LIFELONG LEARNING SKILLS: A REVIEW OF ITS IMPORTANCE FOR ENGINEERING STUDENTS

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Abstract: *Lifelong learning plays an important role in addressing the issue of learning activities that are undertaken by students throughout their life. Such is due to the fact that the lifelong learning enables students to improve their knowledge, skills and competence. The current study concerns with reviewing articles pertaining to the importance of lifelong learning skills among undergraduates in engineering fields. This qualitative study employs content analysis in analysing its data in that it synthesises and analyses articles concerning the subject matter; lifelong skills that students need to develop so they may be advance in their career. In analysing data for the current study, thematic coding is employed to assist the researchers in finding the relevant themes. After data is analysed, it shows that there are three (3) significant themes emerge as the results of analysing the articles. These themes are 'Developing creativity and innovation among engineering students', 'Lifelong learning skills allow students to improve key competencies for their future undertaking' and 'Lifelong learning skills encourage intrapersonal communication among engineering students'. In relation to the results obtained, the study also discusses its implications.*

Keywords: Lifelong learning, Creativity, Critical Curiosity, Collaborative learning experience, Resilience

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1. Introduction

The dynamic world that we are living today due to globalization will continue to challenge all countries in the world – not leaving behind Malaysia (Kok Kuan, 2014). To address this globalization challenge, Malaysia needs to strategize and take proactive steps to strive for its competitive citizens and move forward through the achievement of quality, skilled and knowledgeable human capital (Nor Intan Saniah Sulaiman, 2009). The current version of sciences and technologies will not always be as relevant in the future due to the fact that some technologies will become outdated as the new technologies take place (Burke, 2015). Therefore, there is a need for people to update and upgrade the knowledge about the future's interests in order to be consistent with the concept of lifelong learning to become someone who is relevant to the progress and development of the nation (Mohd Zohadie Bardaie, 2002).

According to the Ministry of Higher Education (MOHE) lifelong learning enables Malaysian students to acquire knowledge and skills in conformity with the high-income economy model. Lifelong learning is capable of rolling out the potential of individuals who are entering job environment through various skills upgrading opportunities. In addition, lifelong learning has been extended to refer to cultivate the interest and inculcate talent for a more

meaningful life. Through lifelong learning, education will not be only be limited to young age groups but also needs to be extended throughout the life (Faizullah Mohamed, 2014).
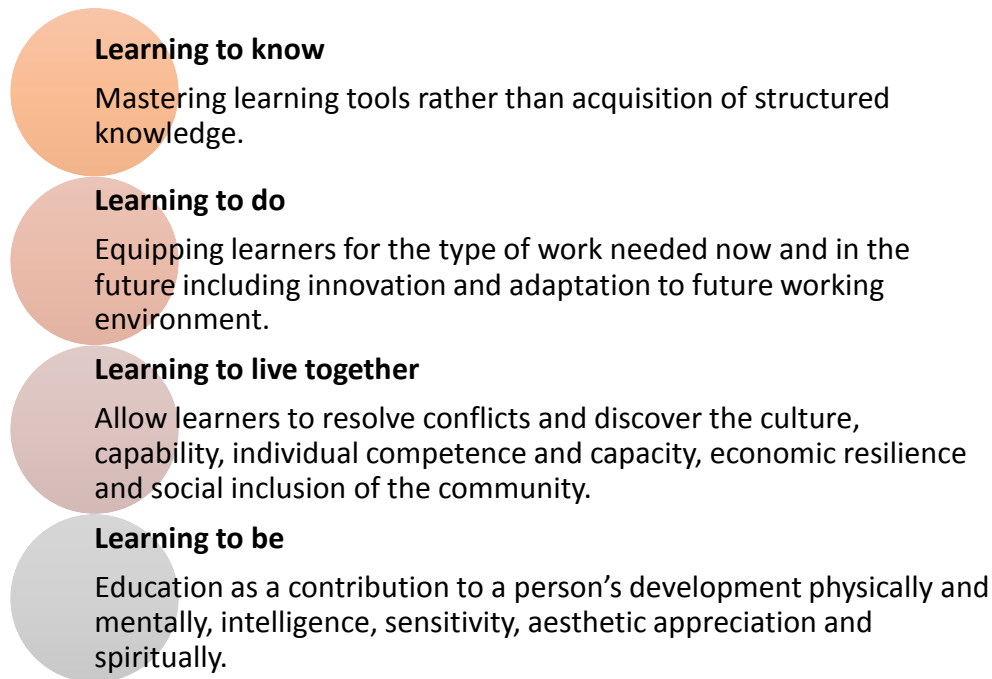
Hence, lifelong learning is a process of democratizing education in which it includes the acquisition of knowledge, skills and competence of certain knowledge field whether formal or informal based on experience and training since global competitiveness and diversity of needs have urged individuals to constantly upgrade their knowledge and skills. In the context of working environment, it is also demanded by employers and industries that potential employers need to increase productivity (Former Minister of Higher Education, Dato' Sri Idris Jusoh, 2017).

