Digital Divide And The Education Value Chain

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Abstract: Education aims to shape human behaviour so they can be able to socialize in the community and adjust to the environment in order to maintain the continuity of life, both personal, group, or society as a whole. UNESCO [1] sees education as a part of the culture because education is an effort to provide basic knowledge in preparation of life. To enhance the learning experience and the entire education process, Information and Communication Technologies (ICTs) have been adopted, however, only a certain population enjoy the benefits which come with the ICTs. This paper seeks to describe the education value chain and how digital divide has impacted to it. It concludes by proposing strategies that can be used to minimize the impact of the digital divide to the entire education value chain.

Key words: *Education, Education value chain, digital divide, ICTs*

Introduction

According to Tom [2], ICT driven revolution has such profound impact on education both in horizontal dimension(global access) as in vertical(depth of content access), that eventually its forcing a paradigm shift in educational process. However, a significant population is still lagging behind in the access to and use of ICTs. The term digital divide has been coined to refer to the disparity caused by such a lag. Naturally, digital divide creates two groups(digitally advantaged andthe digitally disadvantaged). Interactions within the same group is homogenous and simplified whereas it is much of a challenge across groups because of differences on how the world is viewed. The rate of growth of ICTs is so much that it is now part of our everyday life, be it communication, education, banking among others. ICTs have revolutionised the way knowledge is acquired, shared, stored and communicated as such digital divide has an enormous impact to the education value chain.

Education

Education is[3] “the act or process of imparting or acquiring general knowledge, developing the powers of reasoning and judgment, and generally of preparing oneself or others intellectually for mature life”. Education is an effort to instil the attitude and skills of the community members to be able to play them later in accordance with the status and social roles in their respective communities. Bertrand [4] said that education is a social order of civilized social life and through education, we can form a community that developed the order of life, modern, peaceful and peace based on the values and cultural norms. He further emphasizes education as one of the social phenomena that characterize the community- developed society. Education can either be formal or informal. Formal education is structured where learning outcomes and progression levels clearly are defined whereas informal education is achieved through interactions and associations with peoples of diverse knowledge and educational background.Education is often misconstrued as just being about knowledge transfer from a teacher or textbook to the learner, but more is learnt when one gets active by applying and practicing what has been learnt. Education is provided by a system which has an overall purpose for existence. Each system is built on three pillars namely educational philosophy, purpose or view; educational approach and teaching methods.

a. ***Educational philosophy, purpose or view*****:** defines the overall reason for education, describes the child's basic needs and identity, relationship with the teachers, and purpose of life. Educational philosophy has its roots in religion or societal beliefs and is guided by what each religion or society believes in.

b. ***Educational approach*****:** defines the underlying system for presenting academic subject matter.Mary [5] divide educational approaches into classical, traditional, early academics, principle, work texts /mastery, delayed academic, unit, delight directed whereas John [6] puts forward practical life experience, correspondence, self-study, learning contract, and traditional as the educational approaches. Regardless of the approach adopted the end-result of education is educated men.

c. ***Teaching method*****:** describes the manner, on a minute to minute or day to day basis, that the educational approach is put into practice. It is simply how knowledge and skills are learned by the student.

Education is provided at different stages of human development hence the pre-school, primary, secondary, tertiary education levels and of late professional certifications. Each level’s graduates become the next level students creating what is commonly referred to as an education value chain.

Education Value chain

Education value chains are heterogeneous associations of educational systems or processes and other social and economic agents who aim at improving the quality of education and its relevance in improving a way of life and solving life problems.The definition of the value chain arcording to Lynch [7], is: “ *The value chain identifies where the value is added in an organisation and links the process with the functional parts of the organisation*”. In the definition, it is important to identify value addition pointswhose interactionis necessary to produce graduates that embody particular values.The education value chain has been developed from Michael Porter’s value chain (1985) where value addition is a function of a proper interaction and complementary effect of the primary and secondary activities. Primary activities of the education value chain enhance the learner’s knowledge in a specific domain whereas secondary activities are there to support the learning process as can be seen in figure 1 below.

