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PROJECT REPORT

Seeing, thinking and acting against malaria: a new approach to health worker training for community empowerment in rural Gambia

AJ Dawson¹, BM Joof²

¹*School of Indigenous Health Studies, University of Sydney, Australia*

²*Centre for Innovation against Malaria, Medical Research Council Laboratories, The Gambia*

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Dawson AJ, Joof BM

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ABSTRACT

Context: In the Gambia, West Africa, Malaria is a major cause of death among children in rural areas. It has been estimated that in one division in the country malaria accounts for 40% of all deaths in children aged between one and 4 years. Most malaria cases are managed at home assisted by primary healthcare workers. The strategic plan of Gambia's National Malaria Control Programme includes improved training and supervision of all health care providers, at all levels, and increased community awareness in order to reduce the malaria burden by 50% before 2007.

Issue: A malaria in-service training program for Community Health Nurses (CHNs) working at village level was piloted in 2004. The program includes a computer-based training (CBT) package, the first of its kind for health professionals in Gambia. The education program is part of a larger initiative funded by the Gates Malaria Partnership, that aims to increase community involvement in malaria control. The objective of the course is to enable CHNs to facilitate the change process. The curriculum was informed by a reference group and stakeholder input. Interviews and evaluation forms were used to gather information about learner experience and learning preferences.



Analysis: The CBT package was well received. Learners reported wanting more computer instruction, but felt they had gained confidence. There was resistance from other health professionals regarding the development of information technology skills in CHNs. This related to the perceived role and status of CHNs, as well as confidence in their ability. Some modifications of the CBT package were necessary, including the reworking of some activities and language.

Lessons learned: There are issues related to sustainability and resource implications that need to be addressed. Opportunities exist to expand e-learning in the Gambia for pre-service CHNs and other professionals. An investigation into the viability of reproducing this module as a generic planning tool for allied health workers and other extension workers at community level will be undertaken

Key words: community health nurses, computer based training developing contexts, health worker education and training.

Context

Malaria is endemic in The Gambia; it is a major public health issue which affects mostly children under five years¹. The disease is also responsible for loss of productivity among the adult population, school and workplace absenteeism and increased household expenditure on health. As a matter of urgency, the Department of State for Health has undertaken to reduce the burden of this disease through a number of strategies, including health worker training².

In 2001, The Centre for Innovation Against Malaria (CIAM), in Banjul, The Gambia, was established through funding from The Gates Malaria Partnership. In 2003, a proposal for funding of the Seeing Thinking and Acting Against Malaria Program was approved. The goal of this program is to empower communities in three divisions of the country to address malaria needs. This will be achieved by strengthening the participatory planning skills of CHNs in these divisions. A six week in-service training course was developed for this purpose.

CHNs form the front line of primary health care work in the Gambian public health system. They undertake two years training at the Community Health Nursing School and are then posted to village health circuits and health facilities across six divisions. The role of CHNs is essentially health promotion, although they also undertake basic clinical duties and supervise traditional birth attendants and village health workers. They are involved in disease reporting, research

and intervention measures. This diverse role means that CHNs are often overloaded in an already overstretched health service.

There is currently no structured comprehensive in-service training program for CHNs apart from one-off workshops, usually provided by non-government organizations. Prior to the CIAM program, computers were not part of CHN training and were not available at the School. Computers can be found at divisional health offices and are mainly used for data entry, report writing and email. Access to information and communication technology (ICT) can provide CHNs with opportunities to enhance their professional practice and their learning.

There is an urgent need to realise the benefits of ICT for health worker training in Africa. Computer resources are not generally accessed by rural health workers³. Internet users in the African health sector are estimated at less than 0.1% of the total user population on the continent. They are primarily located in urban centres, leaving rural-based health workers who serve over 75% of Africa's population without any meaningful access⁴. The Gambian situation is no different. Studies have shown that CBT can be equally effective as and potentially more cost-effective than traditional health worker training⁵⁻⁷. A survey among health workers in East Africa identified a need for access to basic training material (especially for rural health workers), and access to ICT. They also identified a need for access to information with relevant local content and language⁸.



