

Large Class Teaching in Uganda: Implications for E-Learning

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Abstract

This paper draws on findings of a study within the framework of the Africa-Asia University Dialogue for Basic Education Development (A-A Dialogue) project that explores the impact of university-ministry-school partnership on the quality of basic education provision. It draws on research undertaken in 20 primary schools in Uganda with the purpose of identifying practical suggestions and examples of good practice in the teaching of large classes. Findings of the study indicated that Ugandan primary teachers had devised strategies to cope with the large classes, including team teaching, active whole-class teaching, group work, and school-based professional development. However, it was discovered that these needed further development if they were to lead to life-long learning accessible to all learners. The paper thus examines how a new E-Learning and Teacher Education (ELATE) project being undertaken jointly by Makerere University School of Education and the Open University with support from the British Council can be used to bridge the gap in large class teaching. The ELATE project that involves creating web and CD-ROM based e-learning materials does not only have the potential to improve teachers' existing strategies using Information and Communication Technology (ICT) but will also act as the channel for dissemination of good practice to the wider teaching and learning community.

Introduction

Uganda as a partner of the Education for All (EFA) coalition launched Universal Primary Education (UPE) in 1997. This resulted into the increase of primary school enrolment figures from 2.7 million pupils in 1996 to 5.3 million in 1997, and to 7.1 million in 2005 (MoE&S, 2005). Even though this was followed by a drastic increase in the number of teachers and classrooms, the current official average pupil-to-teacher ratio is 51:1. The reality, however, is that in many classrooms in various schools across the country, there are over 70 pupils in one classroom (Nakabugo et al. 2007). Such a figure is starkly far higher than what has come to be defined as large classes in various contexts: ranging between 25-30 learners in the United Kingdom (Smith and Warburton, 1997), more than 35 learners in the US (O'Sullivan, 2006), and 60 or more learners in developing countries (Valérien, 1991; Michaelowa, 2001).

Over the years, thorough research has been done to bring in focus the reasons why smaller classes may lead to improved students outcome than large classes. Reasons such as easier and regular discussions with students, timely and frequent feedback to students, and active problem solving have been pointed out (Bennett, 1996; Billington, 1997, Davies, 2000; Gibbs *et al.*, 1997; Race, 1998). On the other hand, research has also found that smaller classes are more effective not simply because they are smaller, but because they often offer an educational setting in which it is easier and more feasible for active learning to take place. Simply reducing the number of students in a class does not alone improve the quality of instruction, neither does increasing class size lead to poor education (Johnson 1998; Lockheed and Verspoor, 1991; Maged 1997; Nakabugo 2003). Indeed there is a body of knowledge arguing that it is not the class size that has the greatest influence on teaching and learning. What matters most is the quality of the teacher and his/her approach to teaching, specifically the capacity to create a culture for organising large classes in such a manner that learning can be successfully mediated.

In order to comprehend better the processes which might be involved in the teaching of large classes, a small study was conducted of the strategies employed by mathematics and English teachers of lower primary in Uganda. The findings of the study pose fundamental issues of how teacher training, both pre-service and in-service can be adapted to the actual realities of classrooms, and the implications for e-learning.

Methodology

Data was generated from interviews and lesson observations of 35 teachers (31 females and 4 males), distributed in 20 primary schools. All the 35 teachers were professionally trained: two bachelors' degree holders, seventeen diploma holders and sixteen Grade III certificate holders. The Grade Three Certificate of Education is currently the lowest qualification in Teacher Education in Uganda, being awarded to students who begin teacher training after Ordinary Level (Senior Four). Seventeen teachers taught English while eighteen were mathematics teachers. Apart from two teachers in one school who had a class of 61 learners (their class of 122 children had been streamed prior to commencement of the study), the rest of the teachers taught classes ranging between 70-80 learners (one teacher); 81-90 learners (five teachers); 91-100 learners (seven teachers); 101-110 learners (9 teachers); 111-120 (6 teachers) and 121-130 learners (five teachers). The majority of the teachers taught in schools that were either located in the urban (twelve teachers) or peri-urban (sixteen teachers). Only 7 teachers (taught in schools located in rural areas. Due to rural-urban migration, urban and semi-urban schools in Uganda have tended to have an influx of children compared to their rural counterparts.

