Education 4.0 At First Sight

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ABSTRACT

The wave of education 4.0 effects the learning environment, course assessment and delivery. The major changes need to be addressed in terms of its current situation, its readiness, issues and suggestion. Educators are relying a lot on information technology that resulted a 'test and error' ambiance. Given this juncture, finding the best practices in education is still in the search. A systematic search of research papers, journals and articles from the year of 2017 to 2020 are studied to identify the current situation, issues and readiness and suggestions improvising the delivery of education 4.0. The findings of this review show that the current situation of actively studying the learners experience and it opens up many rooms for improvement. There are mixed responses on readiness and the issues faced are related to relationship among learning environment, course delivery and course assessment. Among the suggestions are to widespread the use of mobile technologies, the enhancement of information literacy and the proposed teaching and learning model for IR4.0 that emphasize the relationship between learning environment, course delivery and course assessment. Further research and investigation on education 4.0 should be done to achieve the goal of multiplying and implementing ideas in teaching and learning.

INTRODUCTION

Webinars are mushrooming to equip both learners and educators toward the current trend of education today. Education philosophy, models, techniques, and agenda have been practiced over 300 years ago all over the world. Matured educators should be perseverance with the current situation; a big wave of change with the right knowledge in hearts and hands. It is important to identify the learning environment, course delivery, and course assessment to decide just the right decision between learning environment vs course delivery, between learning environment vs course assessment, and between course delivery and course assessment. It will contribute to the implementation of curriculum for IR4.0 or other possible changing curriculum variables. Humans are not a machine. In order to get to know what is happening today and conduct it with what we already have in hand need a shift. The changing factor is just the tools, that should not disturb the juice and the value of education. But the system delivery went through a dynamic change which needs adaptability to the system. Educators are to be more sensitive to the emotional and social part of the teaching and learning delivery. In order to understand this, the need to enhance should involve the knowledge in understanding learner's behavior and experience in deep. This paper will elaborate on the current situation of conducting Education 4.0, some definitions, the readiness towards Education 4.0, some issues related to Education 4.0, and suggestions to improvise the perspective of the instructors towards Education 4.0 through literature reviews.

Problem Statement

Educators have to get engaged in the current wave of education. The challenges surround the educator need to be addressed in order to aware of changes that happen to channel it positively. Is there a choice not to follow the wave? Or is it possible to follow the flow with or without

understanding? Recent findings in research on teaching and learning management among 35 polytechnics in Malaysia, 94.3% of the respondents agreed that their institutions need an explanation about IR4.0 planning in TVET[1]. Everything is learnable in this era. The main issue in this paper is to create awareness and understanding of the 'what' and 'how' of education 4.0 in Malaysia in brief through 20 literature reviews (2017-2020).

RESEARCH PURPOSED & QUESTION

Industrial revolution 4.0 is organized by artificial intelligence and digital-physical frameworks that make the human-machine interface more common [2]. This quick revolution in innovation has resulted in another model of education for the future Education 4.0. Furthermore, this idea came about and there are pros and cons in delivering it especially in Malaysia. This research is conducted to create understanding in education 4.0 solutions that can increase the opportunity for enriching T&L strategies in approaching education 4.0. Besides that, the objective is to improve the awareness and the objective strategy in implementing education 4.0 without neglecting to humanize the education. Lastly, this research aims to contribute to the theory and practice of teaching and learning which can be a start of developing a guideline to achieve a collaborative educationist community in Malaysian neighborhoods.

Research Question

To study the relationship between the educator and IR4.0, there are three research questions in this research paper:

 i. What are the current situation of conducting Education 4.0?
 ii. What are the readiness level and issues related to Education4.0?
 iii. How to improvise the perspective of the instructors towards Education 4.0?

Findings

The factors and attributes of education 4.0 were systematically reviewed to investigate the variables that affect physical activity. Table 1 consist of the 20 literature that is reviewed in this paper. This paper will elaborate on the current situation of conducting Education 4.0, some definitions, the readiness towards Education 4.0, some issues related to Education 4.0, and suggestions to improvise the perspective of the instructors towards Education 4.0.