Issue

Project

A six week in-service training course was developed by CIAM and guided by a reference group and key stakeholders. For logistical reasons, it was decided that the curriculum be piloted with 17 second year, pre-service CHNs. Interviews were undertaken to determine the learning preferences of these CHNs. Ethical clearance for these interviews was provided by the joint Gambian Government and Medical Research Council Ethics committee.

The structure of the training course involved a two-week class-based period facilitated by three teachers at the CHN School, followed by a four week community-based attachment, under the supervision of five senior CHN tutors. In class, students focused on improving their knowledge of the socio-economic and epidemiological burden of malaria, the national malaria control strategies and developing skills in situational analysis and planning. In the field, students were required to demonstrate their commitment to the participatory planning process and ability to network.

The decision to incorporate a CBT course was based on pedagogical reasons, as well as identified student need. In interviews prior to the training course, most students indicated that they would like to have computers in their program. Some felt that computers would assist them to improve their knowledge, stating that they can be used to write up notes from class discussion, stored and then printed for revision. Computers were also seen as a tool for making more efficient use of time. Computers, as one student put it, "will remove the time we spend in classes". One student referred to the possibilities that computers allowed for flexible learning and several indicated that the computer was an essential tool on a par with their mobile phones, motor bikes and note books in the field.

This package aims to use the features of ICT to enhance and support learning, as well as build IT skills and confidence. It

would also enable the course content to be presented and reinforced in a novel way which is important for retention and motivation. Throughout the package, learners are engaged in various activities that are part of the action planning cycle. A large number of resources are available including: key malaria policy documents, information on malaria epidemiology, treatment and diagnosis and vector biology. The graphical interface was developed using macromedia and a computer lab was established with 11 networked PCs and a printer at the CHN School. The CD can be obtained from: <http://www3.fhs.usyd.edu.au/yg/links/staff/profiles/dawson.htm> (Accessed 10 September 2005).

The CDROM format was selected for portability. It was anticipated that CHNs could continue to use the CD after the course for reference, using the divisional health facility computer without being reliant on poor internet access. A CD format can also be copied and easily distributed. The package was designed so content could be modified and the instructional sequencing changed.

An advantage of computer based learning is the ability to present information in visual and textual formats, as well as provide learners with the choice of a highly structured, or an all-inclusive learning environment. Accommodating the instructional preferences of learners has been shown to have positive effects⁹. Research has demonstrated that students who experience teaching strategies that match their learning processes achieve better test results¹⁰. Specifically, the matching of the mode of presentation and the instructional material can improve learner performance in terms of faster and more accurate completion of tasks^{11,12}. Motivational issues may also be important in the sense that a preference for a particular method or medium may positively influence the learner's motivation. Sadler-Smith and Riding present the argument, that it may be useful to accommodate learners' preferences in order to address motivational issues, as well as learner performance¹³.

The CBT package was designed in order to incorporate the findings from this research. The content and instruction is presented according to the wholist-analytic and the verbal-



imagery style dimensions¹⁴. A short exercise at the beginning of the package helps students to select one of the four routes through the instruction. The wholist route allows students to navigate through the CD in any order; analysts must proceed in a logical predetermined way. In the imager route, the baobab tree appears as a metaphor for participatory planning, whereas the verbalizers' screens are highly text based. The activities are also rendered in different ways. Crosswords and questions based on the scripts of village meetings appear in the verbalizer route, whereas drag and drop pictures activities and questions based on drawings of people with speech bubbles are presented in the imager route.