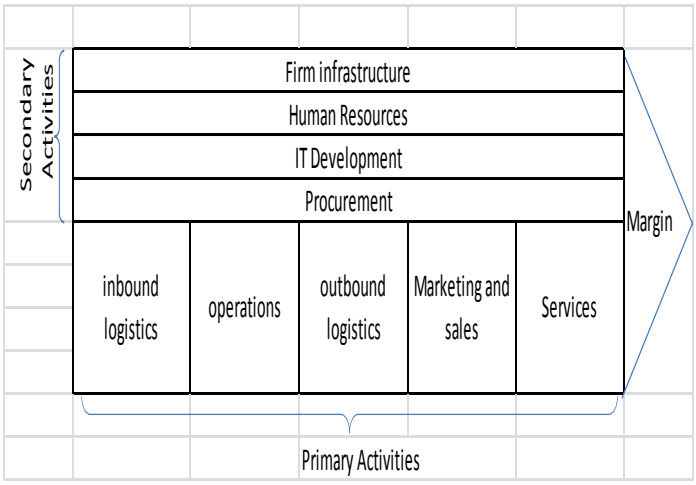

Figure 1: Porter's value chain Model.

Figure 1 proposed by Michael Porter (1985) separates a business system into a series of value-generating activities that develop competitive advantage. He categorized the activities as either *primary* or *secondary.* Primary activities are core to the organisation and are directly linked to the transformation of raw materials [8], and include:

a. ***Input logistics:*** The purpose of this activity is to receive and store inputs, as well as distributing them to the lines of production. The major input to the education value chain is a student who has to acquire a skill relevant to the market expectations.Activities supportive of inbound logistics in the education value chain include recruitment, admission, registration, research purposes, grants among others.

b. ***Operations:*** Encompasses all activities to transform raw materials to a state desired by the market. Teaching is the core activity of the education value chain complemented by such activities like, research, counselling, tutoring as well as industrial attachment.

c. ***Output logistics:*** Is an activity responsible for storage and distribution of finished goods and services. Activities supportive of outbound logistics includegraduation, publications, placement, performance.

d. ***Marketing and sales:*** Includes all activities responsible for scanning for environmental needs as well as the marketing of the finished product. Roles supportive of the marketing and sales activity include recruitment, technology and knowledge transfer, and research, development andinnovation (RD&I).

e. ***Service:*** Is an activity executed after the final product has been delivered to the market and is supportive in nature. In an educational setting , this may include,academic support, society services, alumni support, RD&I support

Secondary Activities

Secondary activities do not directly interact with the production /education process but give the requisite support to ensure a high quality product is produced. It includes activities infrastructure and facilities, human resources, technology development and procurement.

a. ***Infrastructure and facilities:*** infrastructure and facilities activities are managerial in nature and their role is to define and guide the overall direction of the organisation.Organizational structures, control systems, administration management, financial management are some of the activities under infrastructure and facilities.

b. ***Human resources (HR):*** This is a specialized activity focussing on the human capital of organisations. It covers activities like employee recruitment (search and hiring), training, development, and compensation. In an educational setting, it is this activity responsible for staffing the entire education value chain system.

c. ***Technology development:*** This activity's core role is to find, implement and maintain technologies and systems which bring efficiency to activities which add value.IT management, class management, research resource management, course management systems among others are some of the Technology development functions which supportive of the education value chain.

d. ***Procurement:*** The prime responsibility of this activity is to purchase inputs for the production process. In case of an educational setting, attracting students and the purchase educative materials is a key performance area for the procurement activity.

Any education system is comprised of a number of levels (primary, secondary, tertiary, post-tertiary, professional) each becoming an independent sub-system. As such, each sub system will have its own value chain which when brought together will form an education value chain. Kenneth [9] blended Kolb's Experiential cycle with Porter's value chain to come up with five distinct learning processes with value addition properties to the learning process as shown on in figure 2 below:

