Developing Education Leaders In Managing Adaptation Of Technology: Focus Group Analysis

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ABSTRACT

The Industrial Revolution (IR) is an event that marks significant progress in human civilisation. In view of the IR 4.0 which has reached its peak, urged all parties to act fast. For formal education to compete globally, educational organizations such as schools need to efficiently bring their workforce to act and pursue the progress. This study aims to explore how education leaders in Malaysia manage the adaptation of technology. The qualitative approach was utilized in the form of a focus group discussion with various stakeholder. The findings demonstrate that the primary themes are technology integration through leadership and vision; technology management through professional practice; and technology integration for teaching and assessment; all of which are important to be considered by school leaders to adapt to new technology. The analysis presented in this study can be used as a reference by the concerned parties to help to strengthen educators in Malaysia.

Keywords: *Andragogy;Challenges;education technology;education leaders; leadership.*

INTRODUCTION

Industrial Revolution 4.0 has strengthened management, industrial and commercial structures that emphasize on digital technology development in reducing human energy costs while increasing productivity. The increasingly robust development of digital systems has prompted various industry sectors around the world to develop high-tech robotic machines (Adlina et al., 2020). Digital technology systems also facilitate large-scale data usage globally that enable fast and effective long-term cost saving works. Therefore, the importance of digital education in the current Industrial Revolution 4.0 has been among the topics of discussion in various sectors especially for the educational sector. National education system is also facing new changes namely: the 21st century teaching and learning and the Industrial Revolution 4.0. The 21st century is often linked with the era of information technology (IT), while the Industrial Revolution 4.0 refers more to the development of robotic technology (Lu, 2017). The development of 'open sky technology' certainly has implications for human life (Mohamad, 2003). Undeniably, education is the most important tool in the development of human resources that will serve to develop the country. Various efforts were made for the purpose to boost the national education system. However, there are education leaders who still do not understand the importance of digital education elements and do not realise the existence of Industrial Revolution 4.0 in the academic context and daily lives. This article will explore the level of understanding of education leaders and their perception towards Industrial Revolution 4.0. This is also part of the effort to support the Malaysian Education Blueprint (2013-2025) as outlined

by the Ministry of Education Malaysia in utilizing ICT to improve the teaching and learning quality in Malaysia.

LITERATURE REVIEW

DEVELOPMENT OF EDUCATION LEADERS

Leaders play an important role in constituting the effectiveness of a system in an institution (Ibrahim et al., 2018). Abdullah and Ismail (2018) also stated that the strength and quality of leadership lies in the leader's ability to achieve and realize the vision and mission adopted in his leadership institution. Therefore, leaders need to manage their professional development effectively. According to Yusof and Tahir (2018), the development of leaders should be accepted as a necessity and discipline to improve the quality of the organization and as a return, would benefit the parties involved such as workers and stakeholders. Abdullah et al., (2018) states that a leader must act to set the direction and future of the organization. Leaders should also focus and look forward to achieve the vision and mission of an organization after considering various internal and external factors. Bennis (1989) also stated that the quality a good leader needs most, is his vision to guide and provide a clear idea of the requirements and direction of the organization.

Mohamad et al. (2016) stated that educational leadership involves all activities, behaviour, skills, attitudes, and knowledge that reflect the ability and willingness to influence, drive, guide and train individuals, school staff and community outside the school towards achieving the objectives of the school organization. Leithwood et al. (2012) says that in the 21st century i.e., in the era of industrial revolution 4.0, there are two major changes that a leader must face. First, improving accountability, improving student performance and school attainment are the focus of the community and it is the responsibility of the school leaders to fulfil them. Second, the extent to which education leaders are responsible for taking direct steps in determining a goal in line with the Ministry of Education's policy. The 21st century leadership means that one must act proactively using technological knowledge to generate vision and act as an agent of change (Duclewicz & Higgs, 2003). Hence the Industrial Revolution which took place in the 21st century led to the development of education leaders through their proactive behaviour based on the knowledge in achieving goals and improving the teaching and learning processes in schools (Ismail, 2019).

Leadership in the Industrial Revolution Era 4.0

To promote the Industrial Revolution 4.0 in the world of education, three main elements are targeted in supporting the Industrial Revolution implementation among education leaders. First is to add knowledge and skills in the field of technology (Peng et al., 2020). The second element is to provide the necessary facilities to school residents such as a smooth internet network, technological equipment such as sufficient number of computers and conducive spaces (Yusuf & Tahir, 2018). While the third element is to cultivate innovation and technology with school residents (Noorashid, 2019). Looking at the first element which is to find room and opportunities to increase knowledge and skills of the technology field, it is parallel as outlined by the Malaysian Education Development Plan 2013-2025 in the seventh shift i.e., in utilizing ICT to improve the quality of learning in schools. Therefore, education leaders must strive to enhance their knowledge and skills in line with digital transformation to remain competent and remain competitive. Apart from this, the Industrial Revolution 4.0 involving automation

technology provides new challenges and opportunities to the education sector in the country (Noorashid, 2019).