Interviews with the teachers focused on probing their experiences of teaching large classes, and how they went about teaching them. The teachers' lessons were observed and analysed using a structured lesson observation template that enabled the capturing of information on the teacher's type of teaching, how s/he managed the classroom, what type of resources were used in the teaching and how, the prevailing classroom atmosphere, and learner participation and engagement in the lesson. Data was analysed using the constant comparative method (Glaser and Strauss 1967) that involves a continual process of comparing pieces of data and identifying similarities and differences between them for generating patterns or categories from the data. Comparisons were made across the teachers being studied and across the different types of data collection instruments. For example, data from lesson observations was used to establish congruence and/or contraction in what the teachers said they did while they taught large classes.

Findings

It was established that different teachers in different contexts had developed strategies to cope with the large classes and "promote" learning. Some of the strategies were institutional while others were particular to individual teachers. Some strategies had great potential to enhance learning if well developed and others were of minimal pedagogical merit. This paper focuses on the strategies that could be developed for optimal learning. These included group work, team teaching, attracting children's attention and school-based professional development.

Teachers reported employing group work to enhance learning in their large classes. In fact some kind of group work was seen in thirty one of the one hundred observed lessons (31%). Much of the group work was employed to ease work management, for example, sharing the limited resources such as text books and other instructional materials. In some classrooms where the desks had been pre-arranged to aid a group work atmosphere, the strategy helped teacher movement and classroom control because of the corridors that had been left in-between the various groups. In such a situation, it was possible for the teacher to monitor and supervise children in the different groups, especially to control voice levels. What was noted, however, was that little, if any, discussion went on among the group members. In most cases children attempted the work individually within the group without any sharing or discussion. In some cases, even if the children had been required to discuss and produce a group product, the more able child within the group ended up doing the work alone while the rest of the children watched. It was apparent from the lessons

observed that such a strategy needed to be developed further if the teachers were to tap its great potential to promote learning. Group work, if well arranged, and if centered on a well focused learning activity can enable all children in their small groups to engage with the task at hand, share their views, and learn from one another.

Some teachers reported engaging in team teaching and/or co-teaching to manage their large classes. It was an arrangement in all the schools visited that each classroom had two teachers, who were supposed to assist each other in each lesson. In seventeen of the observed lessons (17%), presence of a co-teacher was noticed. The co-teachers in some instances assisted with keeping order and discipline in the class, by moving around and ensuring that no child talked or disrupted the ongoing lesson. They also helped in the distribution of materials and marking classroom exercises. In many other instances, the co-teacher just stood or sat quietly at the back of the class till the end of the lesson. Team and/or co-teaching is another strategy that this research feels needs developing further so that teachers go beyond merely using it to enforce discipline and manage work in the classroom, to viewing it as a potential strategy of enriching teaching and learning. The co-teachers can, for example, plan, teach and reflect on lessons taught together. They can also use it as a means of strengthening group work in the classroom whereby each of the teachers would be in charge of guiding specific groups. It is also a strategy that can ease the difficulty of one teacher reaching out to the weak and/or slow learners.

It was mentioned by some teachers that they managed to promote learning in their large classes by being enthusiastic and attracting children's attention through story telling, singing and question and answer. Lesson observations in fact also revealed, consistent with O'Sullivan (2006)'s findings that several teachers possessed generic teaching skills, and managed to keep their classes warm and alive in general. Such an approach would be a catalyst for promoting active learning in Uganda's large classes. Teachers can strengthen this by engaging with suggested strategies in the literature such as those developed by the Schreyer Institute for Teaching Excellence (1992) including: writing the lesson outline and objectives on the board or transparency, giving a think break and designing a lesson around a problem-solving activity. Out of the one hundred lessons observed, it was only in 4 lessons that some kind of problem-solving was noticed. Otherwise the rest of the lessons were built on factual and rote activities. In none of the observed lessons did the teachers clarify the lesson objectives to the learners. Yet as Clarke (2001: 13) asserts, "with a clear learning intention/objective children are also clear about what they are really supposed to be learning". In this way, both the teacher and the pupils become focussed on the attainment of the intended learning.

