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Integrating Educational Technology into the Schools' Curriculum: Examining the Merits

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Abstract:
This article looked at research into the integration of educational technologies into the schools' curriculum. The qualitative research approach was used to bring to light the merits of integrating technologies into the curriculum. Research data were drawn from secondary sources such as books, scholarly journal articles and then schools and / or counties which have utilized technologies and have benefitted tremendously as well as online resources such as the United States Department of Education website etc. It could be concluded that the greater the degree of technology on curriculum the higher will be students' success in all the facets of the educational arena including educational technology.

Keywords: Integration, educational technologies, curriculum, computer technology, classroom technology, innovation

1. Introduction

Computer technology in education has a history that spans some 50 years, and other kinds of technology have been in use for much longer. Classroom technology resources have changed dramatically over time, but a broad perspective of the field helps illuminate many of today's concepts, terms, and activities (Robyler, & Doering, 2010, p. 2). In the late 1980s and early 1990s, "educators saw value in providing instructional computer experiences for reasons other than improving student performance. Benefits such as ensuring computer literacy, providing variety in instructional delivery, or releasing teacher time from record-keeping tasks were considered important enough to continue investing in technology" (Picciano, 2006, p. 88). Gordon (1971), maintains that the development of textbooks, courses, lessons, and other curriculum materials formerly involved art and politics more than technology. Newer criteria for technological curriculum making have been only recently been accepted as guides to practice. One of the criteria suggested by (Gordon, 1971), is that "the developmental procedures used should be reviewed and validated by other developers: they should be able to be replicated" (Gordon, 1971, p. 24). Also in developing countries such as Ghana, as stated by (Gondwe, & Walenkamp, 2011), the critique is often heard that education is not responsive to the needs of the labor market. Graduates have limited theoretical knowledge and practical skills which are relevant for employers. This necessitates re-training in the workplace which one could describe as waste of time and resources.

1.1. Research Problem

This work is an attempt to look at the influence of educational technology on curriculum innovation. It appears that country (Ghana) has low users of technology which might be due to the curriculum used in schools or the way teachers use technology in the teaching and learning enterprise. In developing countries such as Ghana, as stated by (Gondwe, & Walenkamp, 2011) the critique is often heard that education is not responsive to the needs of the labor market. Graduates have limited theoretical knowledge and practical skills which are relevant for employers. This necessitates re-training in the workplace which one could describe as waste of time and resources.

It is against that backdrop that this researcher decided to investigate the integration of educational technology on curriculum innovation and to provide some suggestions and recommendations which are aimed at arresting the situation to some extent.

1.2. Research Question

The research question is what are the merits for integrating educational technologies into the curriculum? (Qualitative).

2. Literature Review

In this section the conceptual foundations for the study is described. The historical perspective of the definition of educational technology and then curriculum innovationis looked at. The second stream is based on studies on the nature of innovation, a brief history of curriculum, curriculum innovation, technology in the development of curriculum materials, computer and telecommunication, the complex nature of change, educational technology, NETS-T, ISTE, technology and the curriculum, teacher utilization of computers in instruction, and educational technology and data driven decision making among others.

2.1. Nature of Innovation

As cited by (Ajibola, 2008), Mintrom (2000), maintains that the term "innovative" hinges on ideas that are new within the context of the school. Also innovation could be seen as involving an introduction of amethod, custom, device etc.; change in the way of doing things (Webster's New World Dictionary, 2001). (Ajibola 2008), further maintain that (Rogers, 1995) outlines that an innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. Whereas (Dunkin, 2000), links innovation as doing different things or doing things differently.

2.2. A Brief History of Curriculum Development

As cited by (Salim, 2006), since the 1950s, there has been the emergence of a planned change in curriculums. Such changes involve several factors which affect curriculum innovation and development. The factors could be said to be diverse, yet interrelated, complicated and constantly moving. Also since knowledge is not static but keeps being revised, replaced, built upon and then explained in different forms, there is no doubt that technology has played major roles in all such changes in any curriculum designed and / or developed.

2.3. Curriculum Innovation

According to (Egan, 2003), children are initiated, in all human societies, into certain sets of making sense of the world around them as well as a set of norms, knowledge and skills which our society requires for its continuance. One symptom of pluralism is the conflict and/or argument about what such curriculum of initiation should contain (Egan, 2003, p. 9). The initial development and implementation of a curriculum is not end in themselves but means to an end. A curriculum addresses the needs, problems, and aspirations of the society it seeks to serve. As a society changes, the curriculum must keep changing to address the societal needs, problems and aspirations. The needs include; good drinking water, shelter, health, peace and security. Aspirations of people may include; technology, viable economy and self- sufficiency in food supply. These changes in society will provide changes in the curricula of schools since the aim of schooling is to address the needs and aspirations of the society. The changes in society should therefore, be reflected in the related changes in the school curriculum (Shiundu & Omulando, 1992).

