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Higher Education 4.0: The Possibilities and Challenges

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Abstract

Education has undergone a tremendous change over the past few decades, from the use of blackboard to technology gadgets in the teaching-learning environment. The use of technology tools such as iPads, tablets and interactive videos have been managed to engage learners in a better context. The *Education 4.0* is a new trend now and even on the probability and possibility to adopt artificial intelligence in the education context. Educationalists do voice out the concern and urge the need to change education in many ways and at all levels, hence the process of learning will need to change in the near future. Nevertheless, the readiness of stakeholders for these innovative changes in terms of technology, knowledge and skills is a question mark. Education 4.0 has been implemented by several countries and the outcome of it, as expected by educationists, does not seem to be in a favourable state. This is because there are many areas that need to be improved, such as the assessment types, cybergogy's philosophy, agility of governance, sustainability and many more. This paper aims to discuss the evolution of education, Education 4.0's outlook in the future, possible challenges and its expected outcomes. It would be able to provide an outlook to the stakeholders on the adaptability, possibility of implementing the Education 4.0.

Keywords

Education 4.0, Stakeholders, Interactive

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1. Introduction

Industry 4.0 is a name given to the current trend of automation and data exchange in manufacturing technologies which includes cyber-physical systems, the internet, cloud computing and cognitive computing [1]. Industry 4.0 is commonly referred to as the fourth industrial revolution [2], abbreviated as IR 4.0.

In the Education 4.0 framework, challenges of the fourth Industrial Revolution (IR4.0) are addressed in relation to the Malaysia Education Blueprint for Higher Education 2015-2025. It is imperative that students are equipped with ICT and collaborative skills and be interested in lifelong learning. They also need to have critical and creative thinking and communicative skills [3]. Education 4.0 serves as a platform to support IR4.0 and to ensure IR4.0 would be a success.

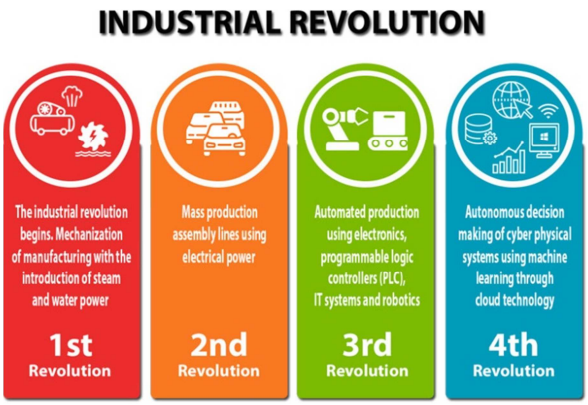

Figure 1. The revolution of IR4.0.

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Figure 1 illustrates the revolution of the IR4.0 and it is interlinked with Education 4.0. Education 4.0 is necessary as learners change with the rising usage of technology and the rising of technology-based younger generations. Other than that, the average human attention span in 2000 is 12 seconds and it falls to 8 seconds in year 2013, which is lower than a goldfish with 9 seconds [4]. Educationalists debate the many ways in which the content of education – at all levels – and the process of learning, will need to change over the years ahead. Whether it is classroom or workplace, online or offline, structured or unstructured, taught or learned, standardised or not, certificated or not, that learning is likely to break free from our old mindsets in the coming years. Education 4.0 caters the responds to the needs of IR4.0, where man and machine align to enable new possibilities, harnesses the potential of digital technologies, personalised data, open sourced content, and the new humanity of this globally-connected, technology-fuelled world and establishes a blueprint for the future of learning – lifelong learning – from childhood schooling, to continuous learning in the workplace, to learning to play a better role in society.

The industry was affected by technological change and innovation and involved in the industrial revolution. All these industrial revolutions did not influence only the production itself, but also the labour market and the educational system as well [5]. Currently, due to the development of digitalisation and robotics, we are facing the next industrial revolution, known as the *Industry 4.0*. The emerging technologies have huge effect on the education of people as only the qualified and highly educated employees will be able to control these technologies. Hence there is a need for the industries to collaborate with universities. According to [6], The main vision the following of Industry 4.0 is the emergence of "smart factories".

1.1. Characteristics of Education 4.0

Education 4.0 is a futuristic vision on education that aims to cover these characteristics. Refer to Table 1.

Table 1. The characteristics of Education 4.0.

Anytime Anywhere	Personalised Learning	Flexible Discovery
Peers and Mentors	Why/ Where Not What/ How	Practical Application
Modular and Projects	Student Ownership	Evaluated Not Examined

Source: (The Genius Works, 2017 [7])

Diverse time and place (Anytime Anywhere)–Students have more opportunities to learn at different times in different places. E-learning tools facilitate opportunities for remote, self-paced learning. Classrooms will be flipped, which means the theoretical part is learned outside the classroom, whereas the practical part shall be taught face-to-face and interactively.