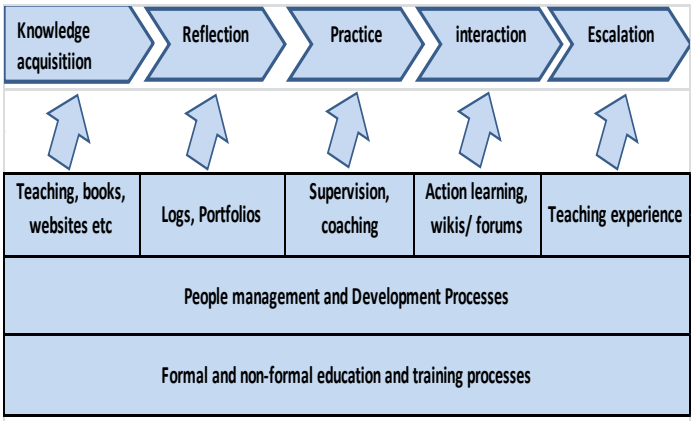

Figure 2: Education Primary activities (Kenneth 2009)

As can be seen from figure 2 above, [9] identifies five primary activities of the education value chain as knowledge acquisition, reflection, practice, interaction and escalation disrobed briefly below.

- **Knowledge acquisition:** is the initial stage when learners acquire information and convert it to knowledge. Knowledge can be acquired using a variety of approaches which include class room activity, group interaction, experiments, reading, researches and conferencesamong others. Knowledge acquisition is the basic activity and applies across all levels of education.

- **Reflection:** This is a stage when learners apply knowledge to their work situation, and reflect on its impact.Learners will be allowed to develop portfolios reflective of the behaviour they have acquired.

- **Practice:** This is a level when learners practice new skills or behaviours, either at work or in a simulated environment. It is at this stage where learners get the exposure to real life situations under guidance of a supervisor or coach. Their level of judgement and ability to solve problem will be examined or observed.

- **Interaction:** Learners are exposed to other learners to exchange experiences and synthesise new experience. This activity is experience based and supports the old adage which says "experience is the best teacher". Experiences we encounter on a day to day basis add to what has been formally learnt. Chat facilities, Blogs and forums are opened to the learners to enhance their interaction.

- **Escalation:** when learners build on their newly acquired skills and behaviours to develop new knowledge, apply it, and develop new skills and behaviours. Escalation is most visible at tertiary and post tertiary level and researches, findings and new theories are a product of this activity.

Digital Divide

OECD refer the digital divide as the '*gap between individuals, households, businesses, and geographical areas at different socio economic levels with regard both to their opportunities to access ICTs and their use of the internet for a variety of activities* [10]. The definition hinges on access as the divide, however [11] argue that there is more to digital divide than physical access to ICTs. Wei, Chan & Bernard [12]have described the digital divide under three main categories namely

i. Digital access divide - is the inequality of access to information technology (IT) in homes and schools.

ii. Digital ability divide - inequality of the ability to exploit IT arising from the first-level divide and other contextual factors like socioeconomic status and education.

iii. Digital outcome divide - the inequality of outcomes, based on exploiting IT arising from the s second-level divide and other contextual factors like motivation and meaningful usage

Digital Divide impacts on students' performance as outlined in the works of [13]. Their work revealed that students who were exposed early to ICTs performed better than those exposed late all other factors equal.

Digital Divide and the education value chain

It is without doubt that ICT play an important role in education. It aids in the acquisition of knowledge, facilitates dissemination and sharing of information, simplifies interactions amongst learners and with their teachers and provides a simulated environment for students to put theory into practice. A disparity in the access and use of ICTs within the education value chain will results in differences in the outcomes between the digitally included and the digitally excluded. This disparity often referred to as the digital dividefavours the digitally included in the education value chain as can be seen in figure 3 below.

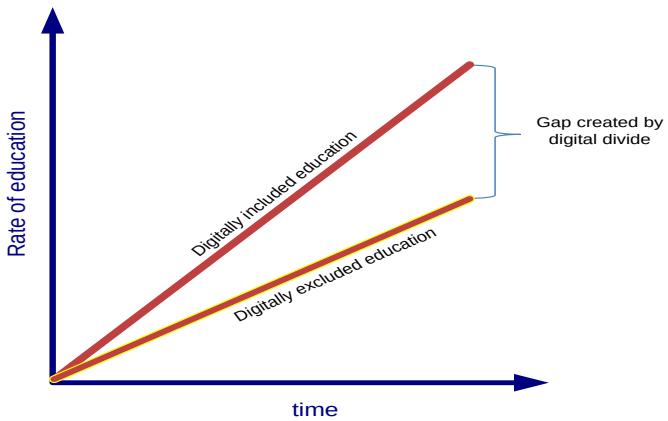

Figure 3: Showing the gap created by digital divide to the rate of education over time.

