to manage expectations.

Transparency

Once it has been articulated and developed, the innovation programme requires transparency as to who is involved; the governance processes; expected value; timing; and risks. Innovation *is* inherently risky and so it may be more about managing risk than eliminating it. Care should be taken not to overload with too many projects that have little chance of realising their targets or staying within their risk parameters.

Pilot projects

Pilot projects and experiments should be implemented away from the core business to help reduce risk, and it is advisable, wherever possible, to stress-test the innovation-in- education strategy. This can be done by creating a separate unit dedicated to innovation. Structural changes to the organisation are not always necessary for this; instead small groups can be established to work unconstrained on key projects before these are being scaled up and absorbed into the larger domain.

External partners

Drawing on the skills and resources of external partners can improve and speed up innovation by sourcing new ideas and insights and sharing costs. Or, as one study respondent put it, "Throw open the tent to people with passion, funding and an interest in progress."³⁹

The Collaboration Schools pilot project in the Western Cape is a recent example of an innovation involving the provincial education department and a group of external funding and support partners. The aim of the Collaboration Schools pilot is to test a new model of schooling that brings additional education management skills and innovation into the public school system, through non-profit partnerships that improve the quality of teaching and learning in no-fee public schools.⁴⁰

Achieving system-wide transformation requires the alignment of all key stakeholders – a broad coalition of industry, education and civil society is needed to achieve lasting reform (Cisco 2008). The growth of learning between different countries and systems clearly helps in the task. International knowledge and expertise should be harnessed so as to support the programme with up-to-date research, data, information and technical advice.

Bureaucracy

Cautious and bureaucratic governance processes stifle innovation. While a balance needs to be maintained between bureaucracy and the push to innovate, bureaucracy should not be allowed to kill the project. Geoff Mulgan, Chief Executive at Nesta argues that "...the natural stance of bureaucracies is to stifle ideas. Bureaucracies exist to bring predictability and order. Indeed that's one of their strengths. Cities and nations where everything was in flux would be a nightmare to live in. But predictability isn't enough. Without energetic and systematic innovation, stability turns into stagnation. That's why all governments need institutions to catalyse innovation." (Puttick *et al* 2014)

To negate the stifling effects of large bureaucratic organisations or systems, an effective option may be to establish a separate or independent unit which is exempt from restrictive processes and policies and where innovation can flourish.

Scale

Peter Senge states in *The Fifth Discipline* that "a new idea is 'invented' when it is proven to work in a laboratory. The idea becomes an 'innovation' only when it can be replicated reliably on a meaningful scale at practical costs."

Given the many innovative projects dotted around our country – ones generally benefiting only a few and often not sustained – *diffusion* and *scale* are perhaps the most important of the conditions necessary for successful innovation. The appropriate magnitude and reach of a given idea needs to be considered carefully to assess the level of risk and ensure that the right amount of resources are allocated.

³⁹ Michael Stevenson, personal communication

⁴⁰ See website <http://www.msdf.org/press-releases/western-cape-education-department-pilots-collaboration-schools-trial/>, accessed December 2015

Albury (2015) identifies three mechanisms for scaling: organic growth and nested communities; mobilising demand and movement-building; and ensuring that enabling conditions are in place. These are delineated below.

- ***Mechanism 1: Organic growth and nested communities***

This mechanism comprises three interacting communities:

- A community of innovators, or community of practice, which is structured, facilitated and supported to use disciplined co-design and innovation methods.
- A community of potential adopters or adapters of the innovative solutions.
- A community of interest consisting of individuals or organisations who are not yet committed to develop or implement the innovations but express an interest.

- ***Mechanism 2: Mobilising demand and movement-building***

This mechanism has four key elements:

- building a compelling case for change or call to action;
- developing an inspiring and guiding vision that describes the future that the innovation will bring into being;
- strengthening and empowering alliances and coalitions of user and professional networks; and
- identifying multiple ways in which individuals from each stakeholder group can engage in demanding, developing and supporting the required innovations.

