



Young Engineers of South Africa

www.yesa.org.za

High Level Strategy

Version 4

In Association with:

(TekkiTots; TekkiKids; Fab Kids; Fab Teachers; 3D Kids; Innovate Conference)

The Meraka Institute

The Department of Science and Technology

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1 Description and context

This proposal is based on three previous documents:

- Seeding Of Critical Mass In Three ICTS Application Research Areas: Geomatics, Wireless, and ICTs In Education – submitted to the South African Department of Science and Technology, September 2005
- ICT in Education Research Group – 2006
- Young Engineers’ Programme – Scope and Business Plan for AMTS 2005

The Young Engineers of South Africa Programme (YESA) (www.yesa.org.za) also endorses the e-Education and the Science and Technology White Papers. The main focus area will be on Information Communication Technologies (ICT) in education and the way that they can impact on the nurturing of future Science, Engineering and Technology (SET) graduates within a developing world context. The inherent power of ICTs in classrooms needs to be harnessed to improve the efficiency, accessibility and quality of the learning process in South Africa while providing practical interventions underpinned by effective research, in order to meaningfully inform educational policy and practice. This intervention aims to confront the challenges in education in our country while fostering creativity and innovation. It also has the potential to provide a vehicle to trial a range of innovations emanating from the Meraka Institute especially in the areas of wireless technologies and robotics. It is, therefore, imperative to link research, development and innovation to implementation within a framework of an overall ICTs in Education strategy.

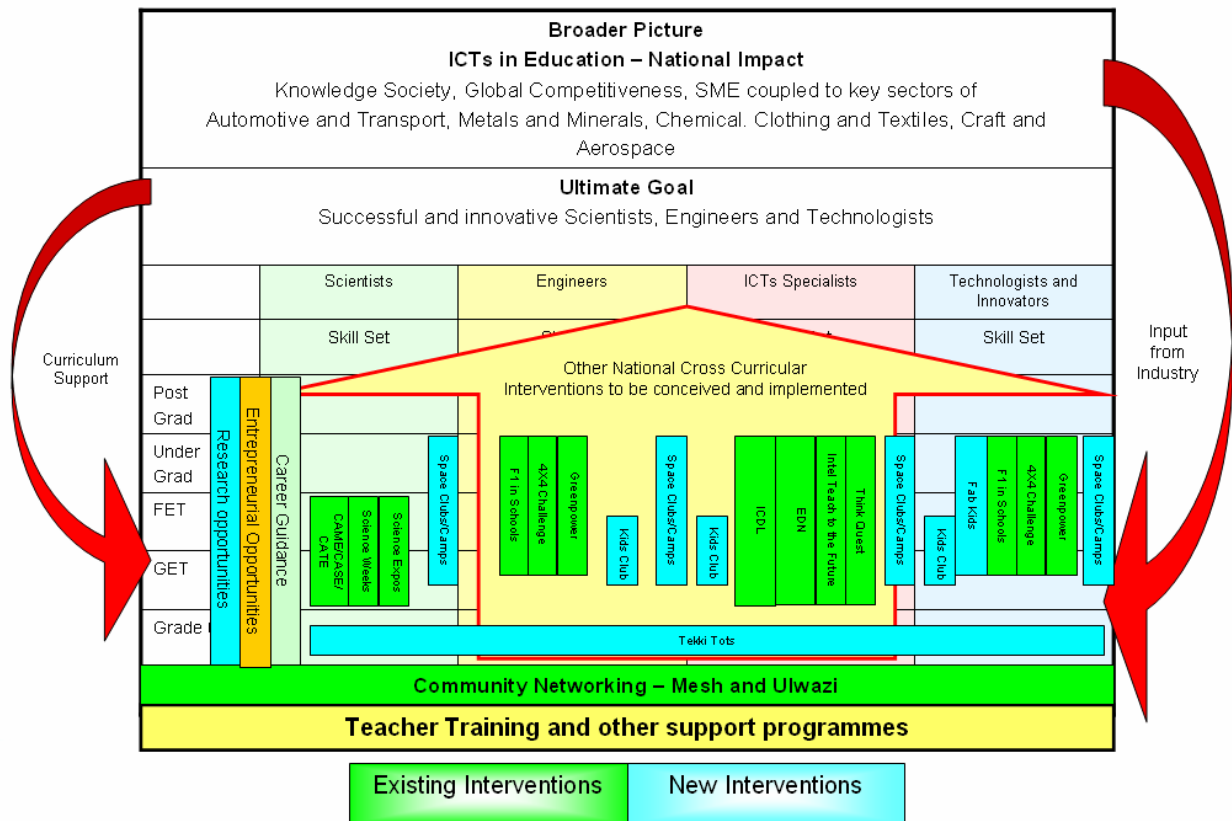


Figure 1. Broad outline of the Young Engineers of South Africa area of influence

2 Vision and Mission Statements

2.1 Vision Statement

The Young Engineers of South Africa Programme aims to increase the number of youth selecting and successfully completing qualifications in the hard sciences at undergraduate and post graduate levels in the next ten years.

