

## ISSUES OF INNOVATION IN EDUCATION

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### ABSTRACT:

The rapid development of technology has opened up new opportunities for improving the education system, to equip students with skills and attitudes to compete with the rate of innovations through the knowledge of sciences and mathematics. In Malaysia, towards the mission of 2020, the government has provided and spend large sums of money in research to improve the educational system in schools, colleges and universities to take care that no child is left behind. The transformation on entire education system such as revise the curriculum has been made in order to prepare and develop students' skills needed for the 21<sup>st</sup> century. This points out that some strategies have been suggested to achieve the targets of meeting the 21st century challenge in producing researchers who are creative and innovative. This article describes some issues of innovation in education are raised to direct further considerations by various stakeholder especially the teachers and education stakeholders in preparing our students with critical thinking and creative in innovation.

Key Words: Innovation, technology, investment, student engagement

### INTRODUCTION

Defining innovation is unlimited from different views and perspectives of people. The word of innovative can be related with other words such as upgrade, improvement, advance and re-produce are the ideas of innovative that have come to mind once people think about it. In Malaysia, "the Malaysia Design Innovation Centre (MDI) is a landmark government-private sector initiative to drive creativity and innovation to advance business in an intensely competitive globalised environment" (as cited in Malaysia Design Innovation Centre 2005-2010, 2005). In order to robust for facing the future challenges, innovation had gave strengthen for individual to develop their self-esteem and also survival skills to produce new innovative products.

From West and Farr's (1989) claimed that "innovations are new and different ideas, processes, products or procedures" (as cited in Morton, Burns & Dainty, 2007, p. 2). West and Farr (1990) also described that "innovation as a cycle with four stages, comprising recognition, initiation, implementation and stabilization, although the innovation process is now more generally agreed to consist of two components, creativity and implementation, which may or may not occur at the same time" (as cited in Morton, Burns & Dainty, 2007, p. 2). Rogers (1995) describes innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. According to Tidd, Bessant et al. (2001), "innovation can be classified as product or process, where product innovation is essentially about change in the product or services that an organization offers, while process innovation involves change in the technology and supply of the product or service, or in its distribution" (as cited in Morton, Burns & Dainty, 2007, p. 3). Utterback and Abernathy's (1975) describe that "dynamic model of the innovation life cycle reflects the interactive nature of product and process change to either one may impact on the other" (as cited in Morton, Burns & Dainty, 2007, p. 3).

UNESCO has defined 'Innovation' as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations (cited in Faizah, 2010, p. 53). According to Hearn (2010) describes innovation is about introduce the new processes, methods of doing things and revolutionizing how things were created or completed before. She extends her explanations about the innovation which is not only involve improvement on something but also requires discoveries and changes to make it better (Hearn, 2010). Thus, innovation can be described as upgrade something new to be better by using different ways and technology that can be used and benefit people in the future. It required critical thinking and willingness to take risks to re-produce some product from using current techniques by adding it with other concept or elements.

Much effort has been put in the development of instructional systems that cause students to think and work more creatively and also have a greater role in their own learning. The improvement of plan teaching strategies is very important starting from education in the primary

schools that may benefit all the students in class to learn the basic of mathematics and sciences subject. The educators need to guide and encourage students to develop problem-solving and critical thinking strategies for confronting the challenges of new expertise and innovations for the future.

During at the launch of the Malaysia Education Blueprint's preliminary report for 2013-2025 in Kuala Lumpur, Dato' Sri Mohd Najib bin Tun Haji Abdul Razak, Prime Minister of Malaysia asserts that,

*“The weaknesses in Malaysia's present education system had to be acknowledged, and Malaysians could not be in denial, if the country is to move forward. Our education system had to be revamped to produce thinking and innovative students to meet future needs. In the new economy, the thirst is for knowledge, innovation and technology. Our system must meet these needs. We must prepare our children for jobs that are yet to exist”.*

Source: The Nation, 2012.