To examine the importance of lifelong learning, the concept of the term is not a recent requirement due to the fact that knowledge seeking is a basic necessities for every individual regardless of age and social groups. Mohd Syukri Jali (2012) asserts lifelong learning enables everyone to gain proper knowledge and participate actively to acquire new knowledge. In the current demands, one's ability to master new knowledge and skills is the key to improving productivity. Paul Lengrand (1970) in a UNESCO report entitle 'Learning to Be' states that educational attainment should not be limited to elites or those who are within a certain age range i.e. children or adolescents. It should, instead, be integrated into the whole community and life of each member of the community. Meanwhile, Knassel, Meeds and Rosetti (2000) opine lifelong learning is identified through three (3) main reasons which are occupation, empowerment and excitement. In Japan, awareness of the importance of lifelong learning triggers "Employability Fever" in which the community is determined to have certain approvals or skills to ensure that they obtain employment opportunities in their field of interest (Frey, 2015). With that being stated, this paper attempts to find the matter in question i.e. the importance of lifelong learning skills particularly among engineering students.

2. Literature Review

Definition of Lifelong Learning Skills

In defining lifelong learning, Dunlap and Grabinger (2003) state that lifelong learning is an intentional learning that people engage in throughout their lives for personal and professional fulfilment. Lord (2011) asserts, an individual pedagogical choices are able to provide significant impacts on individuals' future especially learners. According to Srebrenkoska, Mitrev, Atanasova and Karov (2014), lifelong learning can be defined as the learning that is pursued throughout life in which availability and diversity can be acquired flexibly at different times and places. Delors (1996) introduced the four (4) pillars of education for the future, which are:

Learning to know

Mastering learning tools rather than acquisition of structured knowledge.

Learning to do

Equipping learners for the type of work needed now and in the future including innovation and adaptation to future working environment.

Learning to live together

Allow learners to resolve conflicts and discover the culture, capability, individual competence and capacity, economic resilience and social inclusion of the community.

Learning to be

Education as a contribution to a person's development physically and mentally, intelligence, sensitivity, aesthetic appreciation and spiritually.

Figure 1: Four Pillars of Education for the Future

Srebrenkoska et. al. (2014) state, lifelong learning promotes learning beyond traditional schooling in which allowing a student to continue learning throughout his/her adult life. To connect with the skills acquired during lifelong learning, the researchers agreed that it allows creativity and adaptability to be instilled in an individual throughout the learning process. These types of skills enable students to be initiative and encourage responsiveness while enhancing skills to manage uncertainty and negotiate conflicts in their future working environment (Borges, 2016).

Other researcher defines that lifelong learning is the seeking of knowledge for personal and professional purposes in which can be done throughout life by volunteerism and convincing self-motivation (Aspin, 2006). While Bajunid (2006) and Hargreaves (2004) state that it can also be regarded as development of human potential through a continuous learning process that motivates and empowers individuals to master and practice knowledge, appreciate the worthiness of life that is needed for them to take responsibility in various roles and circumstances with confidence and creativity in facing all the challenges in life. In addition, Zulkefli Ahmad (2005) defines lifelong learning as a lifelong prose consisting of training, self-development and alignment of individual learning concepts. According to Zaharah Kassim and Abdul Razak Ahmad (2010), there are several contexts and concepts that can be found in defining lifelong learning for example; home schooling which involves informal learning at home; adult education i.e. formal learning and structured learning to obtain certificates or qualifications and working skills for subsequent lives. In addition, higher education is a formal and structured learning program that is to pursue studies or attend courses organized by higher education institutions, on-the-job training includes professional development, whether it is done on a personal or organizational initiative. Last but not the least, online learning in which is a personal learning environment or self-directed learning either formally or informally through various resources and multimedia tools that ones can find online (Kassim & Ahmad, 2010).