Current Situation of Education 4.0

The technological advancements in IR4.0 for educational purposes comprise 3D Printing, augmented reality, virtual reality, cloud computing, hologram, biometrics, multi-touch LCD screen, artificial intelligence, big data, QR-code, internet of things and cyber security [3], [4]. It is suggested by Hussin, A. A, [5], the nine trends of education 4.0 elaborated the preference and experience of the 21st-century learners, skills for 21st-century teachers, the strategy to implement education 4.0. What are the nine trends? According to Fisk, [6] the nine trends of Education 4.0 are in term of students' role are;

1. *Learning can be taken place in anytime and anywhere.*
2. *Learning will be personalized to individual students.*
3. *Students have a choice in determining how they want to learn.*
4. *Students will be exposed to more project-based learning*
5. *Students will be exposed to more hands-on learning through field experience*
6. *Students will be exposed to data interpretation*
7. *Students will be assessed differently and the conventional platforms to assess*

8. *Students' opinion will be considered in designing and updating the curriculum*
9. *Students will become more independent in their learning*

The nine trends of Education 4.0 change the major learning responsibilities from the instructors to the learners. Instructors should play their roles to support the evolution by not considering it as a threat to the conventional teaching method and should react to each of the ninth trends accordingly to create a win-win situation. Potential learning styles among` TVET polytechnic students has been studied to improve student's learning achievement outcome, give students the competitive edge and empower the lecturers teaching style concerning the industrial revolution 4.0 (IR4.0) learning analytics [7]. Industrial Revolution 4.0 give indirectly urged teachers to develop students with high skills, critical thinking, and emotional well-being. How? The writer suggested adapting the Learning Skills of the 21st Century, authentic learning, soft skills, and Critical Thinking Skills (HOTS). It also discussed challenges that teachers have to face in education 4.0 [8]. Education 4.0 made future learning more customized, hyper, intelligent, portable, worldwide, and virtual. It involves advanced skill and development with Artificial Intelligence (AI), huge information and examination, distributed computing and portable arrangement, online networking, the Internet of Things (IoT), Virtual Reality (VR), and Augmented Reality (AR). This era offers computerized pleasures which changing the flow of education and instructional advances landscape into smart classrooms. It is an urgency in improving the teaching and learning approach by the instructors to get along with the current mushrooming development in education 4.0 [2].

Readiness and Issues Towards Education 4.0

Readiness Towards Education 4.0

The importance to integrate Industrial Revolution 4.0 and internet of things in governments in order to keep on track along with the advancements. Readiness among 400 students of public university in Malaysia, it showed that 90% have heard about IR4.0 and 70% understand IR4.0 in general [9]. The issue of unemployment and the economy is a potential impact of IR4.0. There are mixed reactions from academics on their readiness and awareness of IR4.0 and its impacts, and second, should the existing curriculum be revamped to serve students' needs on IR4.0, academics opined that the delivery methods must change too. Academicians of NDUM resulted in mixed reactions on their awareness and readiness of IR4.0 at its impacts and the need for transformation on teaching and learning methods [10]. The urge in preparing students to involve in critical thinking, collaboration, communication, and creativity is a must to equip them in education 4.0 for future work expectations [11]. The preliminary study had been done to explore the level of awareness of polytechnic lecturers in Polytechnics in Malaysia of the required human capital in Industrial Revolution 4.0 (IR4.0) transformation [12].

Issues in Education 4.0

In dealing with issues in education 4.0, areas that need to be identified are the assessment types, cybergogy's philosophy, the agility of governance, and sustainability. Education 4.0 also needs to address the evolution of education, the vision of education 4.0, and its challenges and solutions [13]. What needs to be notified in this education 4.0 implementation is the education transformation, the role of the educational institution, the factors in driving the transformation, and its challenges [14]. Management capabilities, competencies, and innovation seems to be a separate element in handling the urge of education 4.0. Competencies skills, solutions, and personal attributes help to strengthen the education 4.0 requirement [15]. A total of 203 technical and vocational education and training (TVET) lecturers in Malaysia were involved in the study to determine the influence of professional identity and ethics on the readiness of TVET lecturers in facing IR4.0. The findings expose the significant influence of lecturers' understanding of the intelligence age and their readiness to face IR4.0. However, professional ethics is not found to be

a mediator of the relationship between IR4.0 understanding and readiness. The room for improvement is open for providing IR4.0 courses and training for lecturers and facilities for teaching and learning technology [16]. It has been said that universities' curriculum structure and instructional design must also be reconsidered to prepare the students to face the transformation of education 4.0 and the technological revolution [17]. One of the elements in education 4.0 is through the usage of widely used social media *Facebook, Twitter,* and *Instagram.* The existence of these elements impacts the users; the teachers or the students emotionally especially for women. It is reported that the over usage of those media will result in a deep impact on their emotional development [18].

