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What is the Role of Lifelong Learning in Relation to Economic Growth in Malaysia?

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Abstract

Lifelong learning is continuous learning throughout the life of an individual. It can occur through formal and informal means. Formal means include training, counselling, tutoring, mentoring, apprenticing, higher education, etc. Informal means include experiences gained etc. Malaysia considers education to be a vital agenda and crucial foundation to optimise every citizen's potential, especially regarding obtaining the Wawasan 2020 objective to achieve a zero illiteracy rate by the year 2020. This national endeavour will all be for nought if the education system fails to produce human capital that can meet the challenges and innovations of a 21st century economy. It is believed that through appropriate training and education level, citizens should be able to perform well in their work. Learning new skills and acquiring new knowledge cannot be restricted to formal educational settings. Effective learning needs to be integrated into the work process, as well. Training is often considered a variable that can be plugged into an economic model. This paper will discuss the significance of lifelong learning for an economy using the economic growth theory of human capital and learning-by-doing.

Keywords: lifelong learning, growth model, human capital, learning-by-doing.

Introduction

Education is chiefly about surpassing expectations and optimising potential. The role of education in human capital accumulation is transformational in moulding and determining the destiny of nations throughout the annals of history. According to Sachs (1995), learning new skills and acquiring new knowledge cannot be restricted to formal educational settings. Training is often considered a variable to be plugged into an economic model. Lifelong learning (LLL) bears the slogan, "Learning for All". The lifelong learning project in Malaysia has been in place since the 1970s, and it became an economic project in the 1990s.

Education is a never-ending quest to gain a competitive advantage, which has led many countries to focus on education as a type of panacea for strengthening competitiveness, employment and social cohesion. According to Knapper and Cropley (2000), lifelong education defines a set of organisational, administrative, methodological and procedural measures that reflect and promote the importance of lifelong learning. Lifelong learning has been used in the literature since the 1970s. The UNESCO Commission (2002) defines lifelong learning as a philosophical and a political vision to foster democratic and emancipated systems of learning possibilities independent of class, race, economic ability and age. Learning is one of the most important human activities. By learning, we engage with the natural, social and cultural world. As we know, learning changes with age, but it should not be confined to any age. Therefore, in times of increasing economic and social uncertainties, making lifelong learning a reality is a political necessity to ensure the growth and welfare of aging societies. Furthermore, it is a moral duty to grant each individual an opportunity for employment and social inclusion.

Education contributes to the economic success of a region by deepening the skills and knowledge, or human capital, of its residents. A study by Abel and Deitz (2011) found that it is possible for academic research to contribute to the stock of local human capital. The knowledge and technologies created through research activities at universities may not only attract new firms to a region but also help existing businesses to expand and innovate. These "spillover effects" can raise the region's demand for highly skilled workers. Education is seen as the engine of economic advancement and social mobility. Education is also one of the

most critical factors in Malaysia's transformation into a developed and economically affluent nation. There are several important opportunities for improvement because the current education sector has limited international focus and lacks unified regulations.

In Malaysia, economics and politics have made their impact felt over the years. Education has progressed in line with the shift towards productivity and growth based upon knowledge and innovation. For instance, the national gross expenditure on research and development (GERD) increased from RM1.1 billion in 2005 to RM4.3 billion in that same year. Within the same period, the use of information and communication technology (ICT) grew from 1.2% to 21.8%. (Ninth Malaysia Plan 2006–2010). Information technology (IT) infrastructure will be further extended under the Tenth Malaysia Plan (2011–2015) in facilitating the connectivity to the global knowledge network. The government's goal is that 75% of households have broadband by 2015, and the Malaysia Research and Education Network (MyREN) will be further promoted to allow Malaysian researchers to connect to the global research community. These trends indicate the increasing demand for knowledge-based input in practically all aspects of life. Ultimately, the onus for this initiative is on universities, which are expected to respond to the demands from the labour market for highly qualified and well-prepared graduates.

Malaysia views education as a vital agenda and crucial foundation upon which to base every citizen's potential and put within reach the promise of the Malaysian dream. A significant amount of the annual budget is allotted to education and the development of human capital. Education is expected to be the major catalyst in the country's continued economic growth and expansion. Since 2009, education has played a significant role in Malaysia's transformation to a developed and high-income nation. Malaysia's vision of having a knowledge-based economy will provide the foundation for sustaining a rapid rate of economic growth and enhancing international competitiveness to achieve the objective of Vision 2020, i.e., zero illiteracy. This knowledge-based economy will also strengthen Malaysia's capability to innovate; adapt and create indigenous technology; and design, develop and market new products, thereby providing the foundation for endogenously driven growth. In addition, a knowledge-based economy will complement and accelerate the change from an input-driven to a productivity-driven growth strategy. A greater awareness of the

role of knowledge input will enhance traditional factors of production and generate new sources of growth. This growth, in turn, will expand the production possibility frontier (PPF) of the Malaysian economy.