Meanwhile, Carlson (2016) in the First Global Conference on Lifelong Learning asserts that the term is defined as a continuous process that stimulates and empowers individuals especially learners He adds that the process allows the acquisition of knowledge, values, skills and understanding to happen naturally throughout people's lifetimes. This process will encourage people to apply them with confidence, creativity and enjoyment in various roles, circumstances and environments (Carlson, 2016). Thus, it states, the definitions that indicates lifelong learning and skills that are acquired throughout the process is not achieved independently but rather stimulated and empowered by self-directed and active learners and education providers. The incorporation of lifelong learning skills include the knowledge application not just for knowledge's sake but rather to build confidence, creativity and enjoyment throughout the learning experiences (Carlson, 2016).

The Attributes of Lifelong Learning Skills
Lifelong learning skills is not only about acquiring a huge amount of facts, information or knowledge but more to giving individuals to bring out changes to be a better learner and better contributors to the society (Borges, 2016). Longworth and Davies (1996, p. 20), consider "lifelong learning attributes to be distinguishable from other graduate attributes since the lifelong learners' qualities involve abilities for example; information-handling, entrepreneurial skills, self-esteem, decision-making, problem-solving and self-management; empathy and tolerance of others, creativity, a sense of humour, flexibility adaptability and versatility, critical judgment, thinking and vision, planning, practical skills, learning-to-learn, discussing and communicating informally, presenting and communicating formally". According to Beckett and Hager (2006), the attributes of lifelong learning skills provide a basis for educating undergraduates towards promoting effective learning skills for example, communication, social, interpersonal and intrapersonal skills, creativity and innovative while being able to enjoy working environment. They suggest that the importance aspects of considering the profile of a lifelong learners on the contextual basis, social and relational will contribute towards improving individual perspective among undergraduates. Watanabe (2018) states that there are several attributes in lifelong learning skills that are important to be acquired by students especially in engineering field. For example; creativity, problem solving, critical thinking, leadership, communication, information management, adaptability, curiosity and reflection.

In the context of Malaysian education systems, lifelong learning suggested by the government has been in the centre of the self-development of every Malaysian learner and teacher especially in achieving the previous 2020 vision (Asma Ahmad, 2009). She adds, there are several benefits that lifelong learning skills may contribute towards the development of individual's self-efficacy in acquiring knowledge. It includes producing a free, steadfast and independent student in the community who is confident of him/herself towards presenting everything that s/he has accomplished, and to be quite agile in facing all obstacles in their future undertaking. Other than that, such skills help forming and developing a mature democratic society based on consensus and deliberation and can be emulated by other developing countries' achievements. The researcher adds, as an individual student, there is a need for him/her to have the ability to respond proactively to change and contribute effectively to the needs of an organization as well willing to use knowledge and innovation for the benefits of the organization and public purpose (MOHE, 2007).

In a wider context, the attributes of lifelong learning skills are generic and transferable (Harpe & Radloff, 2008). Barrie (2006) agrees that the attributes are generally understood in referring to the skills, knowledge and abilities of the university students to be able to

complete the tasks given to them in a disciplinary manner. Field (2009) asserts, while the context of rapid socio-economic, cultural and technological changes, it has become an acknowledgement that individuals are required to possess distinguish skills that would allow them to compete in the increasingly globalised world. The attributes of lifelong learning skills, therefore, has become essentials in coping with all the changes in an individual's daily life.

3. Methodology

Research Design
The current study employs content analysis as its research design. This method allows the qualitative data collected in research to be analysed systematically and reliably by reading a body texts, images and symbolic matter in relation to the categories of the researcher's area of interest (Haggarty, 2011). In the current study, the data are collected from the findings obtain from research articles, newspapers, government reports and websites. These findings are analysed accordingly to obtain the answers to the research question formulated that is stated earlier in this paper.

Data Collection Procedure
The procedures of collecting data follows the guidelines that are proposed by Freankel, Wallen and Hyun (2011). The guidelines consists of five (5) steps that need to be adhered to for the purpose of gathering data:

Step 1: Specify unit of Analysis
In this stage, words, sentences and phrases are the units that are analysed so as to answer the research question in the study.

