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TITLE: ICT in South Africa: Opportunities and Challenges from a NGO Perspective

Kirston Greenop, Research Manager, & Vis Naidoo, CEO, Mindset Network, South Africa

ABSTRACT
The area of ICT, health and education were identified as priority areas by the South African government (for example, the e-Education white paper of 2004, and the e-Health policy of 2006). The e-readiness ranking of the Economist Intelligence Unit (2007) places South Africa 35 out of 69 countries. However, the Unit makes the observation that the divide between the most developed countries and the developing world is shrinking due to innovation and technological advances in mobile phones and online services. Mindset Network is positioned in this environment and aims to develop, produce and provide relevant digital educational content to as wide an audience as possible.

Mindset Network, an NPO, was established four years ago to deliver educational content to the schooling and health settings. Mindset aims to provide ubiquitous access, anywhere, anytime and through a variety of platforms (internet, print, satellite broadcasts, multimedia and mobile technology). During this stage of development, each facet of the programme has been evaluated. This paper provides a review of the research findings of Mindset's Health and Schooling programmes. The challenges of setting up an ICT organisation within the developing world, the value that this has added to the educational and health arenas, the importance of partnerships, the lessons learned and the strategy on the way forward are emphasised. The paper discusses the findings of a large scale meta-analysis and provides a contextualization of Mindset's position in ICT in a developing country, the challenges and opportunities for leadership.

INTRODUCTION
ICT in the context of educational interventions is essentially a means of conveying information, lessons or concepts using technology (Morgan & Kennewell, 2006). Children who have the opportunity to utilise such technological methods of learning tend to develop the ability to work interactively with technology and develop multiple software (and hardware) 'literacies' in which they can operate. This is especially true if the children are guided through the process by educators or peers (Morgan & Kennewell, 2006), highlighting the necessity of empowering and capacitating educators. This argument can be extended into adult education and exposure to ICTs. Adults who are provided with the opportunity to engage with and are supported and trained in multiple technologies are empowered to work interactively with technology and can actively participate in a world with technology inherent in its functioning.

ICTs provide the opportunity for information and concepts to be conveyed across great distances and to reach places where the expertise to convey such information may not be available (Jabry, Williams, Hussein, Muthungu & Islam, 2006). As such, the value of ICT for both the type of learning that it

allows as well as for the dissemination of information is undeniable. There is an argument that if ICTs are not used more widely in Africa it will result in an even bigger gap between international and African students, a greater power differential which affects Africa's ability to compete in the global economy (Jabry, et al., 2006).

ICTs, however, should not be seen a simple solution that can be simply implemented and forgotten. There are numerous considerations and challenges to be faced. Firstly the focus must be to enrich the entire population including the poorer segments. Secondly the languages that are used must correspond to the populations in question. Thirdly the users must be encouraged by the suppliers, educators, management and the government to utilize the equipment to its maximum potential so that they may gain the most benefit from it. Lastly there are numerous logistic, technological and financial considerations that render ICT implementation impossible without funding and support (Jabry, et al., 2006). It should however be noted that South Africa has the infrastructure to implement and utilise ICTs which places it as one of the best positioned countries not only in Africa but in the developing world to implement ICT (Isaacs, 2007).

Mindset Network
Mindset Network was started in 2002 on a model of building significant partnerships and relationships among key influential partners. The aim of the organisation is to produce quality digital material in the health and education sectors. It was envisaged that this content be aligned with relevant curricula and country priorities.

Up until 2007, the organisation was divided into three units:
- Mindset Health – launched in 2003
- Mindset Schooling:
    - Learn (for secondary school) – launched in 2002
    - Cabanga (for primary school) – launched in 2006

Mindset operates on a creative commons license with open source content to provide access to quality digital educational material to all people in South Africa to utilise as needed. Mindset Network distributes its content through various technology delivery platforms including broadcast and datacast, as well as the internet and distributable media. The materials are available in various content formats: video, print and computer-based multi-media format. On all content platforms the quality assurance process of the programmes dictates that the content follows a rigid and stringent review process to ensure quality content that is relevant and meets the priority needs of the country.

The content is made available on a large scale to schools, clinics, centres of learning and any site that is able to access satellite television or the internet. The ability to reach such a large audience depends on Mindset's ability to leverage satellite technology. Being able to access this technology depends on hardware requirements being met. Mindset consistently accesses external funding in order to provide all sites (except where satellite television has been subscribed to on a private level) with the necessary equipment to receive content. In addition, Mindset trains the managers, educators, or appropriate leaders at the site in the use of the hardware and content access.