In a related development (Fullan, 1991), states that curriculum change is the most generic concept which applies to any alterations in instructional or in any educationally arranged conditions which surrounds instruction. As a generic term it is used sometimes to refer to the general changes and directions in the curriculum and sometimes specifically used to describe a particular change. The number of concepts related to change is numerous. (Fullan,1991), groups them into two categories. The first category is those concepts pertaining to the nature of change. They include change, innovation, reform, and movement. The second category is those concepts related to the process or phases of change. They cover development, diffusion, dissemination, planning, adoption, implementation (including fidelity, adaptation and enactment), and evaluation (Fullan, 1991). Educational change or curriculum change may take place or come about in different forms either internally or externally. " In theory the purpose of educational change, presumably, is to help schools accomplish goals effectively by replacing some structures, programs, and / or practices with better ones", (Fullan, 1991, p. 15). Thus, educational reform and curriculum innovation are two forms of curriculum change. They are means through which the nature of change in education is addressed.

Moreover, Goodson 1997, as cited by (Giordmaina, 1999) maintains that curriculum hinges on a lot of spheres and at a lot of levels. The central point is the difference between written curriculum and the curriculum as classroom activity. The problem of learning only the written curriculum is reflected, for, as Rudolph posited: 'The best way to misread or misunderstand a curriculum is from a catalogue. It is a lifeless thing, so disembodied, so unconnected, sometimes intentionally misleading'

2.4. Technology in the Development of Curriculum Materials

The development of textbooks, courses, lessons, and other curriculum materials formerly involved art and politics more than technology. Curriculum development has been a search for some general value – an important idea, problem or skill- around which content and activities could be organized. Newer criteria for technological curriculum making have only been accepted as guides to practice. These criteria are: the developmental procedures used should be reviewed and validated by other developers: they should be able to be replicated (Gordon, 1971, p. 24). Also (Bloom, 1981) posited that products developed in accordance with models that can be replicated should produce similar results. It must be noted that the core or heart of technological revolution in curriculum is, however, the belief that curriculum materials themselves, when used by those learners for whom the materials are developed, should produce specified learner competencies. This belief is a great advance over the belief that curriculum materials are mere resources that may or may not be useful or influential in a certain situation.

2.5. Computer and Telecommunications

According to (Shuldman, 2004), computer and telecommunications technologies' implementation in schools has been a national, state, and local educational goal (Glennan & Melmed, 1996; National Task Force on Educational Technology, 1984, as cited in Reiber & Welliver, 1989).Schools have put in a great deal of effort in terms of money as well as facilities, such as wiring buildings and classrooms, as well as accumulating an impressive computer inventory (Becker, 2000b; Office of Technology Assessment, 1995). Such a great deal of investment underscores society's great expectations, aspirations that education will integrate technology into the classroom successfully. It must be added that technology's integration into schools and its usage in ways that impact student learning has become more difficult than anticipated (Scheffler, & Logan, 2000, citing Houghton, 1997).

2.6. Educational Technology

Technology usage has increased in public schools and / or counties in recent years (Cuban, 2001). Some schools and/ or counties have acquired hardware to aid computer use in almost all classrooms. In New Jersey, for example, a survey report on Technology gave a ratio of students-to-computers as 4.1-1 (New Jersey Department of Education, 2003). In spite of the colossal amount of dollars put in by schools and/ or counties in the areas of computers and accessories acquisition (Cuban, 2001, 2006), Teachers apply technology as if they were in the past. It must be stated that the promise of a technology era of teaching and learning which had been predicted when computers were injected in the sphere of education is still lagged (Cuban, 2001, 2006).

With the birth of technology, especially with the amount of funding in the area of technology, many researchers have made several attempts to weigh the influence of technology on teaching and learning (Cuban, 2001). It was as a result of such a concern that the International Society for Technology in Education (ISTE) put up a committee tasked for setting standards in educational technology. The standards gave parameters for curriculum design and development and also planning for successful technology integration into education (International Society for Technology in Education, 2000b).

2.7. Integrating Technology into the Curriculum

According to (Picciano, 2006), educational technology can only be successful if it has been integrated into the main functions of schools. Technology in itself is expensive unless it is integrated into the curriculum involving what children and young adults need to learn about themselves and the world, then will technology be effective tool in achieving such a vision (Picciano, 2006, p. 4).

Additionally, the ICT era has brought many improvements in several facets of life. Be it education, healthcare, agriculture, and business among others. It is in this light that the Ministry of Education (Ghana) is committed and has submitted to Cabinet a draft ICT policy which is aimed at streamlining computer studies in Senior High Schools (The Ministry of Education, Ghana, 2003).

2.8. Summary

A review of related literature provided a conceptual framework for the study. This framework forms the basis for drawing similarities and differences between the current study and those of other writers and researchers, which helped in shaping and directing this study. The main points raised in the review cover; educational technology, nature of innovation, and curriculum innovation among others. These findings could be applied in any district or school planning or using technology to enhance education.