In addition, on November 2012, the Forest Research Institute Malaysia (FRIM) was celebrated its Innovation Day with the theme, “Quality Innovation, Our Work Culture”. This program is one of the efforts that have been made by governments in fostering a culture of innovation in supporting the transformation agenda especially for the public sector. Various competitions had been made “including the innovation and invention, KIK (innovative and creative group) and crazy idea competitions; the best working environment; the best quality corner; the best auditor; and the best quality QE/5S zone, were organised to promote a culture of innovation and quality, to encourage creativity, teamwork and efficiency, as well as to create a more conducive work environment” (as cited in FRIM, 10<sup>th</sup> December 2012).

FRIM has also conducted many scientific expeditions and present it at the national and international levels with interesting discoveries and useful for innovative as well as increase students' knowledge. Cooperation between FRIM and students in secondary schools in research fields had give them opportunity to produce new scientific discoveries and useful for future use. This effort has indirectly encouraged students to dare to explore and discover their ideas by performing various scientific studies on their findings.

### **Lack Of Technology Approach To Monitor And Improve Performance In Teaching And Learning Process**

An innovation consists of device or technologies that required a risk-analysis and high discipline to produce new products with good quality. Researchers have given different kind of perceptions for the failure implemented of innovations. According to Larry Cuban (1993), innovations have fail because of poor alignment of actions to goals and the design of that innovation does not fit with the goals of the organization as well as bad practice. Berman and McLaughlin (1979) claims that innovation also does not give consumers the opportunity to use and try new innovative products that have been made. In addition, the problems also happened to the teachers when the design flaw in innovations does not give space and guidance for teachers on how to use it in the classroom as a teaching aid. At last, the schools and students will be the victims for the poor design of innovation (Sarason, 1971).

According to Boon (2010) describes that people see the application of technology in the educational field as education innovation. Education innovation is, however, more deeply concerned with the ways and methodologies of teaching and learning. It is not technology alone, but it is the use of technology to enhance our ways of teaching and learning. Strategically, information and communications technology (ICT) has to innovate on the way we perform our teaching and learning functions. Support services for teaching and learning at universities need to support staff to induce them into the new ways of teaching and learning that technology has opened up (Boon,2010;p.313).

In addition, Lowerison, Sclater, Schmid, and Abrami (2006) claim that “technology has the potential to transform the learning environment from passive to active and more subject to the control of the learner” (as cited in Lavin, Korte & Davies, 2010). According to Roblyer (2003), “technology may enable the learner to be more actively involved in his or her own learning” (as

cited in Lavin, Korte & Davies, 2010). Furthermore, a suitable pedagogy should also be selected in using technology-based tools in order to have a good impact on it (Laurillard, 2002). Sometimes the use of technology will make people lazy but it will be easier to use it. Students can read the lecture notes everywhere through the advance of technology like laptop, tablet, iPad and other gadgets. However, some researchers “believe that the use of technology benefits students by engaging them more in the classroom” (as cited in Lavin, Korte & Davies, 2010), enhance students learning and improve interaction with their teachers. Burbules and Callister (2000) propose that technology needs to be used properly, and therefore a good or bad impression consumers have depends on how it was being used, by whom and for what reason.

Even though technology has been widely used, some teachers still use the talk-and-chalk method which is the traditional method for teaching and learning in the classrooms. By using this method, it will be helpful to explain especially for sciences subject, where teachers can explain in more details how the creation of nature occurs. However, the roles of e-learning, which can help teachers to extend their explanation by providing a variety of good examples, have not been fully utilized. There is an unclear understanding among teachers about the role and function of e-learning, which can replace the chalk and talk method. The reasons are the functions of learning platforms are offering may not be clear and still not reached the level of general acceptance among the educators. Moreover, according to J. A. Boon (2010) some educators also claimed that it is hard for them to adapt to the digital age and they did not have enough time to attend to all the teaching classes that have been provided in the e-Learning environment.

