

Information and Communication Technology (ICT) in Education for Sustainable Development (ESD): Quality Teaching and Learning Outcomes

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ABSTRACT This study examined from a theoretical perspective the importance of ICTs in education, in the context of education for sustainable development (ESD). More specifically, it also focused on the system of analysing intended learning outcomes (ILOs) as a means of improving teaching and learning. The study suggested that with advanced technology, cognisance has not been taken of the demands placed on the Faculty members, who as academicians are increasingly involved in administrative tasks, rather than the core business of teaching and learning, community engagement and research. It concluded that the application of ICTs does not necessarily add value to the maxim of Education for Sustainable Development, or education in general. The focus has to be on technology that adds value to the education experience, and Faculty needs to guard strongly against administrative processes and procedures that threaten to overwhelm and detract from the value of teaching and learning.

INTRODUCTION

The maxim “education for sustainable development” (ESD) still remains a top priority “international policy documents and on the global agenda” dating back to two decades “since the Earth Summit in Rio in 1992”. A decade later, it again received precedence “at the United Nations World Summit on Sustainable Development in Johannesburg 2002” (United Nations 2002). The United Nations Educational, Scientific and Cultural Organisation (UNESCO) (2003a: 32), facilitated the implementation of ESD objectives “by means of the Framework for a Draft International Implementation Scheme, where a new vision of education was expressed that will hopefully lead to profound changes in higher education”. Education globally, thus, has to look at the long-term, the future, emphasizing “a holistic, interdisciplinary approach to developing the knowledge and skills needed for a sustainable future as well as changes in values, behaviour, and lifestyles (United Nations 2002; UNESCO 2003a: 46).

The Kyoto Declaration of 1993, adopted by 90 universities across the globe, challenged higher education worldwide to accomplish an essential mission in global sustainable development (SD). A major theme, namely, that of global learning, is a notion that originated from the Declara-

tion (Anderberg et al. 2009). Wehrmeyer and Chenoweth (2006: 131) also stated that global sustainable development is of international importance. “For the successful implementation of sustainable development by society, much is dependent on individuals being informed and educated about the interaction of environmental, social and economic issues, together with their relevance to individuals every day activities and work”. This places a major responsibility on Higher Education Institutions (HEIs) in terms of offering curricula that are cognisant and deliver on the teaching of sustainable development across the range of programs (Wehrmeyer and Chenoweth 2006).

Ko Nomura (2010), writing on higher education in Japan, for example, also described the pressure “to respond to diversifying social needs, which includes the drive towards sustainable development” in South Africa,

“In terms of its national mandate, the Department of Education (sic) has to ensure that all higher education institutions (HEIs), regardless of status, meet the requirements for addressing the inequities and imbalances of the past. Part of this is to ensure that all HEIs offer relevant, quality services to society for the purposes of social, cultural, economic and political development” (Moodly and Saunderson 2009: 1563).

HEIs therefore “have to ensure that program offerings have the ability to meet the requirements for facilitating development within a transforming society, including skills development in scarce skills areas and to redress past inequalities. In doing this HEIs will serve the new social order and meet pressing national needs by responding to new realities and opportunities” (Moodly and Saunderson 2009: 1563).

The above discussion reflects a global move in the focus of HEIs towards contributing to ESD, demanding greater responsibility of Faculty staff to review curricula, to remain regionally, nationally and globally relevant in this regard. Education is seen as key in the process of achieving sustainable development. Visser (1997) emphasised that “in order for formal education to contribute to sustainability, traditional systems and methodologies need to be re-oriented. Visser explained that:

“Centuries of development in education have not been able to avoid the fact that nearly one billion people in the world are illiterate, more than 130 million children do not attend school, and many of those who do, acquire knowledge that does not sustain them or is irrelevant for their needs. There is a clear indication that yesterday’s solutions are inadequate for today’s problems, and there couldnot be a clearer signal that doing more of the same is not a valid solution.”

Research shows that even in developed countries where educational levels are high; the education system has not succeeded in influencing choices and behaviours that would support sustainable development. According to Adu et al. (2014: 38), “more than 80% of the population has higher education in the USA. The rates of energy use and the generation of leftover in the USA are among the highest in the world. Higher levels of education have not led to more sustainability of education. Simply educating citizens to higher education levels has not been sufficient to attain sustainable societies”.

In 2005, UNESCO launched the “Decade for Education for Sustainable Development,” which aims to accelerate the implementation of a new vision in education. The Decade is a call for a collaborative process to re-orient educational policies, programs and practices so that education can better play its part in building the capacities of all members of society to work together to build a sustainable future (UNESCO

2000). According to UNESCO (2003b) “this vision of education emphasizes a holistic, interdisciplinary approach to developing the knowledge and skills needed for a sustainable future as well as changes in values, behaviour, and lifestyles.” Eze and Adu (2013) found that many changes called for in ESD could be supported through greater integration of ICTs in the learning environment.