3. Methodology

In this study the qualitative research approach is used to comb through existing data collected by the United States Department of Education, other documents, published books as well as previous research studies of education on the influence of technology on curriculum innovation. Data collected through case studies of four schools and / or counties which have introduced integration of technology education programmes have been utilized. This was to address the major weakness of case studies. Thus; (Leedy, & Ormrod,2010), the major weakness of a case study is that, especially when a single case is involved, one cannot be certain whether the findings are generalizable to other situations ((Leedy, & Ormrod,2010, p. 137). It is to overcome such a weakness, that this researcher considered more case studies (in this work case study of four schools and/ or counties) on the influence of technology on curriculum in order that generalization to other situations could be made. Data from three previous documented research studies on impact of technology on curriculum innovation were reviewed. Also historical researches on the influence of technology on curriculum innovation were utilized to address the research question of this study. This was due to the fact that historical research looks at present and countercurrents of present and past events by discerning patterns that tie them together (Leedy, & Ormrod, 2010, p.164). This was in line with "the heart of the historical method- which (Leedy, & Ormrod, 2010) - maintain that as with any type of research, not the accumulation of facts, but rather the interpretation of the facts. Nothing can take the place of that. The interpretation of the data is central in all research. "Without it, there is no research" (Leedy, & Ormrod, 2010, p.164).

It must be stated, here, that in this research secondary sources were used. This was as a result of the fact that secondary sources inevitably reflect the assumptions and biases of the people who wrote them. Such may be the case even when the sources were written soon after the primary sources were created (Leedy, & Ormrod, 2010, p. 167). And it was in line with several institutions' policies on human centered research projects. Answering the question what are the merits of educational technology on the curriculum. Data collected from the United States Department of Education and research works, articles, and / or online resources were used to provide a description of patterns to compare the outcomes of the influence of technology on curriculum innovation. These data were examined for any significant increase of performance as a result of the influence of technology on curriculum innovation. The data time frame ranged from 1970 to 2011. Data taken from case studies of technology integration educational programs of four different schools and/ or counties were utilized to identify patterns of effective educational use of technology on curriculum.

Data from three previous research studies were also reviewed for any consistency as to the impact of educational technology on curriculum innovation. Also case studies on the influence of technology on curriculum innovation were evaluated to determine the importance of technology on curriculum.

4. Data Analysis
This section looked at schools and / or counties which have been influenced positively as a result of the impact of technology on curriculum. Also research works; published books as well as online resources have been evaluated in line with the merits of integrating technology into the curriculum. The research question being addressed in this section is: What are the merits of integrating educational technology into the curriculum?

4.1. A Saskatchewan Approach to Quality Change
In Saskatchewan, curriculum reforms in recent times suggest a good foundation has been laid for a thorough examination of the important role technology plays in the classroom. This indicates that approaches to technology change must lend a greater support to developments. It is now obvious that technology plays a much significant role in the transformation of today's classrooms. These, however, includes quality interpersonal relationships within the school, curriculum reforms as well as new ways of involving parents in schools. [Richmond, (n.d)]. Retrieved from http://www.saskschoolboards.ca/

4.2. Illustrative Schools and / or Counties
In Virginia's Fairfax County Public Schools, for example, a web-based system termed the Electronic Curriculum Resource Assessment Tool has been designed to create and access lesson plans, assessment tools, worksheets and others resources approved by the district. This is due to the realization in the 21st century of the need to incorporate technology in almost all the facets of life. Such a technological tool would be very beneficial in the teaching and learning enterprise. Another example is the Manor New Technology High School students (Texas) who out-performed the state average by 16 percent in science as a result of a project-based learning and the integrated use of technology (www.ed.gov/technology).
In a related development technology in education is now a way of life behind walls. Georgia State University now has a programme for the purpose of teacher training. The Department of Early Childhood Education (ECE), according to Weinburg, Collier & Rivera (2003), remains committed to turning out teachers who are "technically and emotionally" prepared to apply technology into instruction of elementary schools .Retrieved from http://www.en.wikibooks.org/
Additionally, in Oregon secondary schools, Hispanic migrant students who speak English as a second language (ESL) are supported with wireless networked note taking. ESL students can read their note taker's translation of key words during class presentations. Communication between note takers and students is by collaborative word processing as well as graphics package on wireless networked computers (Knox and Anderson-Inman, 2001). Retrieved from http://www.ncrel.org/sdrs

4.3. Implications
Based on the research discussed above as well as the illustrative schools and / or counties, it could be concluded that there are many merits in integrating educational technology into the curriculum. And that the way forward for more schools and/ or counties in developing countries to adopt such approach will help better the lots of most of the developing countries in this 21st century.

5. Conclusion
This study has looked at the merits for integrating educational technology in the Schools' curriculum. It must be mentioned that due to the data examined, it could be summed up as the greater the degree of technology the higher will be students' success in all the facets of life including educational technology.

5.1. Limitations of the Study
The attempt to generalize the findings of this study is compromised by the following limitations. First, in the effort to represent the numerous literature on the influence of educational technology on curriculum innovation only secondary sources were used. Thus; the research design was structured to consider the secondary sources of materials including; United States Department of Education collection of data, published works, previous research works as well as online resources that apply to the merits of integrating technology into the education. Finally, in spite of the number of illustrative schools and/ or counties, it is not difficult to generalize findings to other educational settings, states and other countries be they developed or developing.

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