- ***Mechanism 3: Enabling conditions***

Four dimensions of an enabling ecosystem have been identified:

- Culture and leadership which is passionate about outcomes, goals and aspirations but flexible about means; encourages experimentation and well-managed risk-taking; promotes learning from other sectors and other countries; and values engagement with users and citizens.
- Investment funds and venture capital for innovation and its diffusion, along with access to support for disciplined innovation methods: hubs, labs, zones and incubators.
- Rewards, incentives and recognition for the adoption, adaptation and diffusion of innovation.
- A regulatory regime that enables the growth of innovative start-ups; allows for the displacement and decommissioning of under-performing organisations; supports mergers, acquisitions, partnering, joint-venturing and the formation of chains; and stimulates spin-offs.

4.4 Promoting innovation in education: Examples from around the world

There is plentiful evidence as to the need for innovation, the innovations that are required and the areas in which we should prioritise innovation. The prior and pressing question is: What is the best mechanism for promoting, supporting and driving innovation in education?

This section explores a selection of local and international examples of structures set up by governments, non-governmental organisations and public-private partnerships. Based on reviews of innovation programmes, it is apparent that innovation units are a modern concept that has emerged, primarily in developed regions, in response to challenges facing education. (Puttick et al. 2014; Clark 2015). As a result, the impact of most of these initiatives have not yet been adequately measured or reported, and their applicability to developing regions remains to be explored in full.

Brief descriptions of eleven such projects (three national and eight international) are presented here, selected to demonstrate a range of structures and mechanisms that could inform the design and development of an innovation-in-education strategy for the basic education sector in South Africa.

4.4.1 South African examples

The Innovation Edge

The Innovation Edge⁴¹ is the Research and Development arm of a national ECD programme called Ilifa labantwana (Ilifa is a partnership between government, civil society and funding partners that provides implementation evidence to support the provision of quality ECD services and helps to create the systems necessary to enable the delivery of these services at scale). The Edge provides a platform for resourcing, testing the feasibility and effectiveness of innovative ideas to improve early childhood development (ECD) and is committed to creating an environment in which innovation flourishes through:

- Connecting for Innovation – bringing together diverse interests and expertise
- Commissioning Innovation – contributing to the development and funding of innovations
- Communicating Innovation – informing real change for children at scale

In addition to commissioning various innovative initiatives, *Potluck Sessions* bring together individuals who have demonstrated creative problem-solving skills within their particular sectors and encourage them to apply their minds to early learning. Similarly, *Hackathons* are a group of ECD professionals in the same room, tasked to brainstorm solutions for early learning challenges in South Africa. Then there is the web-based *Innovation Exchange*, a platform integrated on the Innovation Edge website where specific challenges are identified, ideas to be shared are promoted and discussed online, and unusual partnerships amongst applicants are encouraged prior to funding and/or technical support.

A modest staff complement, supported by an advisory committee of relevant experts, reviews applications.

Centre for Public Service Innovation

The Centre for Public Service Innovation (CPSI)⁴² was established in 2001 by the Minister for Public Service and Administration to:

- provide independent research and advice on innovative government service delivery;

⁴¹ See www.innovationedge.org.za, accessed October 2015; Sonja Giese, personal communication.

⁴² See <http://www.cpsi.co.za>, accessed October 2015.

- enhance public service transformation and reform through innovation partnerships for incubating, testing and piloting innovative solutions;
- create an enabling environment for innovation within the structures and agencies of the South African government; and
- support the development of systems and processes for improvements in outcomes, efficiency, effectiveness and quality.

The CPSI:

- is demand-driven – it responds to service delivery challenges and their root causes;
- incentivises innovation through awards;
- is a multi-stakeholder structure which facilitates cross-sector partnerships and integration, in addition to helping to leverage of funds and intellectual capital in support of government priorities; and
- supports innovation and advocates for the integration of proven solutions into governmental systems.

Its corporate structure includes a CEO, 20 staff members and a Board made up of government ministers. Separate components/work streams exist.

Bertha Education Innovation Initiative

Established in 2011 as a centre for social justice, the Bertha Centre⁴³ is dedicated to advancing social innovation and entrepreneurship. Its mission is to uncover, connect, pioneer and advance social innovators and entrepreneurs who share a passion for generating inclusive opportunities and achieving social justice in Africa. Located at the University of Cape Town's Graduate School of Business (GSB), its work is integrated into the GSB's curriculum, adding considerably to its reach and capacity.