Meanwhile, education leaders should play the role to rearrange the activities of the teaching and learning process to meet the challenges of this revolution. This change covers various aspects such as conducive learning space, systematic teaching methods, adequate facilities, and the use of the latest technology. It coincides with the second element outlined which is providing the necessary facilities to the school staffs. While for the elements of cultivating innovation and technology, education leaders are seen to be able to play the role of individuals who have the potential to influence teachers and students to succeed in this challenge (Banoglu et al., 2016). The exposure to the Industrial Revolution 4.0 to teachers should be emphasized in line with the education transformation of the Ministry of Education Malaysia. In addition, teaching methods that are in line with the Industrial Revolution 4.0 should be practiced broadly. According to Ismail et al. (2020), education plays a very important role in the Industrial Revolution 4.0. Therefore, the approach of enabling technology-based learning and teaching should be changed in line with the development of automation as a strategy against competition to remain relevant as future jobs will also change. It is clear here that the preparation to apply industrial revolution 4.0 in the education sector especially in schools should be driven by education leaders. The culture of creativity and innovation in an educational institution especially schools are important to face the Industrial Revolution 4.0 era. Education leaders including teachers should cultivate themselves to face the challenges of technological development in the future. In navigating the industrial revolution 4.0 the focus is on the use of modern technologies such as the use of data globalization and self-driven. According to the Strategic Plan of the Ministry of Science, Technology, and Innovation (MOSTI) 2016-2020, innovation needs to be empowered in line with the Basic Science, Technology, and Innovation of The State (DSTIN) which sets a new direction in the field of science, technology, and innovation (STI) to transform Malaysia towards a more competent and competitive country, thus, be prepared to go through the flow of Industrial Revolution 4.0.

The Importance ICT

Information and communication technology or ICT has long been regarded as a driver of economic growth, whether in developed countries or in developing countries. ICT is often associated with social and political change and serves as a driver of innovation (Spence & Smith, 2009). In 2000, the Malaysian Government established the Multimedia Development Corporation (MDeC) as the leader in the development of ICT infrastructure in Malaysia. The government's efforts are in line with the global development of ICT to boost the economy and the development of human resources to meet the economic needs of the 21st century. The Malaysian government is aware that the efforts to produce k-workers must start from school. The Pilot Bestari School project is one of the major projects implemented by the Government of Malaysia to kickstart the educational transformation that harnesses innovation and development in the field of ICT. In this regard, school leaders play an important role as the leaders of innovation and change. Brodin (2010) said that school leaders have an important role in the implementation of new technologies and in developing new learning models in schools. According to Brodin (2010), if school leaders have a positive and knowledgeable view of computers and ICT, they will instill a positive attitude towards integrating ICT in the teaching and learning process among teachers. In other words, Brodin argues that school leaders should have literacy in ICT to lead the implementation of ICT in school operations.

Education Leadership and ICT

In Malaysia, ICT was introduced in the world of education in the early 1990s. From then on, the Ministry of Education Malaysia (KPM) has implemented various information and communication technology (ICT) initiatives in schools to provide physical and non-physical necessities to enable the use of ICT as a tool in the teaching and learning process as well as school management. Among the initiatives that have been implemented are the creation of computer laboratories, Pilot Project of The Smart School, Teaching and Learning Science and Mathematics in English Language (PPSMI), EDUCATION TV via satellite, Edu Web TV which remains today, SchoolNet network, School Access Center, digital course software development and others. KPM has invested at least six billion ringgit (KPM, 2010) in the effort to develop ICT infrastructure to achieve the implementation of ICT in education. KPM also faces challenges to provide knowledgeable and skilled human resources in the ICT field. To ensure that all ICT infrastructure for education is utilized optimally, leaders must have competency in ICT management. Mohamad and Munindy (2007) are in the opinion that, the ICT knowledge and proficiency of most school leaders are at the low level. To plan intervention actions for school leaders, the competencies required are such as, training, guidance, and recognition programmes. Through these competencies, it can help to determine other training needs that should be provided for the leaders to develop human resources in schools to become more competent (UNESCAP, 2009). Therefore, Aminuddin Baki Institute was appointed as a training institution entrusted to provide trainings to education leaders to enhance management competencies and leadership in the field of ICT.