Suggestion Towards Education 4.0

A study was conducted to explore the perspectives and practices of mobile learning in higher education 4.0. A survey about students' mobile technology ownership and learning practices shows that is high and continues to increase among students. The study implicates that mobile technology practices have good prospects for teaching and learning in higher education 4.0. It was suggested that more research should be carried out to offer additional knowledge concerning the duplication of the current study for developing students' mobile technology practices [19]. A study was also conducted to emphasize the importance of information literacy to enhance the ability to access, evaluate and use information from various sources due to revolution in this digital era [19]. A proposed teaching and learning model are suggested to educate future leaders of Malaysia throughout education 4.0 [20].

The author argues that to ensure graduates' preparation for IR4.0, three factors must be properly taken care of, including the learning environment, course delivery, and course assessment. At another level, there are another three relationships, described as the learning environment versus course delivery, the learning environment versus course assessment, and course delivery versus course assessment relationships.
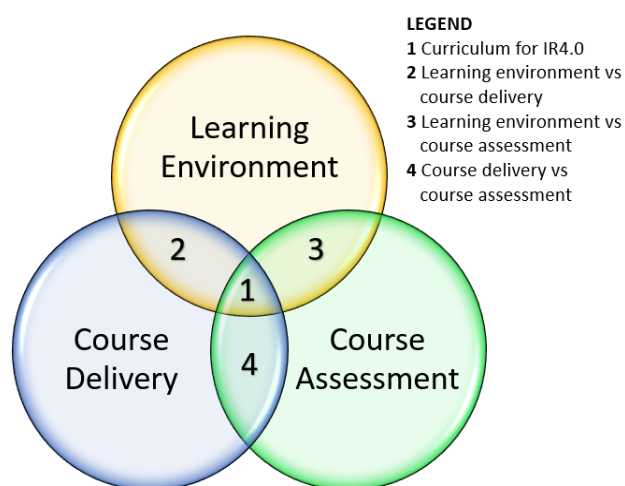

Figure 1. The proposed teaching and learning model for IR4.0 [20]

The set of competencies for technical and vocational education and training (TVET) is reviewed due to this transformation of education. An outcome-oriented qualification framework is developed that supports the process of adaptation and innovation of TVET systems. Among the efforts is the exchange of relevant knowledge within the international cooperation of the scientific community. The Regional Association of Vocational and Technical Education in Asia (RAVTE), as a network in East and Southeast Asia, is involved in the development of TVET systems in the ASEAN region [21].

Table 1 Summary of Systematic Literature Review

No.	Author/ Year	IR 4.0 variables	Sample	Method	Findings
1	Idris, R. (2019)	Readiness among students	400 students of public university in Malaysia	Survey	The importance to integrate Industrial evolution 4.0 and internet of things in governments in order to keep on track along with the advancements. Readiness among 400 students of public university in Malaysia, it showed that 90% have heard about IR4.0 and 70% understand IR4.0 in general. Issue on unemployment and the economy is a potential impact of IR4.0.
2	Juhary, J. (2019)	Readiness and awareness among academicians	Academicians of NDUM	Online Survey	Academicians of NDUM resulted mixed reactions on their awareness and readiness of IR4.0 at its impacts and the need of transformation on teaching and learning methods.
3	Halili, S. H. (2019)	Types of IR4.0	Examples of recent technology	Review	The technological advancements in IR4.0 for educational purposes comprises of the 3D Printing, augmented reality, virtual reality, cloud computing, hologram, biometrics, multi-touch LCD screen, internet of things, artificial intelligence, big data, QR-code.
4	Ishar, et al. (2020)	IR4.0 practices in TVET lessons	Actions taken by the ministry	Review	The planning and practices in TVET lessons may instill IR4.0 influences to ensure the job market quality due to the positive response among Malaysians to TVET lessons as a platform for industrial transformation.
5	Hussin, A. A. (2018)	IR4.0 T&L strategies	Trends, learner's preference, skills for teachers,	Review	The nine trends of Education 4.0, preference of the 21st century learners, skills for 21st century teachers, learners experience and teachers' strategy.
6	Chea, C. C., Tan, J., & Huan, J. (2019)	IR4.0 Challenges	The assessment types, cybergogy's philosophy, agility of governance, sustainability	Review	IR4.0 improvement - assessment types, cybergogy's philosophy, agility of governance and sustainability. Evolution of education, future of Education 4.0's, challenges and expected outcomes towards IR4.0.
7	Raman, A., & Rathakrishnan, M. (Eds.). (2019)	IR4.0 platforms and student's preparation	Utilizing online synchronous and asynchronous collaborative learning platforms	Review	Preparing students in critical thinking, collaboration, communication, and creativity when utilizing digital technologies is well established given the current push to

