EFFECTIVE USE OF ICT IN EDUCATION

Value, relevance & sustainability

Purpose

This paper considers the effectiveness of ICT in Education expenditure by examining a number of national ICT initiatives. It proposes greater focus on building local capacity that allows **Strategic Management of ICT and Leadership in Education (SMILE).**

Executive Summary

The first section *Changes in Education* examines worldwide changes in employment, society and education, and how these are influenced by new technologies.

The second section *Obtaining Value for Money* looks at ICT initiatives around the world and asks which features led to effective and sustainable use of ICT in education.

The final section on *The Strategic Leadership Programme* considers how one Strategic Leadership programme has attempted to support better outcomes through building local capacity.

Document Status

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Changes in Education

This section outlines some of the changes taking place in the world due to the prevalence of Information and Communication Technologies (ICTs). It outlines the widespread use of social networks and mobile technologies, and considers the changes in the job market and the skills that are required for success in the 21st Century.

It concludes that education must do more than introduce ICT or information literacy, it must be used as a catalyst to fundamentally change the purpose and practice of education.

The Changing World

The world has always changed and developed. At times this has been slow and continuous and at other times specific events have been associated with a time of rapid change. Inventions such as the printing press, the sailing ship and the steam engine all led to significant changes in local society.

There is now universal acceptance that the world is again in a period of change, heralded largely by the rapid development of information and Communication Technologies (ICTs). These new technologies are changing employment and everyday life, with individuals and companies discovering new ways to work, study and leisure.

For example, it has been estimated that:

- 50% of the jobs that will be available in 2030 **do not currently exist**;

- 50% of current information **goes out of date in three years**, so half of what a graduate studies in their first year is out of date when they graduate, and;

- there are more mobiles phones in use than there are people in the world (around 7 billion), and most of these devices have more computing power than a 1990's mainframe computer.

The result is that the world economy changing, with OECD reporting that the number of *routine manual*, *non-routine manual*, and even *routine cognitive* roles are decreasing significantly. In contrast, opportunities that are reported as increasing are the *non-routine analytic* and the *non-routine interactive* roles.

As if this was not enough, all of these changes are taking place in a context of previously unknown globalisation of the economy and rapidity of change. The changes are therefore **global** (affecting all countries and sectors of the economy) and **pervasive** (will have a deep and lasting effect).

This presents a number of challenges to existing enterprises but, interestingly, also introduces new opportunities, especially in emerging markets.

The reasons for this include the way business and economic models are also changing, with some of the largest corporations in the world being successful by having a small informal management team, openly distributing their proprietary information, collaborating with "competitors" or providing services free of charge. The success of these new approaches is reducing entry barriers in many industries, allowing new organisations to compete against established corporations, and emerging countries to compete against developed countries.

Drivers of Educational Change

As well as the above global changes that are external to the education system, there are a number of internal drivers of educational change. One of these is the international data about education systems and attainment that are now widely used for comparison purposes, for example the PISA and TIMMS studies.

The external and internal drivers are closely linked, as there is now clear evidence that education is a key indicator of social and economic success. No country can afford to consider its economic policy without paying due regard to its educational provision.

It is hardly surprising that ICT has been identified as one very important way to deliver improvement in education systems. Many of the global changes mentioned above are driven by new technologies. As one of the key purposes of education is to prepare young people for the future, education must take account of that future in all that they do.

In addition, both local studies (see for example The Impact of Information and Communication Technologies) and international studies (see for example OECD indicators) provide clear evidence that investment in ICT supports higher achievement across the whole curriculum.

The **challenge** is that technology is driving us to develop our education systems in two main ways:

- *to improve the efficiency of the systems*, improving academic results and outcomes, and;
- *to adapt the system*, changing the curriculum, assessment methodologies, teaching methods and key learning outcomes to reflect the demands of a changing world.

There is also a "meta-challenge" which is:

- *to build the capacity of the system*, so that it becomes able to sustain continuous change.

Enablers of Educational Change

As well as being the thing that drives change, ICT is an *enabler* of change because the technology allows us to do new tasks and to do old tasks in new ways. The very technology which creates new requirements on the system brings with it new solutions; allowing social learning, personalised approaches that develop creativity, and the opportunity to become self-motivated and empowered learners.

The **opportunity** is that ICTs can support all of the challenges listed above. It can:

- improve academic results and outcomes;
- provide new approaches to learning and teaching, and;
- enable systemic change through the development of self-sustaining innovation networks.

There is now considerable evidence that ICTs can, in the right circumstances, deliver these improvements. What is not so well documented is the topic explored in the next section - how to create the circumstances that allow investment to realise its full potential.

OBTAINING VALUE FOR MONEY

Having outlined some of the *drivers* that create a requirement to develop education systems, and introduced ICT as a key *enabler* of educational change, this section looks at some education initiatives and how to ensure value for money, relevance and sustainability.

Initiatives and their impact

The earlier section has provided a range of evidence that education systems need to adapt to the 21st Century. Understanding how best to invest in these developments is however not always clear. As the World Bank has indicated,

> "Despite evidence of increasingly widespread use of ICT in education initiatives around the world, there is little guidance available for policy makers specifically targeted at countries contemplating the use of ICT to help countries meet the education-related development goals."

Similarly, UNESCO's review of the use of ICT in Education suggests,

> "While it is often noted that ICT can only have educational benefits in certain situations and under certain conditions, there is insufficient empirical evidence to demonstrate how, where and when ICT can bring benefits to education, particularly in the Asia-Pacific region."