One of several initiatives relates to education. The programme links innovation experts with NGOs, government and funders in order to share knowledge and facilitate collective impact. Focus areas include: early childhood development, literacy and numeracy, teacher development, curriculum development, productive partnerships with government, market-based solutions and narrowing the gap between education and employment. The Centre has published key findings of innovations that have proven impact in The South African Education Innovator's Review (Clark 2015).

The Centre is governed by an Advisory Board comprising members of the Bertha Foundation and the GSB. It is headed by a director plus some 30 support staff and academic fellows, and runs three to four dedicated education programmes. Whilst core funding is derived from the Bertha Foundation with some support from the GSB, funding for specific activities is externally sourced.

4.4.2 International examples

Education Endowment Foundation (United Kingdom)

⁴³ See www.gsb.uct.ac.za/berthacentre, accessed October 2015; Louise Albertyn, personal communication

The Education Endowment Foundation (EEF)⁴⁴ is an independent grant-making charity which supports innovative initiatives with the potential to increase the attainment of disadvantaged pupils in schools in England. This is achieved by:

- Identifying and funding promising educational innovations that address the needs of disadvantaged children in primary and secondary schools in England;
- Evaluating these innovations to extend and secure the evidence on what works and can be made to work at scale;
- Encouraging schools, government, charities, and others to apply evidence and adopt innovations found to be effective.

The EEF invites proposals with a specific focus on early literacy and numeracy. Institutionally, it is supported by an independent panel of experts which evaluates proposals based on agreed criteria, including the replicability of initiatives at scale. Critically, the EEF processes include a strong advocacy component that seeks to encourage schools, government and others to apply and adopt such innovations. This is achieved through various channels such as Teaching and Learning toolkits, and providing guidance for teachers and schools on how best to use their resources to improve the attainment of pupils.

Innovation Zones (United States of America)

Also called iZones, Innovation Zones are typically clusters of schools, periodically authorised by state-level legislation to receive “innovation status”, giving them flexibility over budget, governance, and scheduling as a turnaround strategy that will lead to new ways of teaching, learning and higher levels of achievement.

Commonly, iZones target some of the lowest-performing schools for transformation through the adoption of innovative solutions and tools such as technology to solve classroom challenges, leveraging ideas about school design through crowdsourcing techniques, and experimenting with: performance-based learning; expanded learning time; integrating technology; budgeting; staffing; governance; curriculum; assessment; and the school calendar.

The process for selection is through submission of ideas to a panel of experts that make a decision based on innovative criteria.

Earlier results found that iZone schools outperformed the district schools in all areas, including graduation rates, state test performance and disciplinary referrals. However, without an accountability system in place, and with a growing number of participating schools, more recent results show greater variation in performance.

Innovation Unit (United Kingdom)

Initially established in 2002 as a Department for Education and Skills unit to respond to innovative ideas sent in to the government, mainly by teachers, the Innovation Unit⁴⁵ subsequently evolved into a less constrained independent social enterprise working across a range of public services to tackle major social challenges and not confined to the UK.

⁴⁴ See <https://educationendowmentfoundation.org.uk>, accessed October 2015.

⁴⁵ See www.innovationunit.org, accessed October 2015.

The unit comprises around 30 staff, led by a Managing Partner together with a team of experienced partners and senior associates with experience as frontline workers, leaders, consultants, researchers and policymakers.

The Innovation Unit is not-for-profit and receives no grant funding, generating revenue via contracts with charities, regional bodies, local authorities, national and international government in health and social care, greening public services, education and children's services.

In education, a number of innovations have been supported. Critically, the unit seeks to feed the results of its projects into systemic change through the development of products such as policy briefs, teacher guides, service design, leadership coaching and facilitation, organisational change, capacity development, scaling innovation, system transformation and thought leadership.