METHOD

This study uses the qualitative method to collect data. The research design chosen by the author is a literature review and a descriptive survey review using field research methods through interviews. This is consistent with the most common sources of qualitative data, including interviews, observations, and documents (Patton, 2002). In addition, semi-structured and structured interviews were conducted to obtain more in-depth input (Sargeant, 2012). Focus group discussion were conducted with five education leaders who were one MOE Senior Officer, three school Principals from Negeri Sembilan, Malaysia and one Senior Assistant Teacher (Academic). In total, they were five participants selected based on a purposeful sampling. Thematic analysis was used to analyze the data.

Table 1: Participants' demographic information

Participant	Sex	Age	Post
S1	Male	49	Principal
S2	Female	50	Principal
S3	Male	44	Principal
S4	Male	50	Senior Assistant Teacher (Academic)
S5	Male	39	MOE Senior Officer

Meanwhile, ethical issues are another essential consideration in every research planning. The respondents must not be burdened by the research or data collection. Thus, in this study, the safety and confidentiality of the respondents are protected. Nicknames are used during the writing and encoding process to protect the privacy of the respondents. Respondents are also aware that they can withdraw from this study at any time without giving any explanation

Findings and Discussion

Education leaders need to be more open and prepared for future changes to ensure that teachers and students remain competent and competitive. They need to be creative to plan and design organizational management activities so that teachers and students can create potentials that meet the needs of Industrial Revolution 4.0. Therefore, we need to be physically, mentally, spiritually, and emotionally prepared. The presence of Industrial Revolution 4.0 cannot be delayed or prevented. Readiness and change should be taken as a step in addressing the challenges of Industrial Revolution 4.0. The education sector needs to be more flexible and ready to face the challenges so that there are no marginalized teachers or students in this era of globalization and digitalization. With a more flexible and extensive online learning style, education leaders can support and encourage teachers to be more professional and knowledgeable when conducting teaching and learning activities. Teachers also need to be sensitive to the needs and interests of students so that effective teaching methods can be used to obtain targeted results. Based on the data analysis, three major themes have been identified.

Technology Integration through Leadership and Vision

The primary role of the principal has changed from a traditional manager to a curriculum and technical leader (Raman et al., 2019). In fact, the principal as a school leader must play an active role in responding to today's educational challenges. In addition, it is hoped that principals can integrate technology into the work and learning ecosystems by clearly communicating their vision to teachers and support staff, thereby providing a technology-friendly environment.

> *"… Through the technology network provided in schools such as internet facilities, fax machines and smart phone apps. (Telegram), it helps the school management works and help achieving our school vision and also KPM expectation. Technology can also support teachers and staff to work faster and more efficiently…"*
>
> (S1, Principal)

> *"….Technology actually facilitates work; my teachers are very committed to technology. Examples like now, even our meeting minutes we do not have to print anymore and we send via school telegram and teacher can access via online. Save on printing costs…"*
>
> (S3, Principal)

> *".… I found that leaders who use ICT in organization management will smoothen their daily activities.…."*

(S5, Senior Officer MOE)

Chang, et al., (2008) believe that principals play an important role in leading schools towards school reform. To support technological change, school leaders must play a more specific role as change agents, integrating technology into a wide range of administrative, academic, awareness, and training fields. In fact, in a study by Leong and Sathiamoorthy (2016), they explored the correlations between technological relationship behaviour, principal vision and teacher technology integration level which resulted in a strong correlation between the two significant variables. Therefore, the relationship between principal leadership and technology applications is positive.

Technology management through professional practice

Educational leadership has always been facing the challenge of providing future teachers with technical and technology-related skills. These changes have forced school principals to take the lead in technological changes in their professional practices.

> *"… Since the pandemic hit, teachers have been trying to learn a lot about technology. Among the things that I can see are like how to make live online classroom using google meet, they learn how to make video recording using various applications and they are getting more proficient using animation apps. I'm proud of my teachers…"*
>
> (S1, Principal)

> *"… I appointed a specialist teacher in my school to create a PLC group. It aims to help other teachers to use technology better such as online teaching and learning using telegram app. This is one of our newest activities…"*
>
> (S2, principal)

> *"…..junior teachers are seen to be more active in using technology in teaching and learning activities while senior teachers are seen to be less interested in using ICT in their teaching and learning activities..."*
>
> (S4, Senior Assistant Teacher)

Every educational organization deals with various subcultures and ways of perceiving organizational processes, such as the use of technology. Educational management is now implemented using technologies such as online applications, software, test data analysis, and data display. Schools, teachers, school support staff and students use online systems. The school is responsible for the management and management of the necessary steps in each technologically driven innovation process. Professional expertise and key practice, technology embeddedness in management and sustainable use of teaching depend on the style and philosophy of the principal. Arumugam and Shariff (2017) concluded that e-learning or virtual

learning technology has become widespread at the level of lower and higher education in Malaysia. This is a challenge for educational leaders to continue motivating their teachers to constantly applying the use of technology in teaching and work management.