2.2 Mission Statement

This will be achieved through the initiation and deployment of national interventions across a broad range of projects and competitions that will instil a love of the subject in the learners and nurture a spirit of 'I can do IT'. These interventions will include robotics, space exploration, access to high tech rapid prototyping labs, programming, music, conferences, etc, beginning at preschool level and making provision to include all learners in South Africa.

3 Strategy

The long-term goal of the ICTs in Education research group is to apply collaborative research, development and innovation of ICT interventions to support the massification of effective, pedagogically-appropriate and sustainable technology-enhanced teaching and learning in South Africa and Africa, where the next generation is exposed to more career opportunities in the ICTs sector.

In real terms YESA will focus on the interface between SET and ICTs. A national organization is proposed to manage the process of deploying projects which are associated with YESA. Together with nurturing a love of SET, all interventions will place a heavy emphasis on creativity, innovation, logical and lateral thinking, problem solving and group work. Where possible a portfolio as a trail of evidence will be developed by the learners with a special emphasis on digital media.

It is envisaged that the majority of the interventions operating under YESA will function in the informal extra mural and club sectors of the school environment. As interventions mature and educators adopt the programmes more readily the interventions will become integrated into the more formal curriculum in the classrooms. The fun aspects of learning in a non-threatening environment will leverage a change in attitude on the part of the participants. An attitude of 'I can do IT' must be nurtured at all times where SET and ICT principles are smuggled in under the guise of stimulating learning environments. In order to achieve this goal the programme will strongly support champion schools and individuals wherever possible and operate with learners who want to be there.

In order to supply quality interventions and their appropriate supply chains, it is envisaged that a YESA affiliation of organizations is tasked to vet applications from suppliers and to host the details on a national interventions portal. Running concurrent to this is a proposed national outreach project database which captures a range of information from locations to recipient communities, activities, funders and more importantly actual outcomes. It is envisaged that the availability of this type of information together with access to a project database will provide schools with essential information that will assist them in successfully implementing a number of YESA adopted interventions at a variety of levels.

It is envisaged that as YESA Schools are adopted into the programme they will be willing to share their learning experiences and expertise with schools in less fortunate positions. This will require a concerted effort from the YESA organization in terms of logistical support as well as training to ensure that both a physical as well as a digital connection is established

using a digital inclusion concept. Connectivity is an important component of providing a living laboratory to explore the capabilities of the mesh technologies to enable a social transformation in the recipient communities. There must, however, be a commitment on the part of both schools to repeat the process further and so grow the organization organically from the ground up.

In defining the focus area in the context of SET, the emphasis will be on ICTs in education. To this end the following definition will apply.

Engineering is the application of science to the needs of humanity. This is accomplished through the application of knowledge, mathematics, and practical experience to the design of useful objects or processes.¹

The implications of all interventions will emphasise skills acquisition in the key areas of SET with a strong ICTS and computer technology focus.

YESA will operate within the mandate of Meraka (www.meraka.org.za), more specifically within the ICTS in Education Research, Development and Innovation Strategy. In building partnerships with industry to explore proactively the potential for new and emerging technologies to be used within education. This aims both to identify innovative approaches of relevance in education and gather evidence of the benefits of use to education.

The approach and research areas that have been identified to support the YESA long-term goals can be shown diagrammatically in Fig. 2 below.