In America, the use of technology in education shows that “several school districts are experimenting with using student performance data to monitor student progress, evaluate teaching methods, support teacher development, individualize instruction and inform parents” (as cited in Fawzia, 2010). Through this method, it will help parents to access easily the progress of their children's education. In Malaysia, the implementation of school based assessment (SBA) in our education system has encouraged teachers and parents to use technology to track the progress of their students and children's in academic. In addition, Smith (2009) claims that there are some schools that plan only for technology acquisition but do not care about the improvement or maintenance from time to time. It will give difficulty for teachers and students as users to use that technology for teaching and learning process in the classroom. This also will reduce their belief that the use of technology devices may not be supported over time. Moreover there are also some teachers, who are never used the technology that has been provided for them to enhance their teaching strategies. They become more interested in delivering the lesson orally and using board to complete the syllabus in the restricted time. For others, they claimed that they lack of confidence to use technology in the classrooms and noticed that their students are more knowledgeable and advance in technology compared to themselves. Besides, some claimed that lack of educational software that suitable for their subject teaching, lack of pedagogical for teacher training to use that technology, and have limited access to internet and ICT (Deleted, 2013). Thus, it will prevent innovation in technology applications (Smith, 2009).

However, there are some teachers, who do not care about the techniques whether their students understand or not about the lesson and asked them to memorize for the exams only. They need to differentiate their teaching strategies by using the utilize PowerPoint slides and projectors or similar technology in order to increase student involvement so that they are not bored and inactive (Lavin, Korte & Davies, 2010). Furthermore, they also have to prepare students for the working environment where technology skills are imperative for job searching and training besides to have skills to produce high quality innovative products.

A strategic planning between the application of ICT, the teachers and students in the classroom should be made. “The use of the technology in the teaching and learning process will help teachers to enhance the quality of higher order teaching and learning functions” (as cited in J. A. Boon, 2010). Technology serves as an excellent tool for building the knowledge as teachers and students can search lots of information about the innovative projects by connecting through the internet. In addition, many programs and activities are interactive, allow students to manipulate objects and expose them to the new ideas to create something new while exploring new concepts in subjects such as math and science. The challenge is no longer whether the use of

technology will harm students, but it emphasized more on how to use better information about teaching and learning to improve outcomes for every student to have an innovative thinking.

### **Lack of Investment For Educational Mission**

Educators need to change their traditional methods by combining theoretical teaching with practice and other soft skills by applying the knowledge that their students have learned in the classrooms (Xu, 2011). Furthermore, students with high quality talents need to be trained with the innovative ability, which can use their own creative and critical thinking to discover and solve problems, think of new concepts, ideas and create something new (Xu, 2011). The supports from the school administration is also important in terms of providing a well-equipped school laboratories to produce more innovative students to engage and participate in scientific work for creating an innovative product.

Program such as young scientist project, entrepreneurship, problem solving in math project, training enterprise talents, robot games and scientific work are examples of the invention and innovation activities that can be useful when exposing students to new experience and knowledge (Xu, 2011, p. 472). Moreover, according to Xu (2011), these activities will provide an opportunity for all students to show their natural talents to invent a new innovative product as well as develop self-confidences to communicate to share the knowledge, ideas and exchange their opinions between each other.

In addition, “structures that support the vision of a school and learning community are vital to the effectiveness and innovation of teaching at the classroom level” (as cited in Morrissey, 2000). However, due to lack of investment from any organizations or agencies, some innovative products that have been produced in the school laboratories cannot be marketed and it requires highly cost. Education stakeholders need to find out the ways to restructure incentives, tools and investments to enable the students to be more creative in producing new innovative products, helping them in getting an approval from the authorities before the product is released in the market. Cooperation between the education stakeholders and donors should be emphasized more to prevent our children from being left behind globally besides to have critical thinking and thoughtful in experimentation.

To overcome these challenges, organizations or companies have to invest for developing of innovative products in schools. “Donors can fund organizations that provide fellowships or other support for education and training innovators” (as cited in Fawzia, 2010). In other ways, “they can invest in business plan competitions that encourage entrepreneurs to attack problems in education fields”. Moreover, to reduce this challenge they can invest in organizations that attract and train high-quality teachers, principals” and also students. Once the successful innovative products can later be sold to the market or licensed to schools, it will be a good return on the initial investment that has been invested by the organizations or companies (Fawzia, 2010).