In the Ninth Malaysia Plan (2006–2010) and Tenth Malaysia Plan (2011–2015), the Malaysian government encourages lifelong learning to achieve the five national objectives: to raise the capacity for knowledge and innovation and nurture "first class mentality" to address persistent socio-economic inequalities constructively and productively; to improve the standard and sustainability of quality of life; and to strengthen the institutional and implementation capacity. In addition, Malaysia's Ministry of Higher Education (MOHE) drew up a blueprint on the enculturation of lifelong learning for the country. With recognition and support from the government, lifelong learning, through its various modes including distance learning, e-learning, and workplace and part-time learning, will serve a vital role in Malaysia's human capital development (Ministry of Higher Education, 2007). In implementing the country's lifelong learning agenda and assisting the government in transforming the nation into a high-income economy by 2020, MOHE has taken the initiative to embark on a Blueprint on Enculturation of LLL for Malaysia: 2011–2020. In accordance with these initiatives, Table 1 lists lifelong learning issues and challenges; Table 2 provides the four blueprint strategies for lifelong learning; and Table 3 explains the Principles of the lifelong learning blueprint.

Table 1 Lifelong learning issues and challenges

Lifelong learning issues and challenges
Absence of a full-fledged lifelong learning policy
Lack of monitoring of LLL programme at the national level
Lack of awareness and participation in LLL programmes
Inadequate financial support for lifelong learners
Inadequate mechanism and infrastructure for effective implementation of LLL programmes
Overlapping LLL activities programmes
Recognition

Excerpt: Ministry of Higher Education Malaysia (2011b). Blueprint on Enculturation of Lifelong Learning for Malaysia: 2011-2020. Putrajaya, MOHE.

Table 2 The four blueprint strategies of lifelong learning

The four blueprint strategies
Strengthening of the mechanism and initiatives of LLL through the establishment of the National LLL Committee to formulate policy and provide an enabling environment to move LLL agenda for the country as a whole.
Providing awareness and promotional LLL programmes to the general public through catchy jingles or tagline and enticing the general population via incentives and funding mechanism.
Ensuring sustainability of LLL programmes via appropriate recognition and accreditation which include recognition of prior learning experience, quality assurance and establishment of credit bank for LLL programmes.
Providing strong support learning system to encourage individuals to participate LLL programmes.

Excerpt: Ministry of Higher Education Malaysia (2011b). Blueprint on Enculturation of Lifelong Learning for Malaysia: 2011-2020. Putrajaya, MOHE.

Table 3 The principles of the lifelong learning blueprint

The principles of the lifelong learning blueprint
Enculturation of LLL is a national agenda and to be the third pillar of human capital development
Maximum impact and complementarily
Cost effectiveness
Accountability
Inadequate mechanism and infrastructure for effective implementation of LLL programmes
Leveraging on technology
Recognition
Benchmarking with international best practices

Excerpt: Ministry of Higher Education Malaysia (2011b). Blueprint on Enculturation of Lifelong Learning for Malaysia: 2011-2020. Putrajaya, MOHE.

Growth Models

Growth models did not consider education a factor in production in Malaysia's early neoclassical period. It was only in the 1960s that education began to be seen as one of the variables that accounted for

previously unexplained generators of growth. In the mid-1960s, studies based on the concept of human capital investment began to measure education's rates of return. According to the modern growth theory, the accumulation of human capital is an important contributor to economic growth. In this regard, there have been numerous cross-cultural studies that have extensively explored whether the attainment of education can contribute significantly to economic growth. The general findings show that more educated individuals tend to have higher employment rates and earnings and be more productive relative to those who are less educated. Therefore, a strong rationale exists for governments and private households to invest substantial portions of their resources in education with the expectation that higher benefits will accrue over time. In this context, education is deemed an investment that enables individuals to be equipped with knowledge and skills that improve their employability and productivity and that in turn lead to higher earnings in the future. From an economic perspective, growth is determined by various factors and is inter-related in some ways. These various factors may include contributions from human capital, learning-by-doing, infrastructure, innovation and trade between countries. Most of the factors listed above affect a country's economy, be it directly or indirectly. However, in this paper, only the aspects of human capital and learning-by-doing are examined.