One of the institutional strategies reported was staff development through seminars organised by the school administration. It was reported that teachers were trained in several teaching strategies at least twice a term, the most prominent strategies being group work and instructional materials development. It was not possible for the research team to participate in any of these seminars, but they were reported by the teachers and administrators as having built the capacity of the teachers in dealing with large classes. One reported major strength was in the area of instructional materials where teachers had minimized dependency on materials provided by the school, to the development and utilization of low-cost materials. Indeed in 37 of the lessons observed (37%), teachers were seen utilizing varied instructional materials including beads, toilet paper, fruits, cut-outs, charts, and so on as illustrations. All these materials were provided by the teachers, but in most cases they were not enough for the big classes. This notwithstanding, the few available materials assisted in enhancing children's understanding of the concepts being taught. Teachers would in future do better by working hand in hand with the children in the development and provision of materials to be used in a given lesson.

Implications of E-learning in Uganda's Large Classrooms

Whereas none of the teachers participating in the aforementioned research neither possessed nor used ICT as a means of managing and enhancing learning in their large classes, sooner or later Ugandan schools will have to join the globalised, online, knowledge economy. Already more computers are being installed in

teacher training institutions and in placement schools, as a result of such initiatives as UConnect (<http://www.uconnect.org/>) and SchoolNet (<http://www.schoolnetuganda.sc.ug/homepage.php>). It has, therefore, become imperative to develop this aspect of the teacher education curriculum and to promote models of good practice in the use of ICT in schools. Since the various ICT interventions have primarily targeted secondary schools, it would be ideal to develop the capacity of teachers at this level of education. Already the introduction of Universal Secondary Education (USE) this year 2007 has resulted into overflowing numbers of students in participating USE schools thus exerting pressure to the system in terms of meagre resources, infrastructure, teachers, classroom space, etc (The New Vision Tuesday, 15th May, 2007). It is apparent therefore that the introduction of USE in Uganda is creating a pressing need to train many teachers over a short time scale and to provide effective support to those teachers, already qualified, who have to teach subjects in which they have little or no training. At the same time the national market for textbooks and school resources is small so the number of locally written and orientated texts is small. There is therefore the need to evaluate current strategies adopted by secondary school teachers in Uganda to the challenge of large-group teaching in a low resource setting. As Uganda joins the ICT era, there is also need for identification and development of teacher strategies that can be enhanced by e-learning, and a means to instil the confidence which teachers would need to develop them in an independent way. As the preceding study conducted at the primary school level revealed, teachers devise their own strategies to cope with large classes, but they would need to be supported to develop them further in more meaningful ways.

Consequently the British Council funded project, "ELATE: E-Learning and Teacher Education", a collaboration between the Open University and Makerere University in Uganda (<http://www.ugandaschoolresources.org/>) is developing e-content, teaching strategies, classroom activities and teacher guidance across eight secondary subjects. The project explores how e-learning within teacher education might develop synergies which make a contribution to closing the gap in learning resource provision in secondary schools in Uganda. It specifically aims to i) develop an e-Learning programme to support trainee and practicing teachers ii) create web and CD-ROM based materials to support secondary teachers in: mathematics, physics, chemistry, biology, English, geography, history and information technology iii) train the trainees to disseminate the materials and new practices among teachers during their school practice and iv) produce an action research programme and research outputs to inform the future development of e-learning, especially in large classes where resources are limited.

ELATE is being implemented in a context in which there are relatively few schools with computers, many schools have no reliable electricity, Internet download speeds are low and class sizes are large. Nevertheless, the need for training the new generation of teachers in e-learning cannot be overemphasised. There are opportunities available for the use of e-learning in schools manifested in the number of teachers having access to computers in their homes and Internet cafes, the several hundred schools who already have computers and the many more schools that will in future possess computers.

What E-learning Skills do the Teachers Require?