In July 2013, Malaysia National ICT Initiative (MSC) was made a programme named as MSC Malaysia Innovation Voucher. This programme was designed, to increase collaboration between Malaysia's public and private Institutions of Higher Learning (IHL) and Research Institutions (RI) with MSC Malaysia status companies, so as to tap into each other's capabilities and strengths. The objective of the programme is to increase the number of collaborations in research and innovation between MSC Malaysia companies and IHLs/RIs/COEs. The innovation vouchers is a financial incentive worth of RM10,000 awarded to qualified MSC Malaysia status companies to support collaborative research and development (R&D) projects from the approved collaborators (MSC MALAYSIA INNOVATION VOUCHER, 2013). This is one of the initiatives that have been made by governments to encourage the researchers and companies to be participated in research fields in order “to increase the number of innovative proof-of-concepts (POCs), products, services and solutions from MSC Malaysia” (as cited in MSC MALAYSIA INNOVATION VOUCHER, 2013).

In addition, on October 2012, YB Dato' Seri Idris Jusoh, MARA Chairman, had launched Research and Innovation Grant Scheme (SGPM) from MARA or *Skim Geran Penyelidikan dan Inovasi* MARA (SGPIM). This scheme is managed by Research and Innovation Unit of MARA to encourage and establish vibrant innovation as well as research and development (R&D) activities amongst the staff and students of MARA and its subsidiaries. Approximately RM

350,000 has been given to ten successful applicants whose ideas best met the criteria for R&D and innovation set by SGPIM committee and contribute towards the development of R&D in MARA institutions (as cited in Anwar, 2013).

Furthermore, there are many research programmes that have been created by MARA to encourage creative and innovative thinking among the students especially in MARA Junior Sciences Colleges (MJSC) and other MARA Colleges. For examples, MARA had sponsored and invested many research programmes among the MJSC students to produce innovative products by using scientific methods and sent the best ones to participate in the international youth competition. Through this program, it gives opportunities for students to expose themselves to the real scientific works and also getting new experience about the real world of scientific works from other advance countries like Japan and so on.

The issue of lack of investment in research activities in schools need to be resolved immediately. Determination of students and teachers to create innovative ideas must be supported by a variety of stakeholders in providing funds in the form of financial or training for this mission. The difficulties in obtaining financing or sponsorship will cause innovative technology for that country lagging far behind compared to other countries that have been developed far ahead.

### **Perceived Problems Relating To Student Engagement With Learning And The Limitations Of School Practices.**

Researchers such as Cuttance and Stokes (2001) and Hargreaves (1999) argue the important of engagement that “have linked innovation in schools with the need for students and teachers to develop more flexible and generative approaches to learning as a response to an increasingly diverse society which values knowledge generation over reproduction” (as cited in Tytler, Symington and Smith, 2009, p.21). The issue of the engagement of students with science, technology and mathematics, still being discussed in the era of this modern technology .The pursuit of this vision of engagement commonly involved students actively engaged outside the classrooms with exploring, designing, investigating, communicating with practising scientists and technologists, and also linking their work with wider purposes and practices for science, technology and mathematics.

In addition, “educational research over the past decades has definitely produced useful understandings that can support the innovation of early childhood education and confirm this early bird assumption” (as cited in Van Oers, 2013, p. 267). “It is widely believed that early starts in reading and mathematics if it has properly implemented will provide children with benefits that can help them flourish in a future society” (as cited in Van Oers, 2013, p. 267) and being more innovative to create a new ideas and product. “It is the early bird who catches the worm” (as cited in Van Oers, 2013, p. 267). Moreover, lack of exposure for young children in their early childhood education especially in the literacy and numeracy of mathematics and sciences is one of the reasons why it is difficult to implement innovative among the students once they grow up.

According to (Tytler and Symington 2006; Tytler 2007) describe that “there is also evidence that traditional science teaching does not capture the nature of contemporary science practice, being overly focused on the development of canonical abstract ideas and not paying sufficient attention to the multi disciplinary nature of contemporary science, the ethical and social and personal settings of science, or the human aspects of scientists’ work and passions” (as cited in Tytler, Symington and Smith, 2009, p.19). Moreover, Tytler (2007) claims that “the problem with student lack of engagement with school science relates to a failure of the content and practice of school science to reflect significant changes in contemporary society, in students’ perspectives, and in the nature of science itself, and the lack of representation of contemporary science practices in the school curriculum” (as cited in Tytler, Symington and Smith, 2009, p.20).

