School in a Box

Providing a whole-class learning solution in developing countries

Philip Penny and Ciarán McCormack

Introduction

School in a Box (SIAB) is a new Film in Schools/Institute of Art Design and Technology (FÍS/IADT) initiative that addresses the global problem of inequitable access to modern educational tools. It is an innovative technical and pedagogic solution that can help transform classrooms in developing countries into modern learning spaces.

One of the main aims of SIAB is to overcome the infrastructural barrier presented by a lack of access to electricity in developing regions of the world. As a mobile solar-powered system, it can deliver rich multimedia teaching and learning content in schools and classrooms in, for example, rural India or sub-Saharan Africa, transforming them into 21st-century learning spaces. At the heart of SIAB is a solar-powered iPad – with 155 pre-installed educational applications (apps) – that connects to a digital projector and speakers. The built-in cameras (video and still) on the iPad allow development of customised locally driven curricula for ePub (electronic publication) that can be archived and reused.

Research has shown that access to education through the use of information and communication technologies (ICTs) has enormous potential to positively impact the lives of people in developing countries by enhancing the quality of education. It is also recognised that ICT solutions must be cost-effective and sustainable. SIAB shows how ICTs can be delivered at a relatively low cost compared to other bespoke solar-powered systems, increasing the chances of success for international initiatives such as the Millennium Development Goals (MDGs) and Education for All (EFA). Studies carried out on the impact of 32 ICT projects in schools in 8 countries show that up to 80 per cent of participants are more aware and feel empowered while 60 per cent report experiencing a direct improvement in the teaching and learning process (IICD, 2007).

SIAB at the front of the class – a modern pedagogic system

SIAB does not require teachers to change their (normal) position at the front of the class using the blackboard. It enhances the overall didactic experience as the (trained) teacher engages students by using interactive content that comes pre-installed on the iPad as well as content that can be developed locally. Whole-class

engagement is likely to be much more productive than initiatives that require individual tuition for students with their own devices. This is supported by a recent peer-reviewed journal article by Jeffrey James, professor of development economics at Tilburg University in the Netherlands, who critiqued the one-laptop-per-child programme and made a compelling argument for the use of 'shared' ICT products over non-sharing solutions (James, 2010).

In classrooms in developing countries, teachers spend an inordinate amount of time with their backs to the class writing on blackboards crammed with information written in chalk. SIAB ends this archaic and uninspiring scenario, which limits the teaching and learning experience for all concerned. Open, collaborative, inquiry-based learning (IBL), which is required and used in modern classroom settings in the developed world, is enabled.

The iPad can project interactive learning content on to a white wall. The content can be developed locally using the iPad or delivered via pre-installed dedicated apps on almost any subject matter. Traditional classroom props are no longer a requirement – for example, the blackboard is replaced by the ShowMe app, the abacus by Mathsboard, the globe by World Maps and a skeleton by Pocket Body. The simple, user-friendly touchscreen interface enables instant switching between subjects and content matter.

Typically, schools in rural India or sub-Saharan Africa have large classroom sizes, with up to 60 students not uncommon. Similar to conventional whiteboards, the pre-installed ShowMe app is used to project and explain a wide range of topics using voice-recording, multiple brush colours, pause and erase and image importation, facilitating the collaborative inquiry-based methodology that underpins SIAB. The combination of the iPad, projector and speakers in the hands of a trained teacher provides a truly modern pedagogic learning experience. SIAB allows the whole class to learn together, and the highly portable mobile learning unit can be moved between classrooms to reach hundreds of students in a single school day.

The iPad at the core of SIAB is a quality device. Although it costs a little more than other tablets on the market, it allows far more content and user scenarios to be delivered; devices that can do more, deliver more. The developers behind SIAB believe this

approach achieves a much more balanced (valued added – 'more bang for your buck') spread of modern ICTs and should encourage funders who are looking at different solutions to opt for SIAB over other initiatives.

The SIAB implementation strategy

From day one the developers behind SIAB realised the importance of involving end users in the development process. IADT runs courses on 'Human Computer Interaction' and 'Interaction Design'. Communication with clients and project stakeholders underpins the interaction design process with the aim of developing affective systems and good user experiences. It is believed that this bottom-up approach will create the grass-roots network and proof-of-concept needed to convince all stakeholders involved in SIAB piloting. In this context, SIAB developers are aware of the many constituent parts that make up a school: teachers, students, administrators, parents and the surrounding community, who are all collaborating in the education of their children.