METANALYSIS
In order to provide a comprehensive document for use to inform planning and strategizing for the next three year period (2007-2011), an evaluation of all research completed to date was commissioned. This

process involved locating, collating and analyzing the research using a meta-evaluation approach of evaluating both the content and findings of the research as well as the methodology employed.

Objectives

This report outlines a meta-evaluation of past research that has the following objectives:

1. To provide a review of the context in which Mindset Network operates as an NPO in South Africa.
2. To collate all past research that Mindset Network has commissioned and undertaken.
3. To order and compile the research into cohesive, yearly reports, by programme.
4. To meta-analyse the research undertaken each year, for each programme.
5. To present the main conclusions and findings of this analysis. This includes recommendations, lessons learnt and the way forward.

Results

Mindset Schooling

Mindset Schooling had 24 research reports that were used for the purposes of this evaluation. The evaluations were conducted on educators, learners and school staff. The distribution is as follows:

- Educators (26.3%)
- Learners (31.2%)
- Both educators and learners (31.2%)
- Focussed on the school in general and thus used learners, educators and principals (10.5%)

The aims of the studies showed the following:

Table 1. Frequencies and percentages of aims

Aim	Frequency	%
Value of Mindset resource	4	10
Quality of Mindset resources	6	15
Content	4	10
Areas for improvement	4	10
Implementation	2	5
Usage	6	15
Effectiveness	7	17.5
Challenges	5	12.5
Incorporation	2	5
Total	40	100

The methodologies used varied from quantitative to qualitative and a variety of mixed method approach. The distribution of each was as follows:

- Quantitative (5.3%)
- Qualitative (73.7%)
- Mixed method (21.1%)

The methods used showed the following pattern:

Table 2. Frequencies and percentages of methods used

Method	Frequency	%
Instrument/Questionnaire	5	19.2

Focus group	11	42.3
Interviews	5	19.2
Observations	5	19.2
Total	26	100

Conclusions

The studies found the following conclusions:

- Usage and effectiveness
  - Educators perceived an improvement in learners
  - Access is limited in places and usage is therefore low and ad hoc
  - Mindset was viewed as indispensable
  - The resources were viewed as being cost effective
  - Sustainability of the Mindset system was seen as good
- Content
  - Content of the videos seen as useful for both educators and learners, this was nearly universal across the studies
  - Studies showed support for the content from educators and students
  - Response to the Mindset content was generally positive
  - Value of the content was seen as good
- Format and language
  - Response to the Mindset format was generally positive.
  - Sound was at times hard to hear
  - The pace of the videos and presenters was seen as too fast. This was common to many studies
  - Video was seen as an effective medium
  - Video quality generally seen as good
  - Backgrounds and music need improvement in some instances
- Obstacles
  - The placement of the Mindset equipment is not ideal (but is unavoidable due to security reasons)
  - Technical faults emerged
  - Student performance is exceptionally low across the subject areas, thus Mindset content faces the challenge of changing what is an overwhelming poor trend.

Mindset Health

Mindset Health had a total of 29 research reports that had been conducted over the last several years by both internal and external researchers. The targets of the evaluations were split as follows:

- Specifically patient related (14%)
- Specifically health care worker/institute related (34%)
- General (52%)

In terms of specifics, the aims show the following:

Table 3. Frequencies and percentages of research aims

Aim	Frequency	%
HCW uptake	5	9.4
HCW interest/preference	3	5.7
HCW knowledge gain	2	3.8

HCW self efficacy change	1	1.9
HCW attitude change	1	1.9
HCW demographics	2	3.8
Hospital/clinic environment	2	3.8
Public interest/preference	5	9.4
Public uptake	1	1.9
Public knowledge increase	1	1.9
Public demographics	2	3.8
Language related	1	1.9
Challenges	4	7.5
Content related	12	22.6
Production/Quality	11	20.8
Total	53	100

The methodologies used varied from quantitative to qualitative and a variety of mixed method approaches. The distribution of each was as follows:

- Quantitative (7%)
- Qualitative (62%)
- Mixed method (31%)

The methods used show the following frequencies:

Table 4. Frequencies and percentages of methods used

Method	Frequency	%
Focus groups	14	22.6
Observations	11	17.8
Interviews	10	16.1
Instrument/Questionnaire	15	24.1
Tasks	5	8.1
External source	7	11.3
Total	62	100

Conclusions

The following conclusions were drawn from across the research.

- Usage and effectiveness
    - Usage of print materials and health channel was generally very high.
    - Ample evidence for the usefulness and benefit of the health channel.
    - Watching Mindset content seems to lead to an increase in HCP knowledge.
    - Watching Mindset content seems to lead to a decrease in fear of HIV workplace transmission.
    - Watching Mindset content seems to lead to an increase in self-efficacy for HCPs.
    - Professional development viewed favourably and HCPs were impressed by the platform.
- Obstacles
    - Small technical changes necessary to the channel, the multimedia system, the keypad, the HCW interface, print workbooks, the PD system and the website.