Paas and Creech (2008) emphasised that ICTs play an important role in advancing ESD in two ways. By increasing access to educational materials about sustainability (for example, via distance learning, educational networks and databases); and by helping to promote new ways of interacting to facilitate the learning called for in ESD that emphasizes not just knowledge, but choices, values and actions. Explaining these two ways, Paas and Creech (2008) put forward that at their most basic level, ICTs enable the presentation of course content using multimedia (images, text and sound) and facilitate archiving of that content. They also provide new means of interactivity and simulation, thereby, offering opportunities to improve learning and making new ways of understanding possible. The use of new technologies, thus, can offer exciting new possibilities to promote the changes in education methodologies called for in ESD.

INFORMATION AND COMMUNICATION TECHNOLOGIES IN EDUCATION

Information and communication technologies can be understood as a tool or technique for extending human capacity. In this sense, ICTs extend our human capability to perceive, understand and communicate. The portable phone enables us to communicate from wherever we are, to others, who are thousands of kilometres away; television permits us to see what is happening on the other side of the globe, almost as it happens; and the Web supports instant access to, and exchange of, information, opinions and shared interests (Adu and Olatundun 2013).

In the field of formal education, ICTs are increasingly deployed as tools to extend the learner’s capacity to perceive, understand and communicate, as seen in the increase in online learning programs and the use of the computer as a learning support tool in the classroom. Although, universities were certainly leaders in

engineering the internet and interoperable computer systems to connect researchers for e-mail and data exchange, the use of ICTs for education and training has lagged behind other sectors in society (Adu et al. 2014; UNESCO Bangkok 2003: 75).

According to Tella and Adu (2010), the use of ICT in education and training has only begun when access to ICT services and higher bandwidths become more available to learners. The danger is that we ascribe to new technologies the characteristics of previous media and accompanying educational practices without development and reflection on new and better ways to support and evaluate learning outcomes.

To the best use, these technologies in education, new pedagogies and learning assessment methods may, and probably will be required. In this rapidly advancing field, it is worth reviewing the history, current uses and trends in ICTs that will further influence how education practices may be changed in future. Educators are continuing to develop new applications and online resources to support learning objectives in all disciplines. The field of environment and sustainable development education is no exception.

The use of technology in course instruction is an inevitable transition in higher education. However, infusion of educational technology on college and university campuses for faculty and student use does not always result in its successful integration into either instruction or the campus, nor does it mean that the quality of education has improved (Abrahams 2010). Abrahams argued for a change in focus to “how to successfully adopt and diffuse technology or instruction to increase or improve their ability to educate using technology”. Although, there is a tendency to claim that technology has impacted positively on teaching in HEIs, it is argued that in essence there has been no real change in teaching and learning approaches.

The experience of both faculty and students alike is that it has been minimal in this regard. Johnston and McCormack (1996) stated that for the majority of university teachers, it seems that there are still many barriers to and some personal misgivings about moving away from a sole reliance on traditional teaching approaches and moving towards integrating various technologies into their teaching.

It is also argued that for many universities, “the Internet revolution arrived on campus fast-

er than anticipated” (Johnston and McCormack 1996: 39). Although, technologies, such as, campus computer centres, personal computers and the Internet have generated interest, there has also been resistance and opposition to their use in the area of teaching by faculty (Abrahams 2010). Abrahams like Johnston and McCormack (1996), argued that technology has to “maintain and strengthen the quality of its educational for instruction to increase or improve their ability to educate using technology”. This demands an understanding of the manner in which ‘technology is diffused and what kind of adaptation is needed’ and, therefore, an understanding of “the context of technology and education in the larger culture”. This calls for research on teaching and the use of technology that is “reflective, grounded and open” considering the views of faculty, staff and others (Nicolle 2005).

TECHNOLOGY AND ASSESSING THE INTENDED LEARNING OUTCOMES (ILOS)

Intended learning outcomes is a term coined by HEIs and higher education, as an attempt “to describe the knowledge and abilities it intends its graduates to have acquired before graduation”. This entails a variety of teaching, learning and assessment methods characterised by validity, reliability and within a “workable manner” (Shephard 2009: 389).

Hussy and Smith (2003: 360), stated that ‘not all teachers are comfortable with precise descriptions of intended learning outcomes’, and some are ‘cautious about teaching and assessing in the affective domain’ (Shephard 2009: 390). Shephard further stated that not all Faculties see the “value of e-learning and use of technologies in teaching contexts and display a range of emotional responses when expected to do so”. Johnston and McCormack (1996: 38) are of the view that;

“The link between educational outcomes and information technology is also problematic. Information technology of itself does not have an educational value unless it is put to work in educationally sound ways. Technology can be misused by teachers as can any teaching tool. The introduction of information technology does not guarantee enhanced teaching and learning”.