Analysis

The CBT package was discussed at the one-week pre-course training workshop for teachers, supervisors and divisional health team members. Most saw computer training as valuable, but many raised the issue of access in the field. Some felt that CHNs should have access to the computers at every divisional health facility; this, they said, would assist with planning and reporting tasks. Others felt that CHNs should not have access to these computers, arguing that, if these machines were used for more than just data entry by clerks, information maybe lost and systems corrupted. A debate rose concerning the capacity of CHNs to use computers and whether this was actually part of their designated role. As a result, some saw computer training as counter productive. However, several participants felt that access was available at schools, internet cafes and NGOs. They said that IT skills were useful and CHNs, like all health professionals, have to be 'resourceful in resource poor settings'. One suggestion was that information literacy should be assessed in the same way as English proficiency and basic levels should be set for entry into the CHN pre-service course. This would enable CHNs to develop high-level skills.

In the interviews most student CHNs reported being nervous at the start but 'gradually got used to it'. All participants indicated that they were pleased to develop computer skills and would feel confident to use a computer at the divisional

health office, or go to an internet café. The content was regarded as relevant to their course, particularly as they were all about to go on field placements in the community. Several students commented on the useful and immediate feedback the package provided. 'The good thing for me was seeing the pictures and finding out the answers'.

One respondent noted that 'the screens were sequenced, everything was programmed'. Another student said that 'you move step by step, from one place to another ... It will direct you through'. There was some confusion over the multiple response questions. One student reported never having seen this type of question before. Participants also had difficulty understanding some words.

The package, according to one student, 'is a very quick learning process'. As well as learning faster, he also referred to the time it takes to copy everything from the blackboard as compared to the ease of reading something on the screen and printing it out quickly. Another stated that it was easy because everything was already on the CD. She did not have to ask others for notes or clarification. This independent approach was mentioned by many participants. They also liked the self-contained nature of the package. Changes were made to the design and content of the package based on the feedback received from the CHN students. Extra instructions were provided for the multiple response questions and the font changed. Difficult words were removed or simplified. The links to PDFs were improved so they loaded more quickly. In the future, a glossary may be useful.

The IT officer and training coordinator indicated that the CHNs enjoyed the computer sessions and were highly motivated. Students quickly learnt how to navigate with the mouse and how to execute commands such as opening PDFs, selecting answers, and dragging and dropping boxes. The average time taken to complete the package was two hours and seven minutes. This was faster than the anticipated four hours. It was noted that learners had problems with the crossword exercise instructions and had difficulties with the multiple response questions. The need for a book-marking



facility was raised, so that students could start at the last page they accessed in the previous session.

Course evaluations received from 15 of the 17 CHNs indicated that the majority ($n = 11$) *strongly* agreed that the CBT package was helpful. The remaining four agreed it was helpful. When asked what was most valuable about the course, the computer component was mentioned nine times. There were a number of suggestions for improving the CBT package. Most of these focused on the need to allocate more time and one participant recommended that computer training be held on a regular basis. Participants recommended that in-service CHNs undertake this course.

Lessons learned

This project has demonstrated that CHNs valued and enjoyed the computer-based training for malaria in-service education. They noted that the timing of the course was pertinent and that the CBT package enabled efficient, appropriately paced independent learning. It appears that accommodating a range of instructional preferences and allowing users to choose the one that suits them is a useful design approach.

The pilot with pre-service CHNs has shown the need for CBT in the CHN curriculum, as well as for in-service CHNs. This is in line with Unwin's call for the introduction of ICTs to support both environments, due to a past focus on in-service training in Africa, as well as resource issues¹⁵. Nevertheless, structured in-service training in Africa is needed and is a necessary part of re-registration¹⁶. This project has also highlighted the need to work closely with other health professionals at divisional level, so that access to computers can be negotiated and concerns addressed.

The main issue for this project is the question of sustainability. What will the CHNs do with their new IT skills when access is poor? The danger is that these skills will not be continuously used and updated. Certainly, this will be the case for some CHNs. However, in a country where computer and internet access is steadily growing, the

authors see a greater demand for IT skills. IT training is already being provided for other health professionals in the Gambia. The School of Public Health and School of Nursing have new computer laboratories funded through World Bank and African Development Bank initiatives.

