Full Length Research Paper

Teachers' changing roles in computer assisted roles in Kenyan secondary schools

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The use of computer technology in Kenyan schools is a relatively new approach that is currently being included in the school curriculum. The introduction of computer technology for use in teaching does not always seem to be accepted outright by most teachers. The purpose of the study reported in this paper was to investigate the teachers' changing roles in double entry lessons that involved the use of a computer-based instruction (CBI) program. A total of sixteen business education teachers taken from ten secondary schools situated in two provinces, Rift Valley and Western teaching double entry for a period of eight weeks. Two instruments, namely (i) the Teachers Interview Schedule (TIS) and (ii) the Classroom Observation Questionnaire (COQ) were used to collect the necessary data. Data was collected and analysed to help unravel what was actually happening as the teachers and the students interacted with the computer-based instruction program and/or instructional materials during double entry lessons implemented in real business education classrooms. Results indicate that the teachers developed better instructional practices as a result of augmenting double entry lessons with the CBI. Most teachers unanimously reported that their role changed from that of being an instructor to that of being a facilitator of the learning process. Although it was evident from a captured episode that amidst the presence of the computer most teachers preferred to do the job in the same way as the conventional methods without all the effort associated with organizing a technological classroom, data from classroom observation of teacher-student, student-student and student-teacher interactions recorded during the instructional process indicated that the teachers did not dominate in the CBI classrooms but gave learners opportunity to interact with each other and the instructional material. The results further showed that some of the unproductive activities and the state of confusion or silence often common in traditional classes where the role of the teacher is domination changed drastically. The use of CBI in this study proved that it has potential not only to change the teachers' roles but also to affect the students' learning in business education.

Key words: Innovation, Information technology, Interaction, Teacher Roles.

INTRODUCTION

An area of the age old instructional practice that emphasizes the use of voice and the blackboard is currently facing the greatest challenge from the computer-based instruction (CBI). Studies have seem not only to support the idea that the computer is machine that has the capability to motivate students to learn by reducing the teacher's verbal interaction in the classroom while encouraging learner participation, but also described it as the technology that is totally permeating the society

society and creating new conceptions, new forms of interpretation, new ways of instruction and new inputs into our lifestyles (Landsheere, 1991; Tanui, 2003). Perhaps this explains why recent studies show that use of the computer in the classroom is bringing in new roles into the instructional practice (Kiboss, 2000). While the use of CBI is prolific in most developed world schools, it is still a dilemma that poses great challenges to the majority of teachers with regards to their perception and the roles they should play as they cope with this emergent technology. Indeed, the introduction of CBI in Kenyan schools is nevertheless a challenge to the teachers who are battling with the issue of whether to accept the idea of

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students being given the opportunity to interact actively with the instructional material in the classroom (Kiboss, 2000; Papert, 1992). Therefore, this paper reports an investigation into the teachers' changing roles as a result of using the CBI in the teaching of double entry accounting in Kenyan secondary schools.

The teaching of double entry course is an area that is faced with the problem of poor performance and a dislike of the subject by students due to the inappropriate teaching methods often used by teachers (Tanui, 2003). Most of the instructional methods the teachers use in our classrooms are usually teacher-centered and hence give students fewer opportunities or roles to play in the classroom discourse (Kiboss, 2000; Tanui, 2003). Apparently, such situations tend not only to limit the students' active participation but follow the old communication/bullet theory that takes the learners as having empty heads who need the knowledge to be poured into them by the teacher. Recent approaches by cognitivists and constructivists suggest that learners be actively involved in the lesson process. However, the traditional approaches that are still prevalent in most of our classrooms have continued to succumb them to play passive roles.

The literature indicates that the impact of CBI on any environment is complex and difficult to predict in that it is as much about people as about processes or systems. As such, the success to integrate CBI into the teaching and learning process rests on the teachers'.

a).To accept and to embrace the new innovation,
b).Ability to make informed judgments about the suitability of CBI material to help them meet their particular teaching and learning goals,
c).Ability to draw on the CBI in their search for new approaches (Williams et al., 2000).