An integral part of the SIAB solution is the Train-the-Teacher programme. This minimises technology redundancy, maximises exposure to modern ICTs in developing countries and is achieved by putting the iPad in the hands of a trained teacher first. A dedicated SIAB two-day Train-the-Teacher workshop has been developed by Apple Professional Development experts in consultation with the SIAB research and development team. The teacher who is skilled and motivated when facing the class is able to expose the children to the rich multimedia interactive content inherent in SIAB. Post-training online and offline supports are provided, and feedback from carefully chosen partners helps ensure the improvement of SIAB in an iterative way.

From the outset IADT also recognised the vital importance of developing and fostering relationships with organisations and partner institutions that act as representatives or champions of SIAB on the ground. Choosing the right partner with key personnel who understand the SIAB solution in a 'holistic' way is a vital part of the process, and great care is taken at this initial stage. IADT is currently reviewing dozens of enquiries – mostly as a result of the AfricanBrains conference (http://africanbrains.net/edusa/) in January 2012, at which SIAB was presented to 18 ministers of education in sub-Saharan Africa.

To further ensure optimal learning outcomes, both parties sign a memorandum of understanding (MoU) before an order can be processed. The MoU incorporates all elements of the SIAB solution. SIAB is not-for-profit and will only be deployed where all criteria detailed in the MoU are met. Currently, we have completed the SIAB Apple Professional Development (APD) two-day training course in preparation for the first phase roll-out stage in Nepal and South Africa (see Box 1).

Pedagogy – IBL and multiple intelligence theory

IBL is a student-centred pedagogical approach underpinning SIAB. Students mostly work in groups with guidance from the teacher. In SIAB we refer to IBL as the 'inquiry process' as it includes both analytical (deconstruction) skills as well as creative communications (construction and production) of film and multimedia as the end product for assessment.

Inherent in the inquiry process used in SIAB is the 'catch all' capability of this learning methodology, which caters for students of all ages

---

Box 1 Country experiences with SIAB

South Africa

Cape Peninsula University of Technology (CPUT) is the first institution to help develop and deploy SIAB in South Africa. CPUT has received 15 units for deployment in three multi-grade schools where it runs programmes. Core Group, the main Apple distributor in South Africa, is currently assisting CPUT with SIAB local distribution and training needs in preparation for the roll-out. A delegation of three key CPUT personnel visited IADT in December 2011 for training, and a second training day, delivered by IADT and Apple staff, took place in Johannesburg in January 2012.

At the time of writing, IADT and CPUT are fine tuning arrangements on an agreed three-phase model strategy. Both parties have agreed that 'design-based research' is the most appropriate research methodology as its flexibility allows the necessary adjustments envisaged as we work through the roll-out of SIAB in a real world setting in an iterative manner. Both sides will collaborate in running the pilot to design and analyse the development and deployment of SIAB and to measure and document what works and what does not work over a 12-month period.

Nepal

In Nepal, IADT is partnering with Karuna-Shechen, a non-profit humanitarian organisation that works with a network of local partners and volunteers to provide education, health care and social services in the greater Himalayan area. A second SIAB deployment is also under way in Humla – the highest and most remote region in North Western Nepal bordering Tibet. Ten SIAB units were shipped to Nepal and training has commenced. The Nepal deployment presented most of the challenges that SIAB was designed to overcome, and feedback from David Baugh, the digital media expert and Apple Distinguished Educator/ Mentor who delivered the two-day Train-the-Teacher programme, was very positive. The following are just some of his comments:

The hardware combination was ideal for the setting, and being stored in an airtight robust Pelicase is an essential element for success in the future … The biggest success in the Apple Professional Development workshop was the section where participants were encouraged to create their own content from existing curricular resources. Teachers understood the importance of this and created videos, interactive teaching resources and multimedia eBooks … One thing I found quite personally liberating as a workshop facilitator was the open-mindedness of the participants when it came to using technology. I presume that this was due to their lack of ICT experience and thus their lack of preconceptions as to what ICT should look like in a school.

with different learning styles, abilities and personalities. It is very much in line with Howard Gardner's theory of multiple intelligences that we all possess at one level or another. This theory refers to 'a set of human computational capacities – humans have the ability to "compute" language, numbers, social and spatial relations, etc.' (Gardner, 2004). SIAB provides greater opportunities for students to express themselves both within and outside the narrow confines of the classroom. Gardner posits that the onus is on every teacher to 'find a student's favoured way of knowing' and that individuals should be given the 'opportunity to exhibit their understandings by means of media and representations that make sense to them' (ibid.). The iPad can be customised with apps that support the IBL approach.