In his paper "Promoting the Knowledge Economy in the Arab World" Lightfoot (March 2011) looks at recent high-profile ICT initiatives in the Middle East and concludes:

> "On the whole the reports indicate that many of the far-reaching 'knowledge economy' skills which the education reform policies were seeking to promote are underdeveloped. On the contrary, in many, or most, cases ICT implementations have seldom moved far beyond teachers using data projectors and interactive whiteboards (IWB) - what David Buckingham terms "the wasteland of spreadsheet, file management and instrumental training that constitutes most 'information technology' courses in schools" (Buckingham 2010).
>
> As such, it could be argued that Bahrain, Jordan and the UAE are experiencing a phenomenon common to many education systems where the rhetoric of educational technology policies are simply failing to be realised on the ground."

Most recently, the U.S. Department of Education observed (January 2015)

> "The Los Angeles Unified School District's $1.3 billion *'iPad-for-all'* education initiative, announced in the summer of 2013, has been *plagued by* lack of resources and *inadequate planning for how the devices would be used in classrooms*"

With even the highest profile projects showing limited success, there is a need to examine the use of funds very carefully.   The next section examines the evidence regarding effective use of investment in ICT, beginning with the work of Becta, the UK agency for ICT in education until early 2011.

Key success factors

A number of reports have looked at whether ICT is having an impact in education and some have attempted to identify the factors, usually looking either at the overall level of investment or at infrastructure measures such as the number of computers or the connectivity bandwidth.

A smaller number of reviews have looked at more strategic issues such as awareness of the economic impact of ICT or the inclusion of ICT in the strategic planning process.

Where there has been a review of such strategic factors, school leadership has consistently been identified as one of the key determinants of success. One of the first investigations into the factors which led to effective use of ICT was in the UK where over $2.2bn had been spent on ICT in education during the 5 years leading up to 2002. To evaluate the effectiveness of this investment Becta (the UK agency for ICT in Education) analysed the Ofsted (Office of Standards in Education) data for each school, looking at the learning opportunities across the following seven areas.

1. Level of ICT resources
2. Quality of ICT teaching
3. Quality of ICT leadership in the school
4. General teaching quality
5. Quality of overall School leadership
6. Social background of the pupils
7. Prior attainment of the pupils

The importance of leadership both for ICT in the school (aspect 3) and the overall quality of leadership in the school (aspect 5) were was identified as most significant factors.

This outcome has been repeated in many contexts. For example, in July 2009, Singapore's Minister of Education hosted an [International Education Roundtable (IER)](#) with Ministers and senior representatives from Canada, Hong Kong, China, Sweden, the United States of America and Australia, and concluded:

> The IER introduced a model representing the journey to effective system-wide ICT integration. The model makes the point that for effective system-wide ICT use, school systems have to move beyond the traditional considerations of hardware, software, connectivity and maintenance. As laudable and ambitious as it can be to achieve the that improved physical resourcing for schools, *systems need also to build capability among teachers and school leaders*.

A similar conclusion was reached at the Learning and Technology World Forum (LTWF), an invitation-only event attended in 2010 by a record 68 Education Ministers. Over the course of the three days, Ministers and education experts examined the pivotal role of technology in driving educational change. One of the key outcomes of these discussions was once again that, while infrastructure and other purchases were important, it was the development of human resources that was the real issue, and that *leadership development and change management* were the aspects that provided the greatest opportunities for effective and sustainable change.

THE STRATEGIC LEADERSHIP PROGRAMME

Having identified the need to address the **Strategic Management of ICT and Leadership in Education (SMILE)**, this section outlines how one development programme, **SLICT** (the Strategic Leadership of ICT) was created in the UK and has now been delivered in a dozen countries worldwide.

Programme Development and Delivery

As a direct result of the Becta research quoted above, a programme called the Strategic Leadership of Information Communication Technology (**SLICT**) was developed. The central aim of this programme was ***to enhance the capacity of headteachers to lead strategic change in their schools.*** Becta led the development of this programme, and the initial delivery in England was through Becta and the National College for School Leadership (NCSL).

A research evaluation study carried out by Leicester University was extremely positive and led to roll-out across the country, with 10,000 school principals being introduced to how technology is changing the world of education. Comber, C. and Hingley, P. (2003) Evaluation of the Strategic Leadership in ICT (SLICT) Programme: Phase 2: Interim Report, Coventry: NCSL/Becta).

The course has now been adapted and delivered in Scotland, Malaysia, Hong Kong, Japan, Jordan, Syria, Lebanon, Palestine, Egypt, and Pakistan. It has been delivered to headteachers in both the State and Private sectors, to Teacher Education Institutions, and to Government Education bodies.

The programme has continued to develop over time, but has always remained true to its original purpose, which is to empower school leaders not just to understand technology, but to understand the *potential* of technology, and to allow them to start a path which they will continue long after the programme is completed.

The power of this programme is that capacity-building and empowerment. It is not a training course in IT, it is a development programme that takes Head Teachers and other senior educationalists on a journey of exploration, exposing them to the power of ICT and the opportunities it brings. This approach exemplifies the methodology now being used in the most successful education services and schools as it builds the capacity for continuous development and improvement.

Outcomes

The on-going success of the **SLICT** course and the impact on education systems is evidenced by the continually favourable feedback from participants and the emerging international recognition of the importance of strategic leadership in schools.

The key purpose of this programme is to build the local capacity so that education leaders and well-placed to manage ICT initiatives at a strategic, tactical and operational level. While positive feedback from courses purchasers and participants does not in itself provide evidence of the impact of this kind of capacity building, it is illustrative to note that countries that have focussed on local capacity building have achieved significant success in the deployment of technology. While there is little evidence that local capacity building is ***sufficient*** to ensure effective use of funds, notable examples of ineffective use of funds where there is a lack of prior capacity building indicates that local capacity-building programmes may be a ***necessary*** pre-requisite to the effective deployment of ICT.