MindLab (Denmark)

MindLab⁴⁶ is a cross-governmental innovation unit which involves citizens and businesses in creating new solutions for society. The ministries (Business and Growth; Education; Employment) and one municipality cover broad policy areas that affect the daily lives of virtually all Danes.

MindLab's core staff consists of six project managers with a background in design, political science, anthropology, sociology and communication; seconded project managers (up to one year); as well as a number of support staff. The Board sets strategic direction and gives final approval to projects. It is supported by an Advisory Board made up of 10 national and international experts.

Entrepreneurship, digital self-service, education and employment are some of the areas addressed, helping key decision-makers and employees view their efforts from a citizen's perspective and thereby co-creating better ideas. Its physical space is a neutral zone for inspiring creativity, innovation and collaboration.

Experimental Fund for Youth (France)

The Experimental Fund for Youth⁴⁷ was created in 2008 by the French national government (Ministry of Youth) to improve young people's educational achievement and social and professional integration. The Fund invests more than R500m into hundreds of projects and experiments annually. Twenty percent of its revenue is from non-government sources.

The Fund supports the mainstreaming of project results into the policymaking process to promote student achievement and improve the social and professional integration of young people.

Proposals are both invited and open but confined to specific youth-related themes, guided by a Scientific Council, which includes academic researchers. A Management Council, which includes representatives from government and external financial contributors, makes the final

⁴⁶ See www.mind-lab.dk/en, accessed October 2015.

⁴⁷ See <http://www.experimentation.jeunes.gouv.fr>, accessed October 2015.

selection of projects, while the Fund oversees implementation, evaluations and disseminates the results.

Division of Experiments and Entrepreneurships (Israel)

In 1996 the Israeli Ministry of Education established a division called Experiments and Entrepreneurships in order to support innovative suggestions for changes in the education system – from infant to matriculant.

Suggestions are generated by the schools and once considered viable by an expert review panel, a school is declared an “experimental” school after which it is provided special support for up to five years. At the conclusion of the support phase the results are reviewed and, if successful, the school serves as a regional hub and dissemination centre to widen the benefits.

Experimental schools are considered educational trailblazers and are supported both financially and pedagogically, including with the appointment of a half-time teaching post to each school and the services of an adviser. The programme aims to develop innovative learning environments that develop learners to be responsible for their studies, and promotes the skills necessary for the citizens of tomorrow. This progressive programme adds up to 15 schools annually and appears to be a success (Heilbrunn 2010) in that there are some 130 of these schools in Israel today.

Typically, an experimental school becomes a less rigid organisation, with a more adaptable and flexible view of time in relation to, for example, curricula, group structure, flexible timetabling, learning centres, administration, self-management, information technology, the creation of knowledge and organisational culture.

However, some view the experimental schools as “exclusive” and recent attempts to outsource the entire programme have been criticised. The rationale for this move to fully exit the Ministry’s domain is not entirely clear.

Ministry of Education: Innovation Education (Iceland)

One country where innovation policy has become formally embedded in the education system is Iceland, as described by Thorsteinsson (2012). Here, central policy has been devolved to the classroom where it has taken form as a new cross-curriculum subject called “Innovation and practical use of knowledge”. The national curriculum specifically includes Innovation Education (IE) as a subject in which students are trained to identify needs and problems in their environment and find solutions, a process referred to as ideation. IE is a set of broad principles (rather than classroom actions) that guide plans and actions implemented by teachers.

The main emphasis of IE is to increase students’ innovativeness and independent thinking so as to equip them the better to deal with their world and take an active part in society through innovation. It aims to educate children holistically via a carefully structured system of classroom-level innovation. The aim is to improve their social responsibility and preparation for the work place through general education. Thorsteinsson quotes the Ministry of Education’s support for IE: “In today’s ever-changing environment, what individuals need is the ability to respond to new situations, rise to challenges and exploit innovations and advances in all areas” (Thorsteinsson 2012).

Centre for Education Innovation and Action Research (India)

The Centre for Education Innovation and Action Research (CEIAR)⁴⁸ is a new centre in Mumbai designed to engage with, and promote, innovation in school curricula, teacher education and higher education curriculum and pedagogy. While the focus is on the needs of Indian education, it also considers issues relevant to the developing world in terms of raising the quality and standards of education.