Human Capital

Human capital does play a significant role in economic growth. Superior human capital is the source of higher-quality goods and services and greater productivity. These human capital are be able to make good decisions, be strong leaders, and have the ability to create and innovate products and services in the market. In short, an increase in the quality and productivity of goods will also increase the demand for goods in the market. Thus as a whole, economic growth will be boosted through an increase in consumption and export. Therefore, human capital plays a significant role in boosting economic growth.

Policymakers are increasingly viewing education as an engine of local economic development because of the transition in most developed countries toward a more knowledge-based economy. Conventional approaches to valuing the economic activity generated by education often

focus on direct employment or expenditure effects, along with a multiplier effect to capture indirect and induced outcomes. However, the potential influence of education extends beyond these mentioned effects because educational institutions help build knowledge and skills, which are critical components of an area's economic success. A region with higher levels of human capital tends to have greater economic activity and more rapid economic growth.

A study by Abel and Gabe (2011) used a wide variety of data to control for factors such as "highly skilled people are attracted to productive places" that, through statistical techniques, establishes a causal link between human capital and local economic activity. The results were that a one percent point increase in the number of people with college degrees in a given region leads to a two percent increase in the overall economic activity in that same region.

The quality of the nation's human capital is thus the most critical element in the achievement of Malaysia's National Mission, and this human capital development has been a key element in the Ninth Malaysian Plan. Human capital development encompasses the acquisition of knowledge and skills, or intellectual capital. The capacity will be increased to develop knowledgeable, skilled and innovative human capital to drive a knowledge-based economy. The implementation of lifelong learning will be accelerated to encourage skill building among all segments of society. John. F. Kennedy once said, "Let us think of education as the means of developing our greatest abilities, because in each of us there is a private hope and dream which, fulfilled, can be translated into benefit for everyone and greater strength for our nation".

There are numerous studies from an economics perspective on the effects of human capital and learning-by-doing on economic growth. According to Romer (1990) and Nelson and Phelps (1966), human capital is the key variable in the research sector that generates new ideas or products underlying technological progress, and a larger stock of human capital facilitates the transfer, acceptance and assimilation of new technology.

This study applies the endogenous growth model (Human Capital Augmented Solow Model, 1956):

$$Y_t = k_t^{\theta}\left(H_t \mu L_t\right)^{1-\theta}, \theta \in (0,1)$$

where Y= The level of income, H_t = The level of human capital, μ = The fraction of workforce used in production, and L = Labour.

Assume that

$$H_{t+1} = \beta\left[(1-\mu)L_t\right]^{\alpha} H_{\#}^{\ t}, \alpha, \eta \succ 0$$
$$K_{t+1} = I_t + (1-\delta)k_t$$
$$I = sY_t$$

$$L_{t+1} = (1+n)L_t; L_0 = 1, L_t = (1+n)^t$$

Deflate all variables by the efficiency unit of labour:

$$H_t L_t = \left[\left(1+\gamma(1+n)^t\right)\right]$$
$$k_t = \frac{k_t}{(1+n)^t H_t}; y_t = \frac{y_t}{(1+n)^t H_t}$$

Therefore,

$$k_t = (1+n)^t H_t k_t; y_t = (1+n)^t H_t y_t$$
$$k_{t+1} = sk_t^{\ \theta}\left[(H_t,)\mu(1+n)^t\right]^{1-\theta} + (1-)k_t$$
$$k_{t+1}(1+n)^{t+1} H_{t+1} = \delta k_t^{\ \theta}\left[(1+n)^t H_t\right]^{\theta}\left[\left(H_t(1+n)^t\right)\right]^{1-\theta}\mu^{1-\theta} + (1-\delta)k_t(1+n)^t H_t$$

Rearrange these variables as follows:

$$k_{t+1}(1+n)^t(1+n)H_{t+1} = \delta k\, t^{\theta}\, H_t(1+n)^t \mu^{1-\theta} + (1-\delta)k_t(1+n)^t H_t$$

Divide the above equation with $(1+n)^t H_t$

$$k_{t+1}(1+n)\frac{H_{t+1}}{H_t} = \delta\mu^{1-\theta}k_t{}^{\theta} + (1-\delta)k_t$$