The ongoing maintenance and use of the new computer lab at the CHN School is also important. The project has raised the need for a business plan. This is now being developed to generate income using the lab in non-teaching times to fund the IT position and pay for repairs and new equipment. Incentives will most likely be necessary to ensure a demand for this course among busy in-service CHNs. The use of CBT in flexible off campus modes could be explored for these learners. CIAM has also been negotiating with the Department of State for Health in order to have this course accredited and linked to salary and promotion possibilities. It is hoped that the in-service training unit will coordinate the course when it has been revised following the pilot.

As well as developing a pre-service course and polishing the in-service curriculum, there has been some interest in adapting the CHN course as a generic training module for other rural professionals. This will mean that computer skills would be included in the continuing professional development of multidisciplinary functional teams who work at village level and include community development workers and agricultural officers. This would help to contribute to a growing IT-literate body of health professionals and allied health workers, which would undoubtedly lead to a greater demand for computer facilities and internet in rural areas. The next challenge will be developing reliable internet access and creating opportunities for distributed learning using ICT.

References

1. WHO-AFRO. *Desk top Analysis of Malaria in The Gambia*. Banjul: WHO-AFRO; 2000.



2. Department of State for Health and Social Welfare. *Strategic Plan of Action National Malaria Control Programme The Gambia 2002-2007*. Banjul: DoSH; 2004.
3. Wellcome Trust. *Evaluation of the Wellcome Trust Topics in International Health (TIH) CD-ROMS. Report*. London: The Wellcome Trust; 2001.
4. Bukachi F. *Making health workers in Africa part of the global information society: achievements and lessons learned in the last decade*. Oxford: International Network for the Availability of Scientific Publications, 2004.
5. Tavrow PA, Rukyalekere K, Maganda A, Ndeezi G, Sebina-Zziwa A, Knebel E. *A Comparison of computer-based and standard training in the integrated management of childhood illness in Uganda*. Bethesda, MD: US Agency for International Development (USAID) Quality Assurance (QA) Project, 2002.
6. Knebel E. *The use and effect of computer based training in Health Care: What do we know?* Bethesda, MD: US Agency for International Development (USAID) Quality Assurance Project (QAP), Center for Human Services, University Research Co, LLC, 2000.
7. Vivekananda-Schmidt P, Hassell AB, McLean M. The evaluation of multimedia learning packages in the education of health professionals: experience of a musculoskeletal examination package. *Nurse Researcher Using statistics* 2004; **11**: 43-55.
8. Ntiro S, Mrema J. *ICTs and continuing medical education in East and Southern Africa*. Arusha: CEDHA, IICD & Cordaid, 2003.
9. Boles WW, Pillay, H. Matching cognitive styles to computer-based instruction: an approach for enhanced learning in electrical engineering. *European Journal of Engineering Education* 1999; **24**: 371-384.
10. Pask G. *Conversation, cognition and learning a cybernetic theory and methodology*. Amsterdam: Elsevier, 1975.
11. Riding R, Douglas G. The effect of cognitive styles and mode of presentation on learning performance. *British Journal of Educational Psychology* 1993; **63**: 297-307.
12. Riding R, Sadler-Smith, E. Type of instructional material, cognitive style and learning performance. *Educational Studies* 1992; **18**: 323-339.
13. Sadler-Smith E, Riding, R. Cognitive style and instructional preferences. *Instructional Science An International Journal of Learning and Cognition* 1999; **25**: 355-371.
14. Riding R, Cheema I. Cognitive styles - an overview and integration. *Educational Psychology* 1991; **11**: 193-215.
15. Unwin T. Towards a framework for the use of ICT in teacher training in Africa. *Open learning* 2005; **20**: 113-129.
16. Muula AS, Misiri H, Chimalizeni Y, Mpando D, Phiri C, Nyaka A. Access to continued professional education among health workers in Blantyre, Malawi. *African Health Sciences* 2004; **4**: 182.