Personalised learning – Students learn with study tools that adapt to their capabilities. High achiever students on a particular subject will be challenged with harder tasks and questions whereas students who have difficulties will get the opportunity to practice more. Students will be positively reinforced during their individual learning processes. This can result in to positive learning experiences and diminish the amount of students losing confidence about their academic abilities. Furthermore, teachers will be able to see clearly the areas where students need extra help.

Flexible Discovery – Although every subject eventually is aiming for the same destination or learning outcomes, the path leading towards that destination can vary for each student. Similar to the personalised learning experience, students will be able to modify their learning process with tools they feel necessary for them. Students learn with different devices, different programs and techniques based on their own preference.

Modular and Project Based– As careers are adapting to the future freelance economy, students of today will adapt to project based learning and working. This means they have to learn how to apply their skills in shorter terms to a variety of situations. Students should be acquainted with project based learning before their work life begins. This is when organizational, collaborative, and time management skills can be taught as basics that every student can use in their further academic careers.

Practical Application –Technology can facilitate more efficiency in certain domains, curricula will make room for skills that solely require human knowledge and face-to-face interaction. Thus, experience in a particular field will be emphasised within courses. More opportunities are provided for students to obtain real-world skills that are representative to their jobs. This means curricula will create more room for students to fulfil internships, mentoring projects and collaboration projects.

Data interpretation – Although mathematics is considered one of three literacies, it is without a doubt that the manual part of this literacy will become irrelevant in the near future. Computers will soon take care of every statistical analysis to describe and analyse data and to predict future trends. Therefore, the human interpretation of these data will become a much more important part of the future curriculum.

Applying the theoretical knowledge to numbers, and using human reasoning to infer logic and trends from these data will become a fundamental new aspect of this literacy.

Exams will change completely (Evaluated Not Examined) – As courseware platforms will assess students' capabilities at each step; to measure one's competencies through Questions &Answers (Q&A) might be irrelevant, or might not be suffice. Many argue that exams are now designed in such a way, that students cram their materials, and forget the next day. Educators worry that exams might not validly measure what students should be capable of when they enter their first job. The application of their knowledge is best tested when they work on projects in the field as the factual knowledge of a student can be measured during their learning process.

Student Ownership – Students become more involved in forming their curricula. Maintaining a curriculum that is contemporary, up-to-date and useful is only realistic when professionals as well as younger generation are involved. Critical input from students on the content and durability of their courses is a must for an all-embracing study program.

Peers and Mentors – In the future, students will incorporate so much independence in to their learning process, that mentoring will become fundamental to student success. Teachers will form a central point in the jungle of information that our students will be paving their way through. Though the future of education seems remote, the teachers and educational institutions are vital to academic performance.

1.2. Education 4.0 Possible Branches

Figure 2 illustrate the possible branches, areas, fields of Education 4.0 to be looked in to make it a success as many of these areas are not seriously looked in causing many countries tried pulled out from certain areas of the branches.