The above equation is the dynamic of capital stock

Assume a balanced growth path, where $\gamma^n{}_t$ is constant,

$$\gamma_{t+1}{}^n - \gamma_t{}^n = \left[(1+n)^{\alpha}\left(1+\gamma_t{}^n\right)^{n-1} - 1\right]\beta\left[(1-\mu)L_t\right]^{\alpha} H_t{}^{n-1}$$

where γ^n = growth rate, a proxy for human capital, and $(1-\mu)$ = human capital accumulation.
The existence of balance growth path requires the following:

$$\gamma_{t+1}{}^n = \gamma_t{}^n$$
$$(1+n)\alpha\left(1+\gamma_t{}^n\right)^{n-1} - 1 = 0$$
$$1+\gamma^n = (1+n)^{\frac{\alpha}{1-\pi}}$$

Human capital will be able to increase economic growth based on the value of $(1+n)^{\alpha}$ and with the assumption of a balanced growth path. In the balanced growth equilibrium, the capital intensity of an economy is calculated as the capital stock divided by its total output. The value of capital intensity is the constant. However, other variables such as the capital stock, real GDP, and output per worker continue to increase. Lucas (1993) claimed that the key to high growth performance is the ability to move skilled workers quickly between sectors.

It is believed that through appropriate training and education level, citizens would be able to perform well in their work. For this reason, firms prefer hiring workers or labourers with high education backgrounds and extensive work experience. Workers of a proper education level would be able to handle and solve problems at work efficiently and in the firm's best interest. They are quick to analyse related problems and generate

solutions because they are able to process larger amounts of information and are able to expedite issues at work. This skill would thus increase the productivity and growth of a firm.

Learning-by-Doing

Learning-by-doing is a concept of economic theory. It refers to the capability of workers to improve their productivity by regularly repeating the same type of action. Learning-by-doing allows exploration, experimentation, and experiencing novel ways of looking at the human experience in a low risk setting. Learning-by-doing can take the form of modelling, simulation and prototyping in testing an experiment with solutions. Learning-by-doing trains agents to believe that the null hypothesis advances knowledge as much as the proof. Most importantly, learning-by-doing is a learning process from failure and experimentation. The innovation model, which is a learning-by-doing model, targets the development of new technologies that enable a platform for national innovation.

The effects of learning-by-doing are not just one-time-only sources of growth but are potential links in a process of unbounded growth. This process of cumulative causation sustains a continuous cycle, i.e., a self-expanding process in which increased output induces an increase in productivity and thus a further increase in output. Learning-by-doing and cumulative causation support the formulation of a dominant strategy. In view of the high reliance of technology on intellectual capital and knowledge-intensive applications, measures will be intensified to enhance human capital development in a learning-by-doing model.

Learning-by-doing is a form of lifelong learning. In other words, a worker is able to increase his or her productivity through specialisation. By repeating the same task, the worker gains a better understanding of how to improve the production process. Through learning-by-doing, a worker's excellent performance contributes positively to economic growth. Learning-by-doing is an important learning process for workers in an economy. Learning-by-doing is a good index for the stock of knowledge, based on the assumption that the potential productivity gains from learning are essentially unbounded.

Arrow (1962) introduced the theory of learning-by-doing, stating that learning takes place as a side effect of the production of new capital goods and that, because learning occurs at an individual level, the stock of knowledge in the economy will depend on the capital stock per capita.

$$Y_t = k_t^{\theta}(x_t L)^{1-\theta}, \theta \in (0,1)$$

$$x_t = \beta\left(\frac{k_t}{L_t}\right)^{\pi}$$

$$L_{t+1} = (1+n)L_t; L_0 = 1$$

$$k_{t+1} = \delta y_t + (1-\delta)k_t$$

The law of motion can be presented as:

$$k_{t+1} = \delta k_t^{\theta}\left[\beta\left(\frac{k_t}{L_t}\right)^{n} L_t\right]^{1-\theta} + (1-\delta)k_t$$

Divide the above equation with k_t:

$$\frac{k_{t+1}}{k_t} = \delta k_t^{\theta-1}\left[\beta\left(\frac{k_t}{L_t}\right)^{n} L_t\right]^{1-\theta} + (1-\delta)$$

$$\frac{k_{t+1}}{k_t} = \delta\beta^{1-\theta}\left(\frac{k_t}{L_t}\right)^{(1-\theta)(\eta-1)} + (1-\delta) = \left(1+\gamma_t^{\,k}\right)$$

Learning-by-doing will be able to contribute to economic growth if $n \prec 1$ because $\gamma_t^{\,n} \prec \gamma_{t+1}^{\,n}$, $\left(\frac{1+\gamma_t^{\,n}}{1+n}\right)^{(1-\theta)(n-1)} \succ 1$. It follows that $\gamma_{t+1}^{\,n} - \gamma_t^{\,n} \succ 0$, showing an increase in economic growth rate, where γ^n = growth rate.