Furthermore, “the teachers who have attended various training courses of entrepreneurship, career planning” (as cited in Xu, 2011, p.474) and have many experience will be able to engage students with science, technology and establish the entrepreneurship skills. Programme such as an entrepreneurship workshop “offers a platform for students who have entrepreneurship desire to cooperate and communicate with the entrepreneurship teachers” (as cited in Xu, 2011, p.474). Then, teachers will “respectively to guide the students to solve the actual problems in production, develop the students’ ability of solving problems

comprehensively” (as cited in Xu, 2011, p.473) and also develop their innovative thinking in entrepreneurship fields.

In addition, the need for changes into a new instruction methods that is different from the traditional method which is a teacher just standing in front of a classroom just chalk and talk. For examples, teachers can use online coursework interactive games and open-source textbooks that will make students to study at their own pace and stimulate their own understanding. Next, the project-based learning will provide a different ways of teaching strategies which the teachers will be a facilitator to assist student's teamwork by giving problems to address real-world challenges.

However, there are some researchers argue that innovation does not fail because of the design of innovation itself, but because of other reasonable cause. There are some researchers claim that innovations fail because schools and school systems offer little effort to change their teaching practices (Hanushek, 1989 & Friedman, 1962), teachers refused to accept the innovation (Lortie, 1975), schools are so rigid to use the traditional method and claimed that they do not have the space for innovation (Sarason, 1971). These challenges and bad perceptions from teachers should be changed in order to make this innovation process being successful.

Faced with these hard realities, education stakeholders can work together to find and train outstanding teachers and principals who can make high-performing schools and produce outstanding students. The educators also have to face the challenges on how to encourage and develop students' engagement with science and mathematics ideas to foster their innovative thinking (Tytler, Symington and Smith, 2009). This is actually “to propose and introduce a curriculum reform that represents a more student centred, inquiry based pedagogy, and sets the science and mathematics that being learned in contexts that students see as meaningful” (as cited in Tytler, Symington and Smith, 2009, p.20).

Other efforts should be made to “increase the proportion of several elements such as teacher education curriculum, strengthen the professional skills of teachers, make full use of modern educational technology services, enhances students' sense of professional identity, improve literacy and educational ability in students” (as cited in Tan and Wang, 2011, p. 489) to be more creative to produce an innovative ideas.

### **Conclusion**

As conclusion, the need for changes in the teaching and learning methods are effectively seem obvious to align with the current digital era (Fullan, 1993). It is important that new technologies and innovations implementation had change the way in which we teach and learn now. Students and teachers need to develop productive relationships with science, technology and mathematics professionals that led to new knowledge. The collaboration between school administration, educational stakeholders, “organisational structure and the nature of change itself are together creating both the need for, and method of, continuous improvement to education and its outcomes” (as cited in Amanda, 2006).

In short, educators must not only encourage students to innovate, but also train their innovate skills, to create the space to display their talent and opportunities” (as cited in Bian & Wang, 2008). Moreover, they should also study the discipline of innovative development, improve the scientific quality, and actively cooperate with the reform of education system. Continuous discussion about the new ideas and new methods need to be increased, always encourage student's interest in learning and innovation, while promoting high-tech development strategy.

In addition, Whilst Fullan (1993) describes that “societal problems beyond the control of schools frequently prevent educational reform, these cannot be wholly held responsible for the failure of educational reform” (as cited in Amanda, 2006). “Lack of supporting structures, a deficit in the consultative process, an inadequacy in holistic approach, and the absence of ongoing evaluation and amendment contribute greatly to the impairment of implementing innovative practices” (as cited in Amanda, 2006).

Lastly, the educational system and the structures that support the innovation need to be changed to ensure that our children and future generations can flourish in a world characterised by change, enterprise and fully developed (Amanda, 2006). As recommendation, educators and education stakeholders have to “create the small spaces needed to innovate which enable some

state or district or turn-around innovation safety zones in which policy barriers to innovation are reduced or removed for enough time to allow for development, implementation and assessment of dramatically different approaches” (as cited in Smith, 2009).

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