The Connected Learning Initiative (CLI) is the first initiative undertaken by the CEIAR. It aims to improve the professional and academic prospects of high school students from underserved communities. It leverages new technology, including online capabilities, to provide quality educational content and experiences at scale, and more specifically, to offer scalable and sustainable quality teaching and learning experiences for English, Mathematics and Science.

Annexure 2 provides an analysis of each of the case studies based on the following criteria: structure; governance; purpose and function; location; resourcing (personnel and financial); beneficiaries; lifespan; and results.

⁴⁸ See <http://www.tiss.edu/TopMenuBar/academic/independent-centres/centre-for-education-innovation-and-action-research>, accessed October 2015.

5. Conclusions and recommendations

5.1 Proposed Innovation Unit: Rationale

Through this study's literature review and consultations with expert stakeholders, a number of factors have emerged as essential for enabling innovation in education: a compelling case for change; an inspiring and shared vision; strong and brave leadership; a culture of innovation at all levels; collaborative partnerships; a demarcated independent space where innovation can flourish; sufficient resources; measurement of impact; and diffusion and scale.

What this report centrally recommends is that the sustained, effective promotion and support for innovation that meets these criteria requires the establishment of a ***formal collaborative structure, or Innovation Unit, for the basic education sector*** in order to promote, steer, coordinate and resource innovation and critically, to ensure the translation of innovative practices in scaled-up systemic policy and programme changes. It further proposes a centralized infrastructure, a (small) dedicated staff, and a structured process that leads to a common agenda, shared measurement, continuous communication, and mutually reinforcing activities among all participants.

At the end of the day, the innovation imperative and the mechanisms and resources needed to drive it rest on sound and effective partnerships. The successful realisation of the education innovation imperative requires cross-sector participation, collaboration and coordination – a requirement best achieved by locating the Innovation Unit within the NECT, the basic education sector's vehicle for enabling "collective impact".

The section below provides a brief description of such a vehicle for driving innovation in basic education. The description is proposed as a key step towards an in-depth design process of such a vehicle.

5.2 Proposed Innovation Unit: Description

5.2.1 Function

In function, the Innovation Unit could act to:

- promote and support new and existing innovations that improve knowledge and extend the evidence-base on what works, and
- use this to positively impact the system.

5.2.2 Design

In design, the Innovation Unit could utilise two main channels to serve its function:

- ***Supporting innovative projects using "challenge fund" principles, supported by a strategic investment fund to be established and co-financed through both public and private funds***⁴⁹

⁴⁹ Idea advanced by Andrew Donaldson.

Internationally, “challenge funds have emerged as effective and versatile financing mechanisms within which to channel public money to catalyse innovation and investment in a way that benefits the poor”. With the goal of stimulating long-term change through a finite intervention, challenge funds use open and competitive application processes, within “pre-defined eligibility and impact criteria designed to maximise innovation, impact and sustainability”. An example of a challenge fund in South Africa is the Jobs Fund, the objective of which is to co-finance projects by public, private and non-governmental organisations that will significantly contribute to job creation.⁵⁰

The Innovation Unit could use the “challenge fund” approach, facilitating a competitive process with funding channelled directly to those initiatives that address education priorities and are most likely to have impact. Disbursements would be awarded to applicants who have been adjudicated as offering the best ideas and greatest prospect of success and long-term impact. Funding could be based on the principle of “match-funding”, with investment from both public and private funds.

Calls for applications may be made using windows that reflect the prioritised challenges in the basic education sector, identified through a consultative process.

Significantly, since the long-term goal is systemic change/improvement, diffusion and scale will need to be built into the innovation at the outset.

In addition, an open window encouraging innovative ideas unrelated to the prioritised challenges – “free ideas that shake up the dynamics and move the equilibrium”⁵¹ - may be introduced from time to time.

- ***Facilitating the migration of existing successful innovations into the system by providing a “bridge” between innovators and the system***

The Innovation Unit may also serve as an intermediary between innovators and the system, helping to scale up proven innovations by providing a “bridge” between innovation and implementation in the system. This would require ongoing horizon-scanning to identify innovations that have demonstrated positive results; advocating for systemic change; and building and strengthening coalitions and networks of innovators and adopters/users.