This viewpoint was presented by Abrahams (2010) and Nicole (2005), and once again reminds us that technology in itself, serves no value. Assessing learning outcomes (a concept that, as previously mentioned, not all teachers are comfortable with), using technology, does not necessarily mean that teaching and learning is improved or enhanced. It does not guarantee value in itself, nor does it add value to teaching and learning, if it is not applied in a clear and focused way. "Excellent teaching may or may not involve the use of information technology; poor teaching may or may not involve information technology" (Johnston and McCormack 1996; Nicolle 2005).

The argument is, therefore, that an approach that favours the application of information technology "must be driven by educational needs rather than a desire to use the technology for its own sake". Advancement needs to be appraised to ascertain that the educational outcomes sought, are being achieved. "Any associated disadvantages of using the technological approach" must not detract from its overall educational value" (Johnston and McCormack 1996).

DISCUSSION

In terms of the demands made on HEIs, and, therefore, on academics/ Faculty, academics must ensure that the curricula contributes to ESD. As stated, the responsibility for the "successful implementation of sustainable development by society" places much pressure and responsibility on HEIs and, thus, Faculty, to nurture "individuals" who are "informed and educated about the interaction of environmental, social and economic issues, together with their relevance to individuals' every day activities and work" (Wehrmeyer and Chenoweth 2006: 140). Emphasis has been placed on integrated learning outcomes as previously discussed, as an attempt "to describe the knowledge and abilities it intends" (Shephard 2009: 390), albeit that not all Faculty is comfortable with this description. Nonetheless, these ILOs are analysed in terms of technologically developed software, which will analyse assessment tools to the minutest details in terms of meeting the ILOs.

This demands that the Faculty has the ability and time to analyse and assess their teaching and assessment processes, by having the ability to analyse tools of assessments (tests, assign-

ments, projects, and examinations) in a numerical value that can be entered into software that will reflect whether all the ILOs of a particular course/subject has been met. Given that a Faculty member may decide on ten (a random number), or more assessment tools, of a value of up to 100 marks, for example, it demands that the Faculty member inputs this into the system in a manner that reflects that all learning outcomes have been covered. Then, having marked two hundred or more scripts (again a random figure), the Faculty member has to input these individual figures into the system. The software, then, allows for the analysis of the data as entered to assess whether all the ILOs of a particular course have been satisfied, and where these have not been satisfactorily met. It also allows for comparisons between results of Faculty members offering the same courses. The danger of this system is that it can lead to deliberate misrepresentation of figures, and compromising in the quality of assessment tools if the system is not carefully managed or monitored.

The maxim Education for Sustainable Development and the demand for quality may be compromised in favour of a favourable outcome in the reflection of ILOs assessed, and positive results reflected. It must also be considered that Faculty not familiar with, nor experts at technology, may input data incorrectly, leading to skewed results. The assessment of ILOs in such a technologically-driven manner, may lead to pressure on Faculty to compromise on matters of quality and the higher maxim of ESD, in favour of a positive reflection of their performance in terms of the results reflected.

A further danger is that Faculty that are dedicated and offer assessments of a good standard, may be compared to Faculty that are inclined to leniency in both assessment tools and standards of marking. Quality assurance processes should take cognisance of the fact that good Faculty, experts in their areas of specialisation, may not be technologically inclined. Further, the stresses and demands in terms of time consumption in inputting data of ILOs, may take away valuable time that could have been spent on teaching and learning.

Thus, as emphasised by Johnston and McCormack (1996), there has to be a clear link between educational outcomes and information technology. If Information and Communication technology is not put to work in educationally

sound ways, it does not add any value. We have to guard against the misuse of technology, and we must be cognisant that it does not guarantee improved quality in teaching and learning. Mechanisms have to be considered in alleviating the increasing demands on Faculty to perform administrative functions, such as analysing and inputting data. This may mean an increase in teaching assistant staff, or decreased teaching workloads, amongst other considerations.

CONCLUSION

More schools and communities now have access to ICT resources to join the global economy with knowledge workers who have 21st century skills and are inspired by life-long learning. ICTs have great potential for knowledge dissemination, effective learning and the development of more efficient education services. ICT will not only sustain development of education but also the global energy, environmental and social challenges. Besides, the present study argues that technological advancement has not necessarily meant an improvement in teaching and learning standards.

The introduction of ILOs and the assessment, thereof, does not necessarily add value to the maxim of Education for Sustainable Development, or education in general. On the contrary, technology can be manipulated, as can be the input on data regarding ILO assessments, if not carefully monitored. This can add to the stress of Faculty, as well as deprive them of valuable time that could be spent in teaching and learning. The focus has to be on technology that adds value to the education experience, and Faculty need to guard strongly against administrative processes and procedures that threaten to overwhelm and detract from the value of teaching and learning.

RECOMMENDATIONS

The study, however, recommends among others that the faculty should focus on technology that adds value to the education experience, and the faculty needs to guard strongly against administrative processes and procedures that threaten to overwhelm and detract from the value of teaching and learning.

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