Step 2: Locate Relevant Data
This stage requires the researchers to locate the data that are in the articles, newspapers, government reports and websites.

Step 3: Develop a Concept or Rationale
In this stage, it requires the researcher to study the content of the documents (articles, newspapers, government reports and websites).

Step 4: Develop a Sampling Plan
In this stage, the researcher exercises a random sampling in finding appropriate information prior to skimming, scanning, analysing and synthesizing the selected articles.

Step 5: Formulate Coding Category
In this procedure, the researcher needs to ensure that the research questions need to be answered in the study. This step requires the researcher to look for relevant domain i.e. lifelong learning skills among undergraduate students.

Data Analysis
The main data analysis in this study involves the use of coding to develop themes as it facilitates the researchers to synthesise the selected documents. Basically, evident-content on the subject matter pertaining to lifelong skills that are relevant to engineering students are carefully examine in the process of analysing the data in the current study.

4. Results and Analysis

To summarize, the current study attempts to find answers to the importance of lifelong learning skills among engineering students. Specifically, this study aims to determine the lifelong learning skills that they require in pursuing their future in engineering fields. This section is discussed in accordance to the theme emerged out of the research question being formulated.

Lifelong learning skills allow students to improve key competencies for their future undertaking

Mediano and Lord (2012) assert that to be competent is to be able to learn, adapt and respond to a new situation and transfer it from learning to practice, situated learning and tacit knowing (Deist & Winterton, 2005). The key competencies include concrete "technical" knowledge where generic, transversal competencies are shared by all field of professionals including communication, teamwork and information technology literacy to keep up with the changing nature of technical knowledge (Mediano & Lord, 2012). Lifelong learning skills enable students to practice knowledge, skills, attitude and values in solving problems professionally; in an independent and flexible way.

In the West, for engineering students, the programmes namely Lifelong Learning for Engineering Students are introduced so as to enhance their learning competencies which include active learning based exercises (Prince, 2004). This program focuses on helping students to learn about lifelong learning concept and allow them to demonstrate the skills developed throughout their undergraduate studies. The findings of the program show most of the students admit the perceived importance of lifelong learning skills. The skills help them to develop their professionalism as future engineers.

Lifelong learning skills encourage intrapersonal communication among engineering students

Deveci and Nunn (2018) assert intrapersonal communication is an essential part of lifelong learning skills in helping students to understand themselves as individuals in an organisation and to make informed, ethical and society-friendly decisions or judgements in certain situation. The researchers state that intrapersonal communication is a way of adopting lifelong learning approaches into their profession in which has become the most important tool for effective interpersonal communication. In addition, intrapersonal communication requires students to work in collaboration with other future engineers from the same disciplines as well as different engineering fields (Watson, 2013). Also, students will be more aware of other people's needs - in this context their Emotional Intelligence (EI). Therefore, the incorporation of EI into the approach of lifelong learning enables students to engage in student-centred learning process and encourage interactional training and social competence in engineering education as well as building rapport, generating empathy, giving cooperation and demonstrating consensus building skills.

Developing creativity and innovation among engineering students.

It seems that the sustainable growth of technologies and employment need contemporary forces which include the priorities of innovation, creativity and mobility of individuals to fit in an organisation (Srebrenkoska, Mitrev, Atanasova & Karov, 2014). The competitive global marketplace nowadays demand lifelong learning skills to be practiced in an organisation that

suits the orientation, substantial changes, uncertainty and conflicts that might occur. To add, today's employers are opting to provide places for individuals who are continually able to acquire skills and knowledge, and at the same time be resilience and flexible in adjusting the evolving needs of the global employment. To realise this initiative, it demands students as future engineers to be creative and innovative adjusting themselves for lifelong self-directed learning.

5. Conclusion

Generally, the review of this article is intended to identify the importance of lifelong learning skills towards engineering students in preparing them to face their future challenges in this globalised era. In answering the research question, the results of this review of articles support the idea of lifelong learning skills in that they play vital roles in producing capable, dependable and knowledgeable engineering undergraduates in the future in various skills. More specifically, the review of article found that lifelong learning skills are essential as they assist the future engineers to improve their key competencies after graduation, promote intrapersonal skills and develop their creativity and innovativeness.

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