The programme of work should comprise a manageable number of projects of national significance, that are visible, each addressing different priorities, with regular reporting to stakeholders on progress and results.⁵²

5.2.3 Location

It is proposed that the Innovation Unit is established as a self-sustaining unit within the National Education Collaboration Trust (NECT). The NECT supports and influences the agenda for change in basic education in order to achieve the education goals of the country’s National Development Plan.

⁵⁰ See <http://www.jobsfund.org.za/about.aspx>, accessed October 2015.

⁵¹ David Harrison, personal communication.

⁵² Tony Mackay, personal communication.

There are several advantages to housing the Innovation Unit within the NECT:

- **Broad coalition of stakeholders:** The NECT provides a platform that brings together all key sectors – business, civil society, government and labour – making it a natural home for the Innovation Unit, the success of which depends on a broad coalition of such stakeholders.
- **Collective governance:** Importantly, the NECT has a governance structure that ensures that all key stakeholders at the highest level are collectively enrolled in the pursuit of high quality education.
- **Reduced bureaucratic restriction:** The NECT is an independent body with its own policies and processes and is therefore not hindered by governmental bureaucratic restrictions.
- **System-wide impact with limited risk:** Making an impact on the system requires porous boundaries.⁵³ Although external to government, the Innovation Unit will have strong participation by government at the highest levels, a necessary condition for system-level change. In addition, the Innovation Unit provides the opportunity for the Department of Basic Education to be thought-leaders and participants in innovation without exposing the system/end-user to risk.
- **Cost benefit:** By locating the innovation mandate within an existing entity avoids the unnecessary expenses associated with establishing and maintaining a new structure.

5.2.4 Governance and management

The following governance and management structures are proposed for effective functioning of the Innovation Unit:

- An **Advisory Board** comprising five or six experts in the areas of education and innovation; it reports to the NECT Board; and is responsible for strategic decision-making, providing guidance, final adjudication of funding awards.
- A **Technical Team** comprising a director with a small professional team; it reports to the Advisory Board; and is responsible for managing and implementing the operations of the Innovation Unit, including coordinating the application processes, overseeing the measurement of innovations, communicating with stakeholders and managing partnerships.

Clear terms of reference would need to be developed for the Innovation Unit, that articulate its mandate and the boundaries within which it operates. Important considerations are: a degree of autonomy (that is, clear separation between the operations of the NECT and the Innovation Unit); an explicit purpose and mandate for innovation - a "protected space for innovation";⁵⁴ the ability to operate unconstrained by the improvement agenda even while it supports the "split screen" of school improvement and innovation; and the promotion of a top-down and bottom-up approach.

⁵³ John Volmink, personal communication.

⁵⁴ John Volmink, personal communication.

5.2.5 Financing

The Innovation Unit would be financed as a unit within the NECT, with specific funding 'ring-fenced' for the innovation mandate. As previously proposed, it could operate on "challenge fund" principles. To finance the innovations – from idea through to system change – a strategic investment fund may be established and co-financed through a mix of public and private funds.⁵⁵ This would necessitate the creation of strategic alliances with like-minded investors. In addition, core funding for operational costs would be required for the effective functioning of the Unit.

5.2.6 Partnerships

Partners come together when they can see individual benefits as well as collective benefits that will only come about by working together. In South Africa, the Dinokeng scenarios provided three options for taking the country forward into the 21st Century – walking apart; walking behind or walking together. Since large-scale change requires broad cross-sector participation, collaboration and coordination, the latter scenario is clearly the preferred option for the Innovation Unit⁵⁶. Various forms of collaboration at different levels will be required: from investment partners and coalitions of innovators to networks of users/adopters.

5.3 Conclusion

There is a clear *case for innovation* in the South Africa education system. At the same time, there are in-built challenges and risks in pursuing an innovation agenda, and these need to be addressed through appropriate means, including a realistic, long-term *innovation-based vision* for the education system, *strong and inspired leadership*, a *flexible regulatory system and administration*, a *culture of innovation* across all levels of the education system, *collaborative partnerships and networks*, *adequate resources*, effective *monitoring and evaluation* of impact, and the channelling of successful innovation into *scaled-up systemic changes* to universalise the benefits.