					prepare our students for future work expectations.
8	Bujang, S. D. A., Selamat, A., & Krejcar, O. (2019, November)	IR4.0 teaching styles	332 TVET polytechnic students	Survey	Pattern of potential learning styles among TVET polytechnic students with different field studies. The use of CIDOS, mobile learning and other exciting platforms-AR and VR apps, YouTube, online gamification, and MOOC
9	Taib, Y., & Jali, M. N. (2018)	IR4.0 readiness	Management capability of higher education	Case Study	Management capability adoption was directly influenced and moderated by operation, technology and knowledge, and corporate governance.
10	Zulfikar, et al. (2018, July)	IR4.0 challenges	Malaysian-based university	Review	Transformation; the role of university, why the transformation is needed, and what are the challenges that come with such transformation.
11	Nazir, et al. (2019)	IR4.0 and women challenges	Women in education	Review	the usage of social media, emotional effects among women
12	Zulnaidi, H., & Majid, M. Z. A. (2020)	IR4.0 readiness	203 TVET lecturers in Malaysia	Descriptive and Inferential Statistics	TVET lecturers' understanding is a mediator of the relationship between readiness and implementation of IR4.0.
13	Mahmood, M. F., & Hussin, N. (2018)	IR4.0 impact and influence	Information literacy	Review	The impact and influence from 4th industrial revolution; big data, information system, management literacy and infopreneurship.
14	Schröder, T. (2019)	IR4.0 TVET objectives	Digital transformation TVET system	Review	setting up objective for technical and vocational education and training (TVET) by preparing a set of competencies as an outcome for oriented qualification frameworks. Research on TVET helps the process of adaptation and innovation of TVET systems.
15	Jones, C., & Pimdee, P. (2017)	IR4.0 educational objectives	Thailand Educational objective	Review	Educational objectives towards IR4.0, the digital/e-commerce, agribusiness, automotive sector in Thailand.
16	Shahroom, A. A., & Hussin, N. (2018)	IR4.0 management	Organisation in developing countries	Review	Information management system, knowledge management, slowly change the flow of education and instructional advances landscape into new type of computerized teaching method and smart classroom.

17	Azmi, I. M. A. G. (2020)	IR4.0 legal education	Legal students	Review/ Discussion	The traditional method in training of law graduates to think like a lawyer by understanding the reasoning in the judgement of cases are no longer relevant in the IR4.0 era as these activities could easily be undertaken by bots. The students should be equipped with a multiplicity of human skills that could not be performed by autonomous systems such as those involving conscience, high level thinking, and emotion as well as social skills, resource management skills, technical skills and most importantly system skills.
18	Abd Karim, et al. (2018)	IR4.0 and mobile technology	higher education students	Survey	The perspectives and practices of mobile learning in higher education 4.0. A survey about students' mobile technology ownership and learning practices show that is high and continues to increase among students. Mobile technology practices have good prospects for teaching and learning in higher education 4.0.
19	Adnan, N. A., Paimin, A. N., & Hasan, A. A. (2020)	IR4.0 awareness	curriculum designers and lecturers from selected polytechnics	Survey	The requirement of knowledgeable, skilled, high attitude and competent employees is crucial to meet the requirement of IR4.0.
20	Ajmain, M. T., Hehsan, A., & Mohamad, A. M. (2019)	IR4.0 facilitation	teachers in Islamic Education	Review	By adapting Learning Skills of 21st Century, authentic learning, soft skills, and Critical Thinking Skills (HOTS) teachers need to be creative and innovative using a suitable source and media to produce more interesting T&L media.

CONCLUSION

Students are the main potential in education. The equipment or changing conditions are just tools whether it be IR4.0 or education 4.0 in being a mediator to continue the development of education. The medium is changing in this approach of education. The management of the student oneself and the teacher plays a major role in its success. The content of the subject is barrier-free. What is the main priority in students' development? The importance of *adaab* among students is still important within this education. Not to mention in terms of emotional readiness, the upcoming challenges in this education 4.0 open their way to get ready to prepare themselves emotionally to study and to be independent. In terms of intellect aspects, students have time to make themselves prepare intellectually by doing some precedent studies on what is going to be learned, get ready to explore, and practice critical thinking. In terms of their spiritual aspects, the management of time is crucial to upgrade their discipline in learning. Last but not least, the importance of their physical aspects in order to ensure their physical health, for instance, the way they sit, their physical exercise, the health of their eyes, and their time spent online are factors

that need to be considered to ensure success in education 4.0. The three major elements that need to be addressed which are learning environment, course delivery, and course assessment must be prioritized by the students first rather than just implement it without deep and detailed considerations.

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