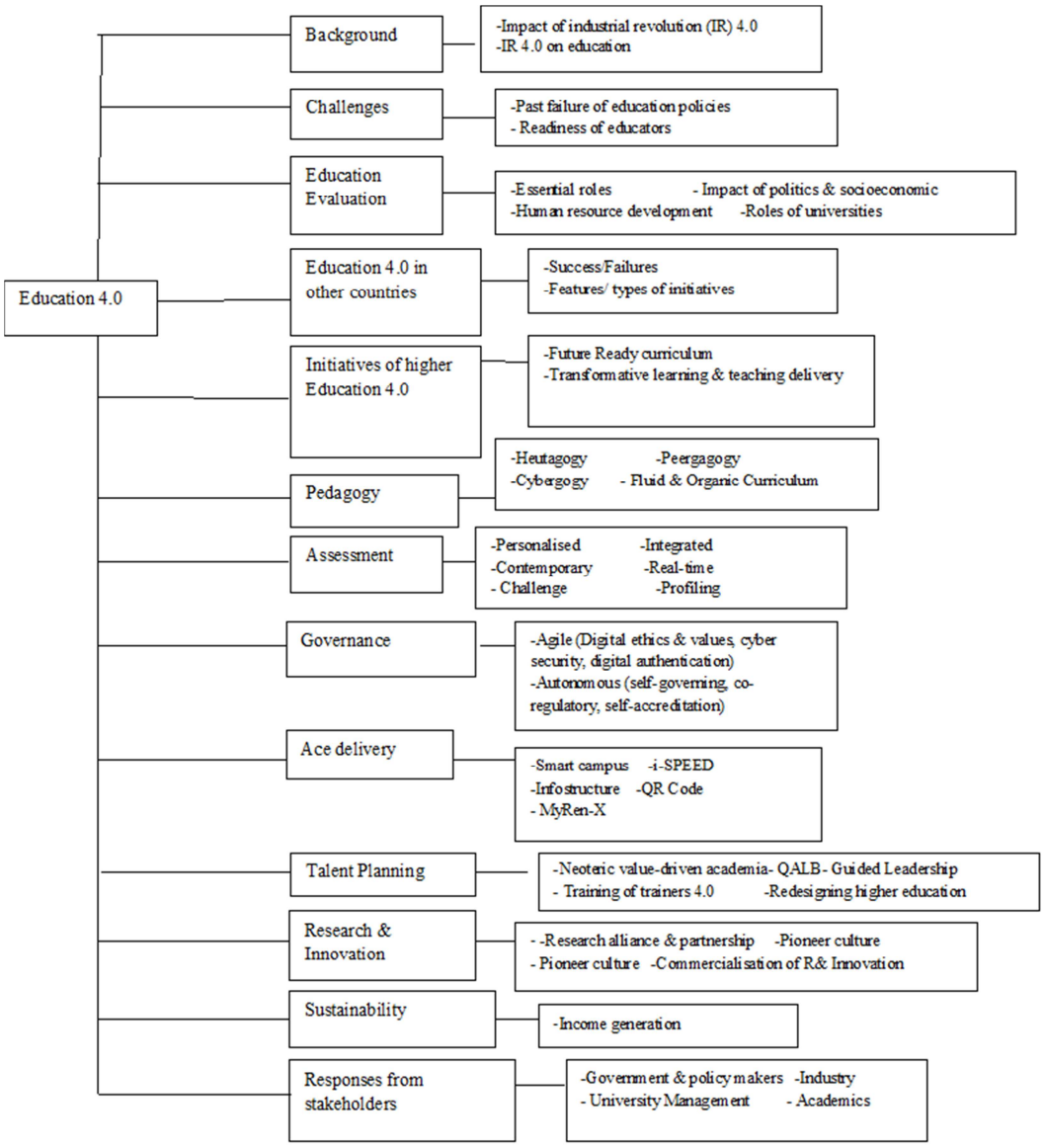

Figure 2. The Possible Education 4.0 branches

2. Challenges in Education 4.0

Education 4.0 covers an interesting, exciting, provocative and potentially far-reaching challenge in futuristic education. For individuals and society, new educational tools and resources hold the promise of empowering individuals to develop a fuller array of competencies, skills and knowledge and of unleashing their creative potential. On the other hand, technology is a very technical skill that is vital in realising Education 4.0. Hence the need to have the knowledge and skill are necessary to the educators in academia. The education institutions need to prepare to provide sufficient training to their academicians and recruit the right trainers to train their academicians. Cost may be one of the hurdles and this issue needs to be handled carefully. Some financial allocations for this purpose should be prioritised.

Technology has become integrated into virtually every aspect of work. Since we spend so much time working, work really is the place where we most directly feel the impact of developing technologies. From collaboration to productivity; from new ways of approaching workspace design to the increasing ability to work from virtually anywhere; and from hiring and recruitment to new skill set; all of this matters require time of experimentation for companies and organisations as trends in technology converge to change what it means to work. One of the challenges is to recruit the right skilled and right-in-set human to execute and implement the plan. The role of the human factor will be necessary for the future manufacturing. The skills and qualifications of the workforce will become the key to success of a highly innovative factory. For this reason, the companies should be focused on the development of qualified workforce.

According to [7], the requirements for the qualifications and skills of employees will be higher than present, because the companies will use new technologies and smart media. In tandem this reason, the education system may have to change from Education 3.0 to Education 4.0. Education 4.0 will combine real and virtual world information. Virtual resources, for example glasses for virtual reality, will be used for teaching (refer to [8]). Meanwhile according to Katharina M. D [9], higher education will be enhanced, for example the course of information science will need to include knowledge about processes management. The knowledge, qualification framework and staff training will be an essential part of Industry 4.0 [10]. As for the teaching, virtual learning environments (VLEs) will be used for high transfer of developed knowledge and skills. Teachers and students will meet with their avatars in the VLEs [11].

3. Conclusion

Higher education system needs to change to suit the needs of the younger generation. The higher education institutions need to be flexible and ready to anticipate the future for Education 4.0 as many jobs are not catered in the past/conventional education such as Zumba instructor, cloud specialist etc. By the year 2050, all the current knowledge will only represent one per cent of what students will have in front of them when they are exposed to the teaching and learning process. The big challenge would be how to ensure that students of the future and those of today to have the capacity not only to memorise but to process discriminate information and be critical thinkers.

Educationists suggested that Education 4.0 should start since elementary school to have a higher successful rate of it. Nevertheless, there is a need to have a new blueprint and new direction in the education from elementary school all the way to the university. Universities need to engage with relevant parties to obtain insights in order to turn the education revolution 4.0 a success. The current education system in most countries needs to be adapted in line with technology and student generation to provide the right graduates with the right skills for the future. Education 4.0 is a revolution in education and it's a challenge faced by all countries around the world.

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