This report has introduced the concept of an Innovation Unit - as a vehicle within the NECT - to promote, resource and coordinate innovative practices that will ultimately have the potential to impact the basic education system at scale. The next step is to use the findings of this study to inform an in-depth design process, the outcome of which will be a detailed plan to operationalise the Unit.

⁵⁵ Andrew Donaldson, personal communication

⁵⁶ John Volmink, personal communication.

6. References

- Ananiadou, K. & Claro, M. 2009. *21st Century skills and competences for new millennium learners in OECD countries*. EDU working paper no. 41, OECD Directorate for Education. Paris: OECD Publishing.
- Australian Institute for Teaching and School Leadership (AITSL). 2014. *Learning frontiers: professional practices to increase student engagement in learning*. Issue 1: Insights and Ideas.
- Albury, D. 2015. *Myths and mechanisms: a brief note on findings from research on scaling and diffusion*. Innovation Unit.
- Cisco. 2008. *Equipping every learner for the 21st Century*. White Paper. Cisco Systems, Inc.
- Cisco. 2010. *The learning society*. Cisco Systems, Inc.
- De Beer, J.A. 2004. Open access scholarly communication in South Africa: a role for national information policy in the national system of innovation. M.Phil Thesis. University of Stellenbosch.
- De Jong, M., Marston, N., & Roth, E. 2015. The eight essentials of innovation. *McKinsey Quarterly*. April.
- Dynarski, M., Agodini, R., Heaviside, S., Novak, T., Carey, N., Campuzano, L., et al. 2007. *Effectiveness of reading and mathematics software products: findings from the first student cohort*. Washington, D.C.: Institute of Education Sciences, U.S. Department of Education.
- Evans, R. 1996. *The human side of school change: reform, resistance, and the real-life problems of innovation*. San Francisco: Jossey-Bass.
- Fadel, C., Bialik, M., & Trilling, B. 2015. *Four-dimensional education: the competencies learners need to succeed*. Boston: Center for Curriculum Redesign.
- Fullan, M. 2008. *The six secrets of change: what the best leaders do to help their organizations survive and thrive*. San Francisco: Jossey-Bass.
- GELP. 2014. *Transforming global education with new metrics*. Statement by the Global Education Leaders' Program.
- GELP. 2015. Building future learning systems: from exceptional innovations to systemic transformation. GELP Durban event, April 2015.
- Hall, G.E., Loucks, S.F., Rutherford, W.L., & Newlove, B.W. 1975. Levels of use of the innovation: a framework for analyzing innovation adoption. *Journal of Teacher Education*. 26(1): 52-56.
- Halbert, J. & Kaser, L. 2013. Developing leadership in British Columbia. In *Leadership for 21st Century learning*. Paris: Educational Research and Innovation, OECD Publishing. 146-151.
- Hannon, V. 2009. 'Only connect!': a new paradigm for learning innovation in the 21st Century. Occasional paper. Melbourne: Centre for Strategic Education.
- Hannon, V., Patton, A., & Temperley, J. 2011. *Developing an innovation ecosystem for education*. White Paper. Cisco & Innovation Unit.