Although the use of the CBI may benefit the teaching of double entry and improve the students' performance that is reported to be poor, the teachers' response to CBI developments and ability to address (if not embrace) the use of CBI in the classroom will be influenced by the extent to which they themselves feel confident as users of the CBI. Studies indicate that an understanding of the potential the CBI to support the teachers' existing professional practice as well as those goals and aspirations needs to be examined during the initial stages in order to establish the needs the teachers express in relation to their views to moving forward with the CBI. Therefore, this report on the impact of the CBI on the teachers' perception of the use CBI and its challenge to their roles in the teaching of double entry is an attempt in this regard.

METHODOLOGY

The study was a comparative investigation of the teachers' changing roles in Business Education lessons both in the regular and the computer-assisted learning at various schools in Rift Valley and Western provinces. The sample involved 16 teachers from 10 schools (Rift Valley province 6 and Western province 4) that participated in the study.

Design

The study quasi-experimental in nature involved the use of observations, interviews with teachers and questionnaire to obtain the necessary information regarding the teachers' experience with the use of the CBI in the teaching of double entry accounting course in Business Education. The nature of the schools setting could not allow classes that have already been constituted to be reorganized for experimental purposes. So the study adopted the quasi-experimental pre-test and post-test research design. The teachers taught the same content of double entry course to both groups except for the teaching methods used (i.e., teachers in the control group used the regular method while those in the treatment group used the CBI mode).

Data collection and analysis procedures

All the participating teachers were interviewed using the Teacher Interview Schedule (TIS). The questions queried the participating teachers regarding their perception of their changing roles while using the CBI and views about the effectiveness of the CBI on the teaching and learning of the double entry course. The TIS consisted of four critical queries:

a. First item addressed their first reaction to the use of CBI.
b. Second and third items sought data on what they felt their role was and the implication of the new role.
c. Fourth and fifth items garnered data on the participants' perception of the relevance of the CBI to their course objectives and content and thought regarding the sequencing and organization of the CBI module.
d. Sixth and seventh items evaluated the teachers' perception of the impact of the CBI on their delivery of the course content and achievement of lesson objectives, and the strengths and/or weaknesses of CBI to foster or interfere with the students learning.

In effect, it was specifically used to capture the teachers' feeling about the changing roles in CBI lessons. In addition, the Classroom Observation Questionnaire (COQ) was also used to garner additional information. The COQ consisted of items used by the researcher to code and evaluate the teacher-student, student-student, student-teacher and student–machine interactions in relations to certain roles they play during the instructional lesson.

The data collected from TIS and COQ were tabulated and presented descriptively as percentages. Because the data collected using COQ were taken from both the treatment and regular classroom, the data were collated and presented comparatively to help uncover the differences between teaching double entry lessons using the regular method and with the new method.

FINDINGS AND DISCUSSION

Teachers' perception of the use of CBI program to teach double entry in school accounting

Results of interviewing several teachers using TIS revealed that most teachers viewed the computer as a machine that is helping the schools introduce computer studies to the students. It is also a machine that helps them set tests, and keep student records. The majority of

teachers did not find any connection between instruction and the new machine in the classroom. They observed that the classroom computer is used to introduce children to the computer technology by those teachers specialised in computer subject. For the teacher it is used for word processing to write letters, class notes, record marks and other services that fall under computer managed instructtion (CMI). Table 1 below are the findings of the teachers' reactions to individual statements:

First reaction of having a CBI lesson and feeling regarding the new role

Only 13% of the teachers reported that the CBI made them nervous while 12% felt confused at the start of the program compared to 25 and 12% who were excited and comfortable with it. A similar number of business education teachers (25%) first felt that their role was that of an instructor and co-learner. But a majority of them felt that their role was changing into that of facilitator of the learning process. Moreover, the result further reveal that 30% of the teachers felt threatened by the new role, 40% felt challenged while 30% of them felt comfortable with the new role. They also found it difficult to use because of its complexity.