Technology integration for teaching and assessment

Successful digital transformation in the higher education classroom requires technical tools to determine the assessment of learning. Principals play an important role in implementing teacher evaluation and policy effectiveness that affect the overall school culture (Anderson & Dexter, 2005). The successful implementation of teaching through technical integration assessment depends on the ability, motivation, and ability of the principal. Recently, assessing the ability and performance of teachers has become a complex task for university presidents, especially when teaching is combined with technology. Principals must assess teachers' teaching responsibilities; they integrate technology into learning.

> *"… I always support my teachers, I allow them to use technology materials such as projector machines, school laptops according to school schedule during this pandemic. If their home internet line is not stable during this pandemic, they can use the internet in school. After all my teachers mostly live nearby to our school. "*
>
> (S1, Principal)

> *"….I observe my teachers by joining myself into PDPR sessions (via online) and I found my teacher were good at conducting and controlling the sessions…."*
>
> (S2, Principal)

> *"…… Usually, young teachers are faster in using ICT in teaching and learning activities. However, there are also senior teachers who like ICT and will use ICT to smoothen their tasks……"*
>
> (S4, Senior Assistant Teacher)

Suffice to say, principals must analyze the efficiency of technology-based instructional techniques, evaluate existing management operations based on technology for improvement, and delve deeper into the effectiveness of digital technologies for teacher performance (Richardson & McLeod, 2011).

Conclusion and Implications

Education leaders and teachers in Malaysia should prepare themselves with the knowledge and skills in science and technology as recommended to meet the challenges of the Industrial Revolution 4.0. The willingness of education leaders to bring teachers equipped with the ICT knowledge under their leadership can make a difference to the progress of their students. This is because the effectiveness of a teacher starts with the excellency of their leader and t try various strategies in creative, proactive, and competitive manners. In summary, the education

sector needs to be prepared to go through the Industrial Revolution 4.0 so that the existing teachers and students can remain competent. Widespread exposure and approach should be disseminated to all teachers to increase the level of awareness and knowledge of the Industrial Revolution 4.0. With this, educational transformation can be implemented through teaching and learning methods in facing challenges of the Industrial Revolution 4.0. Therefore, to face the Industrial Revolution 4.0 era, human development is an important platform in generating the paradigm shift in each teaching staff. It also plays an important role in producing knowledgeable and beneficial human resources for the country. According to Wan Abdullah and Mohd Zhaffar (2018), the changes that occurred in the Industrial Revolution 4.0 demands knowledgeable and highly skilled human resources. With that, they can be competitive and able to lead their organizations globally.

As a result, Industrial Revolution 4.0 can contribute to the positive development in the new millennium education model with the use of modern telecommunication tools and can assist the teaching and learning process as well as attracting the interest of digital generation students. The progress of leaders in the Industrial Revolution 4.0 is also closely related to leadership patterns in the VUCA era. VUCA is an acronym for Volatility, Uncertainty, Complexity and Ambiguity. The term appeared in the leadership theories of Warren Bennis and Burt Nanus in 1987, which was later used in military leadership exercises in the United States. The VUCA brings in four situations: Volatility, Uncertainty, Complexity and Ambiguity. All these situations give a clear picture to education leaders to be prepared with efficiency, knowledge, technological agility and probability of issues or problems in the world of leadership. Therefore, Bob Johansen adapted VUCA in his 2009 book, Leaders Make the Future on how to deal with these four situations for VUCA by eliminating Volatility and replacing it with vision (O.Mack et al.,2016)

To face the progress and the future of the organization, leaders must set clear visions and achievable targets. To address The Uncertainty, leaders must try to develop ways of thinking and act against all threats of uncertainty. Always observe, analyze and compete healthily in the education sector and take it as a challenge in order to not be left behind. For the Complexity, it is recommended to React to Complexity With Clarity. Focus on how to communicate. In complex situations, communicating clearly can be helpful for leaders and subordinates to understand organizational direction. VUCA situations are too complicated for individuals to handle. While Ambiguity must be overcome with Agility. Through this situation, leaders must always encourage their members to move vigorously and have the skills to cultivate cooperative practices within the organization. Overall, the VUCA era requires leaders to act quickly in developing new, future-oriented skills that based on the Industrial Revolution 4.0. Leaders also need to be trained with the skills and elements that will provide them with new leadership learning which can prepare them to face the VUCA world. Industrial Revolution 4.0 has been seen as a situation that prepare education leaders to face the agility and surge in technology.

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