- o Different obstacles exist for HCPs and patients with regards to them watching the health channel.
- o HCPs lack the time to utilize Mindset properly and several are unaware of the purpose and accessibility of the equipment.
- o PD usability is not intuitive enough
- Format and language
  - o Video generally preferred
  - o English should be used as a standard with support material in other languages, or all languages must be available with an English voice over.
  - o Format and content was generally viewed favourably, language was rated as just right and English as a language of instruction was seen as sufficient.

GENERAL CONCLUSIONS

In terms of Mindset Schooling, a summary of research in Mindset Learn found that in the area of teaching and learning, educators reported that they felt that not only had their learners learnt something new, but they themselves had learnt something new from Mindset Learn (in terms of content and paedagogy). They felt that they were able to use the Mindset Learn products to enhance the learning experience. Educators reported feeling empowered, and having more confidence in their teaching. They stated that they felt the content was well produced and easy to understand overall. The educators reported wanting copies of the videos and were willing to buy them if necessary.

All the educators reported that they found the content to be well linked with the curriculum requirements and that the outcomes and areas covered in the videos were appropriate. The educators further said that the videos made the curriculum content meaningful, relevant, applicable to real life and that they particularly liked the practical approach to relaying information. The learners demonstrated similar feelings to those expressed by the educators. Learners felt the videos were exceptionally beneficial, and of high quality. Special mention was made of the use of activities and explanations in the videos. The length of the video was found to be appropriate, and the learners stated that they generally liked the way the videos were presented. Specifically, the learners stated that their levels of understanding were enhanced by the videos. 95% of learners stated that the video made it clear what the lesson was about.

In 2007 an evaluation of access and usage was undertaken. It was found that there were instances of technical faults, and a skills gap in that trained educators had left the school. Training was viewed as positive and a strength of the Mindset system and often informed educators about the curriculum better than other training had. However, when educators left the school a skills gap was created and with hindsight the cascading of skills to other educators should have been implemented by the schools.

The conclusions and suggestions of a 2007 study were:
- Formal incorporation of the Mindset resource in the school structure;
- Sufficient training and follow-up training sessions in utilising the Mindset resource, for all relevant stakeholders in the project;
- Troubleshooting by Mindset Network to ensure that the Mindset equipment and the Mindset Datacast Programme are fully operational and functional at all times.
- Troubleshooting by learning area facilitators employed by the relevant education department to ensure that educators understand the curriculum and are in a position to implement the curriculum with their learners.

In the research 'video' has tended to be the most impressive to stakeholders. This is the case across both Schooling and Health. Arguments for this bias include the fact that video is the easiest to interact with, is novel and perceived as similar to television. Explicit research into the value placed on all three media needs to be undertaken. A review of the research indicates that print is still highly valued and multi-media is rated positively, but the latter was most often evaluated on its own.

In Mindset Health, research found that the content was at the right level, was stimulating and empowering. In addition, the participants felt that the choice of language was appropriate and that additional materials should be printed in alternate languages, but that English should remain as a common language. An evaluation of the usage of the datacast system found that both the public and Health Care Providers (HCPs) found the content of good quality, and of benefit. Obstacles that affected usage were time constraints from the HCPs and high levels of traffic and noise in the waiting areas.

In terms of HCPs, 98% reported that they would like more training in the area of HIV and AIDS, but only 58% had accessed the Mindset system at their clinics. This is an important finding as it appears that the HCPs often find it easier to receive facilitated training, to taking control of their own learning. Implementing the professional development, aligned programme for HCPs may address this issue of taking responsibility for learning.

For HCPs, the video and multi-media were found to be easy to use and were preferable as means of learning. However, print material was also highly valued, especially when confidence in and ability to use technology was low. Focus groups in 2005 especially mentioned the fact that having multiple graphics, videos and pictures in the CBMM was of benefit and also suggested that the print material be in colour to attract the HCPs attention. These changes were then made.

In conclusion, the research into Mindset Health and Schooling has found that the quality was excellent, that educators, learners, the public and HCPs appreciate the input the content has, but that barriers to usage remain and require efforts to challenge these at various levels. Smaller issues that emerged in specific content research reiterates the importance of having consistent research into all content and projects that are developed. This ensures that lessons are learned primarily, but also goes some way to providing accountability information. In Schooling the incorporation of research into the future planning of the programme has demonstrated consistent improvements in the programme. The success of this is emphasized in the recognition of the quality pf products. The challenge of usage remains, however.

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