Relevance of the CBI for classroom instruction

A small percentage of teachers (20%) perceived the CBI program to be unfit to the course objectives and content compared to 50% who perceived it to be appropriate. Also, a very low similar number (10% of each) of teachers perceived the sequence and organization of the CBI program to be disorganized and either congested or muddled up compared to a similar higher percentage (40% of each) who found it to be organized and clear.

Teachers' perception of the effectiveness of CBI on the delivery of course content and achievement of lesson objectives

The results revealed that the majority of teachers concur that the CBI was effective not only in the delivery of the content but also in the achievement of the lesson objecttives. For instance, 50% of the teachers reported that using the CBI made them take less time to cover the lessons compared to only 10% of those in the traditional classes who reported covering the content in less time. Moreover, a very high percentage of teachers reported that the use of CBI enabled them to:

a. Capture and maintain students' vision (80%).
b. Encourage peer tutoring and co-operation (80%).
c. Foster interactive learning rather than passive learning (80%).
d. Make students dependent on one another (85%).
e. Make students less dependent of the teacher (50%).

f. Improve students' communication skills (70%).
g. Improve student overall performance (90%).

These findings lend support to Underwood and Underwood (1994) finding of teachers in Britain and Canada who were engaged in the use of CBI. The teacher believed that the computer promised great things for the classroom interaction. They observed that the computer is a tool that can be used interactively to present lesson content in a novel way that is able to adapt to different learning and teaching styles. Therefore, it can be concluded here that teachers perceived the use of CBI appropriate to achieving the course objectives and content of Accounting.

Moreover, it is not gainsaying to say that despite the success observed in the CBI classes, some teachers still had doubts regarding the ability of the computer. Studies indicate that most teachers feel threatened by the computer because it forces them to organize their classrooms differently which reduces their control and makes their normal approach monitoring progress difficult to implement (Eraut, 1991; Wragg, 2000). Davies and Selwyn (1999), Olson (1992) and Kiboss (1997) also observed that teachers feel bereft of influence because they feel unable to monitor what goes on and are uncertain about their role about their proper role in the class. Their fear of loosing control or power in the classroom is probably what makes them behave negatively to the use of CBI in their classrooms. The new role of the computer and the teachers' allegiance to the traditions tend to increase their worry about the new technology (Kiboss, 2000; Tanui, 2003). The use of CBI to some teachers may imply new classroom environment where students discuss loudly. This may increase the teachers' anxiety about the use of CBI and so makes some of the teachers unwilling to even try to use the technology to supplement their classroom teaching. Nevertheless, the results captured through observation of classroom interactions between the teacher and learners during the instructional process show sharp contrasts in favor of those using the CBI.

Classroom interactions among the teachers and the students during the classroom discourse

Usually, the teacher occupies a central position in classroom interaction in that he/she often dominates classroom talks and questions asked while the learners sit and listen (Kiboss, 2000). Part of the purpose of the classroom observation investigation was to establish the classroom interactions that transpired during double entry lessons both in the CBI classrooms and the regular ones. This was captured using the Classroom Observation Questionnaire COQ. Results of this investigation are presented in Table 2.

A perusal of the findings shown in Table 2 indicates that there were more verbal interactions in the CBI class-

Table 1. Teacher reaction to perceptual statement.

Reaction of having your lesson in CBI	Percentage
Nervous	13%
Excited	25%
Confused	12%
Comfortable	42%
Feeling about role to play	
Instructor	25%
Co-learner	25%
Facilitator	50%
Feeling regarding the new role	
Threatened	30%
Challenged	40%
Comfortable	30%
Perception of the relevance of CBI to course objectives and content	
Unfit	20%
Appropriate	50%
Unclear	10%
Inappropriate	20%
Perception of the sequence and organisation of the CBI module	
Disorganised	10%
Congested/muddled up	10%
Organised	40%
Clear	40%
Perception of effectiveness CBI on delivery of the course content and lesson/course objectives	50%
	10%
Took less time to cover	80%
Able to cover large amount of content at one time	80%
Helped to capture and maintain student attention	85%
Encouraged peer tutoring and co-operation	80%
Made students dependent on one another	50%
Fostered interactive learning as opposed to passive learning	70%
Made students independent of the teacher	90%
Improved students' communication skills	
Improved student overall performance	
Perception of strengths/weakness of CBI to foster/interfere with students learning	82%
Cognitive demand on student was good	65%
Pictorial/visual apparatus appeared to be appropriate	80%
Size of the screen proved to be convenient for group study	69%
Letter legibility created good learning environment	