Yang and Borland (1991) have shown that learning-by-doing plays a role in the evolution of countries where greater specialisation in production is achieved. In both of these cases, learning-by-doing and increasing returns provide an engine for long-term growth.

Clearly, in this new economy, human capital and learning-by-doing are powerful catalysts that promote economic growth. The benefits to society from infrastructure projects for the public good are enormous, extending well beyond the benefits of each project on a private basis. The returns from infrastructure development are likely to generate value to society over the long term that far exceeds the cost of any individual project. Better living conditions, an increase in property usage and values, and a larger proportion of the population engaged in commerce all represent tangible benefits to society that accrue over the long term.

The model of educational and trade openness with real gross domestic product

Panel data equation:

$$Y_{it} = \alpha_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \varepsilon_{it}$$

Therefore, the equation explaining real gross domestic product will be expressed as:

$$\ln RGDP = \alpha_0 + \beta_1 \ln TO_{1it} + \beta_2 \ln EO_{2it} + \varepsilon_{it}$$

where *RGDP*= Real gross domestic product (based on US$); *TO* = Trade Openness (% of GDP); ED= Educational (% of GDP); ln = Natural logarithm; and εt =Random error term.

Results Summary

Table 4 Analysis summary

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness
Constant	8.237380	8.177961	10.57144	5.446111	1.576355	-0.116214
In TO	4.152988	4.151605	5.433177	2.764116	0.528115	0.007015
In ED	5.163411	5.038391	7.539047	3.361567	0.739208	0.768356
Observation	270	270	270	270	270	270

	Kurtosis	Jarque-Bera	Probability	Sum	Sum Sq. Dev.
Constant	1.721425	18.99873	0.000075	2224.093	668.4321
In TO	1.861928	0.557241	0.756827	1121.307	75.02555
In ED	3.575544	30.29325	0.000000	1394.121	146.9892
Observation	270	270	270	270	270

Table 4 shows the summary of the panel data analysis as a total observation of 270 cases. In summary, the variable constant represents the dependent variable, the real gross domestic product. The GDP has a value of 8.237380 and 1.5766349 for mean and standard deviation, respectively. Meanwhile, for the independent variables of trade openness, the value of the mean and standard deviation are 4.152988 and 0.528115, respectively. The other independent variable education yields a value of 5.163411 and 0.739208 for its mean and standard deviation.

Conclusion

This study shows that the degree of education has an effect on a country's income. The regression results show the effect of openness on the drop in GDP, and that the more closed an economy is, the larger the drop in GDP. Looking further at how education affects the Gross Domestic Product indicates no direct linkage between a more open economy and higher income. The descriptive statistics show that the more closed a country is, the more the country will grow (although this is not statistically significant), which result was not in accordance with the hypothesis.

According to the endogenous growth model, human capital and learning-by-doing play significant roles in economic growth; people do learn how to address real life problems within the context of their work. Learning does not take place in a separate phase and in a separate place but is integrated into the work process. The economic growth theories on human capital and learning-by-doing do increase economic growth under certain assumptions. Higher education trends, whether in Malaysia or elsewhere, will be a continuous indicator of growth and development. Certainly, restructuring and reforms need to be undertaken, bearing in mind the challenges that will always be present due to the effects of technology, politics, the economy, demographics and market opportunities. The ability to circumvent some of the problems that these challenges pose will depend upon the innovativeness and vision of the institution concerned.

However, it is assumed that the potential for learning in the production of any particular good, using any particular process, is in fact finite and bounded. That is, by specialising in one particular job or task, one is restricted in the development of his or her skills. One may only be good at one particular task or part of production and have no knowledge at all about the other processes of production. Therefore, some economists may argue that learning-by-doing in one particular area of expertise may not be a good thing and will not affect economic growth positively. This possibility is due to an individual's limited knowledge, skills, or capabilities regarding the production of a good as a whole. It is therefore suggested that an individual should alternate specialising in one skill with specialising in other skills from time to time. By transitioning from one task to another, a worker may increase his or her skills overall. In this way, the impact of learning-by-doing on economic growth may become significant.

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