The starting point would be to define for ourselves what e-learning really means. Most often e-learning has been defined as a wide set of applications and processes such as web-based learning, computer-based learning, virtual classrooms, and digital collaboration that includes the delivery of content via Internet, intra/extranet, audio- and videotape, satellite broadcast, interactive TV, CD-ROM, etc. (Kaplan-Leiserson 2000). The shortcoming of such a definition is that it might prompt teachers and teacher educators to focus more on technology and content resources, than on the ways in which these might support learning.

Defined differently, e-learning would mean using Information Communication Technologies (ICT) as mediating devices that allow students to access learning resources that inform them of new ideas, which they can then reflect upon and integrate into their existing knowledge (Littlejohn 2007). Such a definition situates e-learning within the social constructivist understanding of learning, i.e., the active, goal-directed construction of meaning (Palincsar and Brown, 1984), as apposed to the mere transmission of knowledge

from the teacher to the learner. Whether we are engaged in conventional forms of learning and teaching (e.g. face-to-face discussion, whole-class teaching, group work...) or in computer-assisted learning, we need to consider what students do in order to learn (the process) and what results from that (the outcome).

It is generally accepted in educational circles that students learn best when they are actively engaged in the learning task. This view is not only applicable to conventional classrooms; it is equally relevant to virtual classrooms and e-learning situations. Students should not be mere recipients of electronic information from teachers. They should actively engage with information for optimal learning.

There has been a misconceived belief in various circles in the power of ICT / e-learning. It is believed that "teaching problems will disappear as we join the globalised, online, knowledge economy" (Biggs 2003, p. 213). But as Biggs (2003) goes ahead to caution, educators should desist from conceiving e-learning as the mere presentation of more and more information as such a view reinforces the idea that presenting and accessing information is what teaching and learning is all about. While information management is obviously crucial in facilitating teaching and learning, but in teaching itself, we should refrain from limiting ourselves just to the information-handling facility of electronic technology.

In this regard, the conceptualisation model of Mayes (1995) (Table 1) offers useful tips for the effective utilisation of e-learning in teaching and learning. His model is based on the premise that learning is achieved through giving students opportunities to perform meaningful tasks. Accordingly, therefore, the model he posits takes into account learning processes at three interrelated stages: primary, secondary and tertiary. At the primary stage information is disseminated via learning resources such as notes, articles, video, etc. being placed on the website or online library. The secondary level involves information usage whereby the students perform a task such as in a shared workplace to help them understand a concept. The third and final stage involves two-way dialogue and feedback including dialogue of students with tutors or peers and interactive systems such as discussion fora, online chat, video-conferencing, etc.

Most often, e-learning in schools and colleges has been restricted to Mayes' primary level: distribution of learning resources using the computer. The resources are hardly directly linked to learning tasks, and there is minimal feedback, if any. For example, a study of the use of e-learning in undergraduate courses in the UK established that both tutor and students viewed e-learning as a channel for the delivery of digital content resources (Britain and Liber, 2004).

Table 1 Mayes' E-Learning Conceptualisation Cycle

Stage	Characteristics	E-tools to support this stage
Primary stage: Information dissemination	Information disseminated via learning resources (notes, articles, animations, video, etc.)	Online library Digital repository
Secondary stage: Learning activity	Information usage: students performing a task to help them understand a concept	Shared workplace E-portfolio
Tertiary stage: Dialogue and feedback	Dialogue and feedback: Two-way dialogue of students with tutors, peers or interactive systems	Discussion for a Blogs Online chat Videoconferencing Simulations and hyperworlds

Adapted from Mayes (1995)

The concepts of teacher as 'facilitator' or 'mediator' of learning should not only be restricted to face-to-face classroom environments. In Virtual Learning Environments (VLEs), the concepts manifest themselves in the teachers' capacity to design rich tasks that are capable of facilitating higher order thinking and learning. The

higher thinking skills should engage learners in explaining, relating, applying and theorising as opposed to the low level thinking skills of memorising, note-taking and utmost describing concepts (Biggs 2003).