¹ <http://en.wikipedia.org/wiki/Engineering>

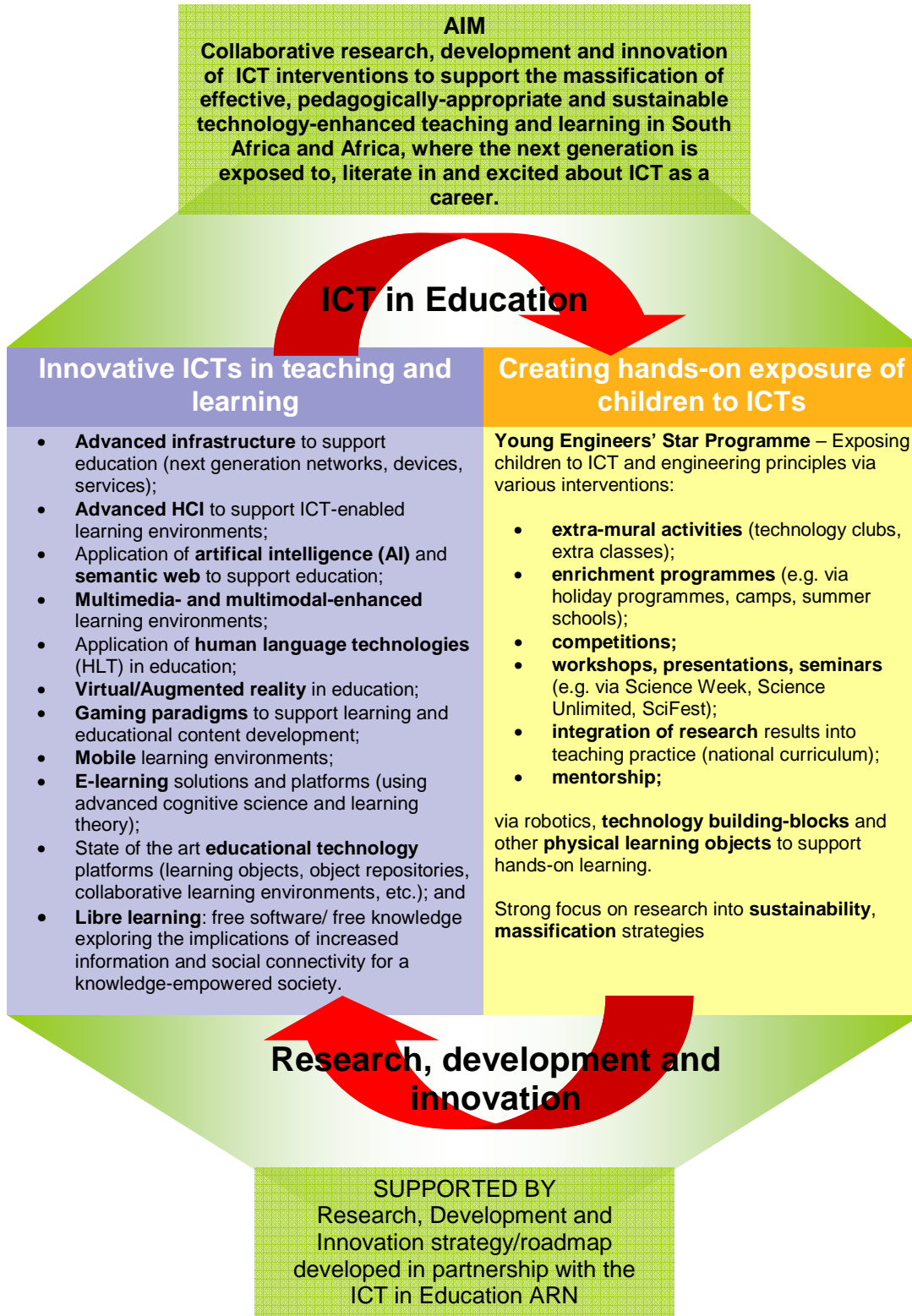


Figure 1: ICT in Education approach and research areas.

Other areas that will be explored further include:

- World Class research on state-of-the-art technology-enhanced “Classroom of the Future”
- Robust Innovation Chain which will research on aspect of implementation, monitoring and evaluation of pilot “Young Engineers of South Africa Programme” with learning fed back into the model and concept refined and tested.
- Development of sustainability model and business plan for YESA. This may include a franchising, a Formula One in Schools model, etc.
- A strong focus on applying the research, development and innovation in ways that can readily be implemented within the education system - research into massification and sustainability models forms part of each initiative.
- Establishment of international cooperation on as many levels as possible
- The integration of Science centres into the delivery of YESA interventions
- The development of ‘hub manufacturing centres’ in addition to current and future Fab Labs to provide more learners with access to technologies
- The integration of Outcomes Mapping as a method of monitoring and evaluation
- The integration of Dinaledi schools wherever possible

3.1 YESA Outcomes

YESA Outcomes include:

- Exposing as many learners to the wonders of modern technologies
- Promoting fun learning in a non-stressful environment
- Enabling hands-on interaction with modern technologies
- Providing career guidance to more learners which is both relevant and stimulating enough to enable more informed decisions to be taken
- Changing of learner attitudes to ‘I can do IT’ amongst both learners and teachers
- Encouraging learners to discover personal aptitude and capabilities for SET subjects
- Exposing learners to more entrepreneurial opportunities within a broad range of interventions
- Nurturing a spirit of innovation and creativity wherever possible
- Creating situations for learners to operate in groups and become effective members of a winning team
- Developing presentation skills and professional trails of evidence embodied in digital portfolios
- Identification and development of massification strategies
- Exploring models for piloting
- Establishing a monitoring and evaluation programme which would include the dissemination of best practice

3.2 The way forward

In planning the way forward it is proposed that all stakeholders are afforded the opportunity to buy into the project from an early stage. There can be little doubt that this intervention is of national importance as it represents a long term investment aimed at addressing the critical shortage of manpower in this important sector of the economy. Learners must be given the skills to cope with life in a technological world before the benefits to the economy can be appreciated.

The list of possible stakeholders include:

- The departments of Science and Technology, Education, Communication, Trade and Industry
- Engineering Societies
- National and International Donor Organizations
- Private Sector