classroom (20%) than in the regular one (8%). This is not unrelated to the changing role of the teacher from that of an instructor to that of a facilitator (see Table 1). The higher verbal interactions among students and the teacher ranged as follows:

a). Responding to questions (15% compared to only 7% of those in the regular classroom).

b). Asking for direction (13% in CBI classes compared to 8% in the regular classes).

c). Initiate talks (8% in the CBI program compared to only 3% in the regular classes).

d). Engaging in individualistic activities (8% in the CBI classroom compared to 15% in the regular program).

e).Silence or confusion (4% in the CBI program compared to 20% in the regular classroom).

Table 2. Comparison of interaction in the CBI and regular classes.

Variable	CBI	Regular
Verbal interaction in classroom	20	8
	15	7
Responds to questions	13	8
Ask for direction	8	3
Initiate talks	8	15
Individualistic activities	4	20
Silence or confusion	5	9
Writes notes	10	6
Cooperation	8	15
9. Non productive activities		

f).Writes notes (5% for the CBI classroom compared to 9% in the regular program).

g). Cooperation (10 and 6% for the CBI and regular groups respectively).

h). Non-productive activities (8 and 15% respectively for the CBI and the regular classrooms.

Hertz-Lazarowitz (1995) observes that verbalization forces cognitive restructuring and reprocessing of information through rehearsal and practice of relevant information and skills resulting in higher quality understanding. An environment that gives opportunity for students to discuss, argue and present their own ideas and hear one another ensures better learning (Sewel, 1991; Crawford, 1999, 2000). The high percentage categories of healthy interactions that are known to empower learners were quite evident in the experimental classes in respect to the students-student interaction and student–machine interaction. In the control group teachers to still monopolize the classroom interactions while the students seem to either be in a state of silence and confusion or engaged in non-productive activities.

These results agree with earlier findings by Woerner et al. (1991) that only 1% of the teachers in science classes invite open responses from learners. Recent studies by Kiboss (2000) found high verbal interaction enabled students to perform better and to develop on psycho-social skills with students using the CBI to learn measurement in school physics. He observed that CBI students did not just sit by the computer and absorb information relayed by the screen but engaged themselves in serious intellectual debates and negotiations of meaning.

Impact of the CBI on the teachers' status Quo

According to Lazarowitz (1995), a classroom is a complex social and academic system with some components that tend to affect learning. It is for this reason that data were collected from interviews of teachers both in the CBI classes and those in the regular ones. A majority of teachers asked how they felt about their new roles in the

CBI class. The study found that amidst the presence of the computer most teachers preferred to do the job in the same way as the conventional methods without all the effort associated with organizing a technological classroom. This was quite evident from one interview with a teacher in experimental situation carried in the following excerpt that explains the fear of the teachers:

o Researcher: How was the accounting class using CBI program?
o Teacher: The CBI was very good… the software was wonderful.
o Researcher: How did you use the package?
o Teacher: The computer program was used after a series of lectures to reinforce prior learning
o Researcher: Why could you not use it first to help students conceptualize the double entry concepts?

Teacher: I could not afford the time. My students could not understand the topic. Most students would not be interested in spending the time learning such skills and those skills would not be important to the great majority of students in my class. I have to complete the syllabus.