Conclusion

As we move into embracing e-learning in Ugandan classrooms through the opportunities provided by projects such as ELATE, U-Connect and School-Net, one thing is for sure: E-learning will not improve ineffective teachers. As Russell (2001) emphasises, "there is good teaching and bad teaching and it has nothing to do with the technology". An academic or teacher who sees lecturing or note giving as the sole and best means of teaching, may not warm up to approaches mediated by technology (Holt and Segrave 2003). If e-learning is to contribute to enhancing learning in classrooms irrespective of class size, teachers need to possess the capacity and willingness to create meaningful learning activities in which children engage the higher cognitive levels.

Besides the mere use of ICT for information dissemination to learners (Mayes' primary stage), the role of technology in classroom environments should be expanded to include the roles suggested by Jonassen et al. (1999; p.13) viz.

- Technology as tools to support knowledge construction
- Technology as information vehicles for exploring knowledge to support learning-by-constructing.
- Technology as context to support learning-by-doing
- Technology as social medium to support learning by conversing
- Technology as intellectual partner to support learning-by-reflecting.

The approach of developing computer-aided learning activities being promoted by ELATE as in the bednet activity (See Annex I), have got the potential of engaging most, if not all, the roles being suggested above. The four levels engaged in the investigation of how effective bednets are in preventing malaria viz. the use of bednets, conducting a family survey, analysis of the results, and summary and evaluation involve some kind of knowledge construction, learning by doing, learning by conversing and learning by reflecting. And consistent with Mayes' 1995 conceptualisation cycle involving information dissemination, learning activity and dialogue and feedback, ELATE also undertakes to disseminate good practice in the teaching of large classes, but at the same time develop learning activities that will tap into the learners' higher cognitive levels. The bednet activity is one example of such engaging activities.

The teachers' own strategies of large class teaching such as those identified in the primary school research study (group work, team teaching and cultivating student's interest) could be applied in the context of children working on such meaningful and engaging activities, be it in conventional face-to-face or virtual learning environments. The school-based staff development strategy would then be used as a means of instilling the confidence with which teachers would need to develop the strategies in an independent way.

The ELATE project is premised on the belief that if we are to improve teaching and learning in large classes in primary and secondary schools through the use of ICT, reform has to start with teacher training institutions. Such institutions need to showcase good practice in e-learning. There are already ample examples of good practice in the literature from which we can draw (see for example those in Annex II, extracted from Biggs 2003). But as in the context of Harland and Kinder's concept of "value congruence" there is need for sensitivity in achieving an appropriate balance between e-delivery of "current good practice" and "perceived best practice" (Harland and Kinder 1997).

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ANNEX I: The Bednet Learning Activity

STUDENT INVESTIGATION

How effective are bed nets in preventing malaria?

Curriculum Context

This exercise may be used with O-level Biology students or as an example of how to use spreadsheets within Information Technology.

Part 1: The use of bed nets

Guidance on answers

1. What is a bed net? It is a fine mesh curtain that fits above a bed.
2. What is its use in fighting malaria? Bed nets prevent people from being bitten by mosquitoes, when they are sleeping.
3. What stage of the malaria life cycle does a bed net interrupt? Bed nets prevent the malaria parasite being passed from the insect host, the mosquito, to its human host.
4. Why is it important to dip the bed net in insecticide? The insecticide kills mosquitoes that come into contact with it and prevent them from going on to infect anyone else.
5. How must people use a bed net to prevent malaria? They must make sure that it is in good condition. There must be no tears or holes in the fabric, and it must be tucked into the sides of the mattress to ensure that mosquitoes cannot get in to bite the person sleeping.

Part 2: Conduct a Survey

The following survey has the advantage that most students will be able to complete it from their own knowledge of their families, so it can, in most cases, be completed in the classroom. Each student writes only about the immediately family group they are living with. However, a class of 50 may well produce data on over 200 individuals. So the completed data set will be a large sample.

One way to find out how effective bed nets are in preventing malaria is to conduct a survey. If we ask the same questions to many families we may be able to find out how well they work. For this survey you can fill in the information for your family and then combine the information with others in your class in order to carry out the investigation. You can either collate the results on paper or use a spreadsheet program on a computer.

