

# ICT Impact Assessment in Education

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## INTRODUCTION

It has been noted that while there is clearly much promise in the use of ICT for education, there is also concern of a widespread ignorance of the specific impact of ICT on education goals and targets (World Bank, 2003). Trucano (2012) lamented about the situation in less-developed countries (LDC) that the lack of evaluation tools and methodologies for the assessment of ICT impact on teaching and learning (T&L) constitutes a limitation. Adedokun-Shittu and Shittu (2011) identified that LDCs with an emerging thrust in technology are gradually deploying technology because of its prowess, but they do not seriously consider evaluating the impact of technology on the system it is deployed for. In an attempt to respond to these limitations, Adedokun-Shittu (2012) conducted a study to assess the impact of ICT in teaching and learning (T&L) in higher education in LDCs. The outcome of the study produced an operational model to address concerns relating to ICT impact assessment in LDCs which composed of four elements (perceived impact, integration, motivation and challenges). This article presents the developmental stages of the model and provides operational definitions of certain concepts relating to the elements of the model. Having identified that barriers or challenges to ICT use in LDCs need to be assessed, Adedokun-Shittu developed a model that extends the elements of Kirkpatrick and Stufflebeams' Context, Input, Process, Product (CIPP) models by adding the "challenge" element. Thus, to determine the efficacy of this operational model, the study developed a set of instrument on ICT impact assessment and validated it by establishing interaction between the dependent variable (ICTRate) and the independent

variables (perceived impact, integration, motivation and challenges). These predicting factors of ICT impact are subsequently developed into an ICT impact assessment model that fits the current situation of LDCs.

## BACKGROUND TO THE STUDY

Technology penetration in LDCs has been observed to be driven by the promises inherent in technologies however, evaluating its impact have been evasive (Adedokun-Shittu & Shittu, 2011; Unwin & Day, 2005). This illusive perception of technology has beclouded the specific and local impacts technology has on education in LDCs. This has consequently led educators in LDCs to entirely refer to technology impacts derived by evaluation tools designed in developed countries (DC) rather than create local tools that derive specific and local impacts. Ashraf, Swatman and Hanisch (2008) argue that applying indicators for measuring ICT impact which are designed in one context and then applied in another has led to many failures of ICT4D projects. Researches by InfoDev (2006) emphasized that the aims of any impact evaluations are to see how far the intervention has reached its desired audience, to identify effects and to measure impacts considering different quantifiable local indicators. Heeks (2005) maintains that improved ICT4D interventions must be associated with local data content and ICT skills for sustainable impacts to be feasible.

Having realised that ICT frameworks for education used in DCs are not totally suitable for ICT implementation in LDCs, researchers have taken the initiative to develop suitable models that take into consideration the peculiarities of education and level of ICT pen-

etration in those countries. Bass (2010) developed an eight-level maturity model that defines the ICT infrastructure resource levels required to achieve student learning outcomes. The model shows management, teaching and technical staff and donors how to make most efficient use of ICT resources by maximising opportunities for student learning. Reijswoud (2009) also developed a theory for the design and implementation of ICT projects in LDCs that takes into account local conditions while incorporating existing theories used in DCs. Ashraf et al. (2008) developed an extended framework that demonstrates that ICT projects can lead to development, but only when local constraints are addressed. After series of review on ICT impact in education, authors (World Bank, 2003; Trucano, 2012) conclude that evidence is scarce and limited and that the impact of ICT use on learning outcomes is unclear. Therefore they call for the need for cautiously carried out research in different countries with widely accepted methodologies and indicators to assess the impact on education. In response to this, Adedokun-Shittu (2012) develops an ICT impact assessment model by employing two grounded impact evaluation models (Kirkpatrick and CIPP) as a theoretical framework to guide the development of the model and the data gathering instruments for impact evaluation.

### **Theoretical Framework: Blending Kirkpatrick and CIPP Evaluation Models**

Kirkpatrick's successive four-level model of evaluation and Daniel Stufflebeam's Context, Input, Process, Product (CIPP) evaluation model were synchronized because of the similarities inherent in their elements and named blend model to guide the development of the ICT impact assessment model. Kirkpatrick's model follows the goal-based evaluation approach and is based on four simple questions that translate into four levels of evaluation. These four levels are widely known as reaction, learning, behavior, and results. CIPP model on the other hand is under the systems approach and the acronym is formed from Context, Input, Process and Product. However, this study limits its scope to the product evaluation in this model which is suitable for impact studies like the one reported in this article (Wolf, Hills, & Evers, 2006).

To substantiate the essence of blending these two models, authors who have either employed both models in their study or recommended a mix of models to solidify research findings are cited. Khalid, Abdul Rehman and Ashraf (2012) explored the link between Kirkpatrick and CIPP models in public organization in Pakistan and came up with an extended and integrated framework. Taylor (1998) employed both CIPP and Kirkpatrick management-oriented approaches to guide his study on technology in curriculum evaluation. He noted that the Kirkpatrick model is often utilized by internal evaluators to measure the impact of a specific treatment on students while the CIPP model is designed for external evaluators to collect data about program-wide effectiveness that can assist managers in making judgments about programs' worth. Lee (2008) concludes his assessment on research methods in education by saying; "there is no such thing as a perfect teaching model and a combination of models is needed to be able to adapt to the changing global economy and educational needs" (p. 10). He discovers that there is always an overlap in the building and development of learning models and thus suggests a combination of closely related models to meet the needs of educators. A comparison of Kirkpatrick's goal-based four-level model, CIPP and TVS was offered by Eseryel (2002). Owston (2008) also looked into both Kirkpatrick and CIPP models among other models. He offers comprehensive suggestions for evaluators thus: (i) to look broadly across the field of program evaluation theory to help discern the critical elements required for a successful evaluation, (ii) to choose whether a comparative design, quantitative, qualitative, or a combination of methods will be used, and (iii) to devise studies that will be able to answer some of the pressing issues facing T&L with technology.

Similarly, Wolf, Hills, and Evers (2006) combine Wolf's Curriculum Development Process and Kirkpatrick's to inform the assessment and design of the curriculum. The two models were tabulated and assessed in stages making it worthwhile to use similar measures to determine whether they foster the desired objectives. They affirmed that combining the two models has resulted in intentional and sustainable choices that were used as tools in creating strategies and identifying sources of information useful in creating a snapshot of the situation in the case study chosen. Among the tools

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