As seen in Figure 3 above, the digitally advantaged learner's rate of education is faster compared to those who are digitally disadvantaged. This is due to the fact that ICTs brings with it tools for knowledge acquisition, interpretation, transmission, presentation, preservation as well as filtering which are by far efficient compared to the traditional approaches (classroom activity , conventional libraries). Over the same period of time, those aided by ICTs would have gained more compared to their counterparts creating a gap between the two groups ,which will continue to widen with time if interventions are not taken. Digital divide impacts on all the primary activities of the education value chain and when compounded will create a huge gap as discussed in the following sections.

Knowledge Acquisition: This is the basic stage of the learning process and involves acquiring information from a variety of sources which include on-line, books, classroom, and social interactions among others. ICT provides information seekers with a wide range of online sources which are most current and relevant. It also helps in filtering and processing of information, as such, the digital divide will shrink the options available to support the knowledge acquisition process. The absences of ICTs takes away the efficiencies that it comes it with , and consequently the entire education value chain will be affected.

Reflection: ICT supported education allows learners to simulate a real life situation by using computer programs, for example one can simulate a network design by using simulators like packet tracer which conventional/ traditional approaches lack. The digitally disadvantaged will lag behind in reflection against their counterparts and this lag will affect other nodes in the education value chain.

Interaction: interaction allows learners or even employees to compare notes on how to tackle or solve certain problems. Through interactions, one gets to understand the angle others use to solve a problem, thereby adding to the inventory of knowledge they already have. Social media (facebook, Twitter, Whatsapp and others), emails, chat facilities,blogs, communication networks all facilitate interactions and are provided through the utilization of ICTs. However digital divide makes access to such interaction tools impossible thereby thinning the tools list one can use for interactions and as a consequence, the entire education value chain will be affected. Interactions suing ICT tools remove distance, place and time barriers as one can hold an interaction from anywhere and anytime. Removing ICTs will mean the interacting parties have to be at the same palace which may prove to be a challenge in scheduling and time wise since most of the interactions are informal in nature.

Escalation: Most importantly, what is currently known need to be effectively managed and be complemented with newer knowledge. Knowledge management is simplified when ICT is employed and the digital divide has a polarising effect between the digitally advantaged and disadvantaged.

Recommendations

The digital divide remains an enormous and complicated issue heavily interwoven with the issues of race, education and poverty. Aside from the financial barriers, the following will help narrow the gap:

- Universal Access: this has to be enshrined in policy and requires a strong political will and commitment. Interventions like subsidies may weigh in handy to make ICTs affordable as well as making ICT a basic right.
- Establishing community access centres in areas where individual ownership is not possible due to an array of factors like lack of communication and power networks.
- Conduct community outreach programs aimed changing people's attitudes towards technology. Some people/communities still view ICTs as luxuries, as such; they need to be liberated from such a mentality so they can view ICTs as absolute necessity.
- Training must be provided to those who will be teaching or rolling out ICT programs.
- More investment may be required where basic ICT infrastructure (Communication networks and power lines) may be lacking.
- Activities of the Sub-systems of the education value chain need to be well integrated since output from one sub-system is input to the other sub-system(s).
- A strong collaboration between the educational system and industry needs to be built so education with purpose may be offered.
- Educational curriculum will have to be revamped in line with the ICT revolution.

Conclusions

Education is essential for everyone and it is indispensable part of life both personally and socially. Education empowers, brings financial stability and dignified life, personal growth, efficiency and gives one an ability to plan ahead. However, the unequal standard of education is still a major problem that needs to be solved. This in-equality may be due to an array of factors one of which is digital divide. It is beyond doubt that ICT adds value to the processes of learning, and in the organization and management of learning institutions and any disparity in the access and utilization of ICTs in education will tilt the education scale in favour of the digitally inclusive. All the systems which educate us are collectively referred to as an education value chain. For a value chain to produce purposeful individuals, it has to be managed from policy level.

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