A similar study by Underwood and Underwood (1994) found most teachers perceived the introduction of the computer to imply a change of their style of teaching; a change in timetabling and the rearrangement of the furniture. These issues tend to make teachers to develop evasive tendencies in the classroom and sometimes could result in eventual refusal to use the computer with the claim that it will waste the students' time and may lead to non-completion of the syllabus ready for examination when the time comes (Kiboss, 2000; Tanui, 2003). But with time, these seem to disappear when the teachers find it beneficial to them (Hudson, 1999; Kiboss, 2000)

Conclusion and implications for teaching

The findings of this study have shown that teachers perception of the use of CBI do not just imply changing roles and style of teaching for the teachers but also better learning and social skills for the students (Hudson, 1997, 1999). There is evidence to this also in the literature to the effect that despite the negative perception observed in the use of CBI in schools, the technology has potential for classroom instruction because the teacher is able to prepare worthy lessons with adequate class activities and learning aids (Kiboss, 2000). This has major implication for the whole-school policy for the integration of the CBI in the school curriculum. From the data collected, there is a general consensus that the use of CBI in teaching double entry in school accounting benefited in that it empowered the learners not only to socialize but also to learn the subject. This and other earlier studies will no doubt give a head start to the country's recent effort to integrate IT in the school curriculum (Republic of Kenya,

1999).

REFERENCES

Crawford R (2000). Information technology in secondary schools and its impact on training information technology for teachers. J. Inf. Technol. Teach. Educ., 9(2): 183-198.

Crawford R (1999). Teaching and learning IT in secondary schools: Towards a new pedagogy? J. Educ. Inf. Technol., 4: 49-63.

Eraut M (1991). Education and the information society: A challenge for European policy. London: Cassel Educational Limited.

Hertz-Lazarowitz R (1995). Understanding interactive behaviors: Looking at six mirrors of the classroom. In R. Hertz-Lazarowitz Miller N. (Eds), Interaction in cooperative learning: The theoretical anatomy of group learning. Cambridge: Cambridge University Press.

Hudson B (1999). A social perspective on teaching and learning in the context of computer-mediated communication in Teacher Education. J. Inf. Technol. Teach. Educ., 8(3): 349-360.

Hudson B (1997). Group work with multi-media in mathematics: The role of the technology and of the teacher. Br. J. Educ. Technol., 28, 257-270.learning in classrooms. In Gulbertson, J. & Cunningham, L. (eds). 40-58.

Kiboss JK (2000). Teacher/pupil perspectives on computer-augmented physics lessons on measurement in Kenyan secondary schools. J. Inf. Technol. Teach. educ. 9(3): 199-213.

Kiboss JK (1997). Relative effects of a computer-based instruction in physics on students' attitudes, motivation and understanding about measurement and perceptions of the classroom learning environment. Doctoral Thesis presented to the University of Western Cape, Bellville, South Africa.

Landsheere DEG (1991). The information society and education. In Eraut, M. (ed) Education and the Information Society: A challenge for European Policy. London: Cassel Educational Limited.

Olson J (1992). Understanding Teaching. Buckingham: Open University Press.

Papert S (1992). Mindstorms: Children, computers, and powerful ideas. New York: Harper Collins Publishers.

Sewel DF (1991). New tools for new minds: A cognitive perspective on the use of computers with young children. Cambridge, USA: Cambridge University Press.

Tanui EK (2003). Relative effects of a computer-based instruction in accounting on students' achievement, perception of classroom environment and motivation in secondary schools in Kenya. Doctoral Thesis presented to Egerton University, Njoro, Kenya.

Underwood and Underwood (1994). Computers and Learning: Helping Children Acquire Thinking Skills. Cambridge, U.S.A; Blackwell.

Williams D, Coles L, Richardson A, Wilson K, Tuson J (2000). Integrating information and communications technology in profe-ssional practice: An analysis of teachers' needs based on a survey of primary and secondary teachers in Scottish schools. J. Inf. Technol. Teach. Educ., 9(2): 167-182.

Woerner JJ, Rivers HR, Vockell EL (1991). The Computer in the Science Curriculum. New York: Mitchell Publishing Inc.

Wragg EC (2000). An introduction to classroom observation. London: Routledge.