Interactive digitised content and support

SIAB does not replace existing local paper-based learning content. Our approach focuses on producing an interactive digital version of this content that is cost-effective and increases productivity in the classroom. Interactive quizzes built into content provide ideal support for teachers who can navigate seamlessly between subjects and subject matter using the intuitive iPad interface.

iPad native apps such as iMovie and GarageBand can be used by teachers and students to develop and create locally driven content and curricula. The built-in video and still cameras can be used to produce endless teaching and learning resources and exploit the power of digital storytelling. iBooks Author is a book publishing tool that is used by SIAB developers to create interactive content. Customised iBooks Author widgets can be developed to add to six existing widgets that allow the following to be embedded into an iBook: custom sliding puzzles, interactive timeline images, YouTube and Vimeo video clips, Google Maps and live classroom polling. End users can download the iBooks Author app free from Apple's App Store.

SIAB benefits from the inherent security built into apps downloaded from the App Store, which protects against malware and viruses that could disrupt or interfere with the system. The lack

of IT infrastructure in rural schools in developing countries demands a system with minimal or no requirement for back up or help in an IT 'trouble shooting' context.

At the same time, while SIAB is an IADT initiative, it is able to tap into the full support of Apple's infrastructure on the ground. In Southern Africa, for example, Apple is represented by the Johannesburg-based Core Group, which sells and supports products through a network of resellers across the region. Central and Northern Africa is covered by MCI, which is headquartered in Paris but, like Core, has a network of regional representatives. SIAB has also partnered with BPI Telecom Ltd, Dublin, which is the largest distributor of digital products in Ireland with a global reach – providing complete distribution and logistics solutions.

Conclusion

SIAB is an innovative, cost-effective and sustainable solar-powered solution that can transform rural classrooms in developing regions across the globe. It is a student-centred paradigm shift away from static, primitive, teacher-centred learning spaces that currently exist in many developing countries. This shift in emphasis encourages constructivist, interactive and collaborative learning that is in line with modern, progressive pedagogic systems. This progression should have the effect of levelling the playing field for all learners to increase opportunities for emerging economies in a fairer and more equitable way.

References

Gardner, H. (2004). 'Frequently Asked Questions: Multiple intelligences and related topics'. Available at: http://www.howardgardner.com/FAQ/FREQUENTLY%20ASKED%20QUESTIONS%20Updated%20March%2009.pdf (accessed 6 August 2011).

IICD (International Institute for Communication and Development) (2007). 'People – ICT – Development'. Available at: http://www.iicd.org/files/icts-for-education.pdf (accessed 4 August 2011).

James, J. (2010). 'New Technologies in Developing Countries: A critique of the one-laptop-per-child program'. *Social Science Computer Review*, 28(3): 381–90.

Philip Penny is Lead Researcher on School in a Box. He has an MSc in Cyberpsychology and a BSc in Psychology Applied to Information Technology from IADT. He currently works in the Development Office in IADT as a full-time researcher. He has worked on a number of European Commission-funded projects for IADT and has conducted evaluations of several EU projects. For more information about SIAB, see www.iadtschoolinabox.com

Ciarán McCormack is Creative Manager of School in a Box. He has a BA Hons Degree in Film and Television from the National Film School at the IADT, Ireland, and a Masters in Education specialising in Digital Learning from Dublin City University, graduating with honours. In 2000, he launched Magic Inc Productions, a digital media company that designed, created and broadcast corporate content for leading Irish companies. Subsequently in 2003 he became Creative Director of the FÍS (Film in Schools) Project, where his key role is to develop innovative digital media projects for a pan-European audience.

National Commission for Mass Literacy, Adult and Non-Formal Education

Ensuring rapid eradication of illiteracy across the country

Established in 1990, the National Commission for Mass Literacy, Adult and Non-Formal Education works with other national bodies to eliminate illiteracy in Nigeria. It works closely with the National Mass Literacy Campaign designing strategies and programmes, and monitoring and co-ordinating activities to ensure a rapid eradication of illiteracy across the country.

The Commission organises professional training courses for senior educational staff and staff from government and non-governmental organisations, and annual conferences for heads of adult education in state ministries and higher learning institutions. It also develops teaching materials suitable for distance-learning programmes; conducts research in various areas of education development such as teaching methods, the curriculum and needs assessments; and runs national and international training workshops and seminars for the promotion of mass literacy, and adult and non-formal education.

The Commission comprises a well-qualified part-time chairman; representatives from federal ministries and bodies such as education, health, the National Teachers Institute and the National Primary Education Commission; and representatives from adult education departments in higher education institutions. In addition, five people are individually selected who, in the opinion of the President, will contribute significantly to the work of the Commission. The chairman and other members of the Board are selected by the President on advice from the Minister.

Contact

Mr Alhaji Jibrin Paiko, Executive Secretary
Block A, Former Open University Building
Area 3, Garki, Abuja, Nigeria
Tel: +234 803 381 8232
Email: jibrinpaiko@yahoo.com