- Hanushek, E. & Woessmann, L. 2015. *Universal basic skills: what countries stand to gain*. Paris: OECD Publishing.
- Hattori, R. A. & Wycoff, J. 2004. *Innovation Training*. American Society for Training and Development Workshop Series. 206pp
- Hattie, J. 2003. *Teachers make a difference: what is the research evidence? Distinguishing expert teachers from novice and experienced teachers*. Melbourne: Australian Council for Educational Research.
- Heugh, K. 1999. Languages, development and reconstructing education in South Africa. *International Journal of Educational Development*. 19: 301–313.
- Jansen, J.D. 1998. Curriculum reform in South Africa: a critical analysis of outcomes-based education. *Cambridge Journal of Education*. 28(3): 321-331.
- Jansen, J. 2015. Our education ecosystem. In *South African Education Innovator's Review*. L. Albertyn, C. Swart, & F. Bonnici, Eds. Rondebosch, Cape Town: Bertha Centre for Social Innovation and Entrepreneurship, Graduate School of Business, University of Cape Town. 8-9.
- JET. 2011. *Priorities for addressing South Africa's education and training crisis*. JET Education Services.
- Knapp, M.S., Copland, M.A., Ford, B., Markholt, A., McLaughlin, M.W., Milliken, M., & Talbert, J.E. 2003. *Leading for learning sourcebook: concepts and examples*. Center for the Study of Teaching and Policy, University of Washington.
- Kruss, G. 2004. Employment and employability: expectations of higher education responsiveness in South Africa. *Journal of Education Policy*. 19(6): 673-689.
- Leadbeater, C. & Wong, A. 2010. *Learning from the extremes*. Cisco Systems, Inc.
- Mullis, I.V.S., Martin, M.O., Foy, P., & Drucker, K.T. 2012. *The PIRLS 2011 international results in reading*. Progress in International Reading Literacy Study (PIRLS). Chestnut Hill, Massachusetts: TIMSS & PIRLS International Study Center, Boston College; Amsterdam: International Association for the Evaluation of Educational Achievement (IEA).
- NDP. 2012. National Planning Commission, the Presidency, Republic of South Africa. 2012. *National Development Plan 2030: our future - make it work*. Pretoria.
- OECD. 2012. *Strong performers and successful reformers in education: lessons from PISA for Japan*. Paris: OECD Publishing.
- OECD. 2013. *Leadership for 21st Century learning*. Centre for Educational Research and Innovation. Paris: OECD Publishing.
- OECD. 2014. *Measuring innovation in education: a new perspective*. Centre for Educational Research and Innovation. Paris: OECD Publishing.
- OECD. 2015. *Educational Research and Innovation Schooling Redesigned Towards Innovative Learning Systems: Towards Innovative Learning Systems*. Paris: OECD Publishing.
- P21. 2008. *21st Century skills, education & competitiveness: a resource and policy guide*. Partnership for 21st Century Skills. Tuscon.

- Puttick, R., Baeck, P. & Colligan, P. 2014. *I-teams: the teams and funds making innovation happen in governments around the world*. London: Bloomberg Philanthropies & Nesta.
- Rogan, J.M. 2007. An uncertain harvest: a case study of implementation of innovation. *Journal of Curriculum Studies*. 39(1): 97-121.
- Roschelle, J., Singleton, C., Sabelli, N., Pea, R. & Bransford, J.D. 2008. Mathematics worth knowing, resources worth growing, research worth noting: a response to the National Mathematics Advisory Panel report. *Educational Researcher*. 37(9): 610-617.
- Salmon, G. 2005. Flying not flapping: a strategic framework for e-learning and pedagogical innovation in higher education institutions. *ALT-J: Research in Learning Technology*. 13(3): 201–218.
- Spaull, N. & Kotze, J. 2015. Starting behind and staying behind in South Africa: the case of insurmountable learning deficits in mathematics. *International Journal of Educational Development*. 41: 13–24.
- Taylor, N. 2011. *Priorities for addressing South Africa's education and training crisis*. JET Education Services.
- Thorsteinsson, G. 2012. Innovation education to improve social responsibility through general education. *Tiltai/Bridges/Brücken*. 61(4): 71-78.

Annexures

Annexure 1: Study contributors

Annexure 2: Case study matrix

Acknowledgements

Numerous local and international experts and stakeholders gave freely of their time to this study. Their contributions enriched the product and are greatly appreciated. My sincere thanks are also extended to the following:

Godwin Khosa and Adam Boros - my core study team members - for assisting with the conceptualisation and design of the study and for ongoing guidance and advice;

Anthony Mackay, Sizwe Nxasana, Vineet Bewtra and John Volmink - the study reference group - for expert input provided at various intervals;

Rudy van der Elst, for assisting with the literature review;

Patricia Martin and Andre Wiesner, for editorial assistance;

The First Rand Empowerment Foundation, for financing the study.