Please answer the following questions for each member of your family group:

1. What is their family name? This could be replaced with a letter or left blank, if it is felt to be a sensitive question.
2. What is their personal name? This too could be replaced with a letter or left blank, if it is felt to be a sensitive question.
3. Are they male or female? Use the code 0 for female and 1 for male
4. What is their age? Enter the actual age if known.

5. Do they sleep under a bed net? Enter 1 for Yes and 0 for No.
6. Does the bed net keep out mosquitoes? Enter 1 for Yes and 0 for No.
7. Has the bed net been treated with insecticide in the last year? Enter 1 for Yes and 0 for No.
8. How many times has the person suffered from malaria in the past 12 months?
Enter the actual number of times (0, 1 or 2..)

Part 3: Analysis of the results

Either on paper

Combine the results for your class in a single table with the following headings:

Number	Family name	Personal name	Age	Sex 0=Female 1=Male	Do they sleep under a bed net? 0=No 1=Yes	Does the bed net keep out mosquitoes? 0=No 1=Yes	Has the bed net been treated with insecticide in the last 12 months? 0=No 1=Yes	Has this person had Malaria in the past 12 months? 0=No 1=Yes	How many times has the person suffered with malaria in the past 12 months?
1	Musoke		23	0	0			1	1
2	Musoke		12	1	1	1	0	1	2

If collating on paper, it would be useful to use a large sheet of paper. Students could work in groups to see if they can see any patterns (i.e. relationships between the occurrence of malaria and the data in the other columns).

Or use the Excel spreadsheet on a computer

Your teacher will explain what you need to do in this case.
See the sheet on analysing your data.

Part 4: Summary and Evaluation

1. Did you find any relationship between the use of bed nets and the occurrence of malaria? This could be done, for example, by comparing the proportions of people who have suffered from malaria according to whether or not they have used bed nets. You might also want to take account of the number of occurrences of malaria.
2. Was malaria related to: the age of the person, their gender, the condition of the bed net, whether it had been dipped in insecticide recently? Examining the link to age might lead to discussion of the growth of resistance as people get older. Differences between males and females may reflect differences in behaviours which influence biting or differences in attraction.
3. What other factors could affect the level of malaria infections? This encourages students to look at wider environmental factors such as proximity to standing water in the vicinity of people's homes. The general nutrition and health of people in an area, the quality of housing (including the use of mosquito screens) and the use of insecticide spraying within homes.

ANNEX II: Examples of good use of e-learning in large classes (Biggs 2003: 218-220)

1. A nice example is given of Mazur (1998) who kept the photographs of the 160 students in his physics class and in his address file. His concern was to give students regular feedback about small weekly learning tasks. The tasks were such that errors fell into few categories, say four or five, so that there were in essence only five generic emails to be sent, to groups of thirty or students. By clicking on the student's address, up would come the face to remind him whom he was talking to, and then he could tune the opening and the close to the individual.
2. Lap-top/desktop + data project use: particularly Power-P presentation. Biggs cautions that PowerPoint should be used sparingly as its excessive use reinforces the view that good teaching is a one-way transfer of information. After a display of a few slides, attempt should be made to engage in discussion and reflection.
3. Biggs quotes Battacharya (2002) who reports on a successful design where lectures video-taped by excellent teachers are circulated with supplementary readings, quizzes and assignments. These become stimulus material for small-group collaborative learning. The groups could stop the video any time to raise questions and share views.
4. Mazur (1998) further to his use of e-mail to give feedback, was adamant that he would not lecture on what the students could read more cost-effectively. Accordingly, he set readings that must be read before the class, and two or three simple questions had to be answered by the previous night, but e-mail: 'Please tell us what you found difficult and confusing. If you found nothing difficult or confusing, please tell us what you found most interesting.' He would then go through these emails the night before the class, and form a database of generic comments. Each student would then receive the appropriate comment, duly personalised. The students felt they were getting personal attention, despite the large class, and although it took more time than not giving students feedback, it took much less time than providing feedback by writing the same comments on the original scripts.

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