

# Industrial Revolution 4.0 and Its Impact on Language and Cultural Studies

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**Abstract**—As Industrial Revolution 4.0 (IR4.0) made its debut about a decade ago, it is now pertinent to investigate how it changes several facets of people's life. The education sector has the biggest task to ensure that the future generation is fully equipped mentally, physically, spiritually and cognitively to face the unknown challenges. Preparing the future workforce for Malaysia has never been as daunting as today, with the instability of the world's economy. This work attempts to answer two questions, first, what are the effects of IR4.0 on language and cultural studies in Malaysia, and, second, what are the best possible strategies to prepare students to face IR4.0 and beyond. In so doing, this work starts with the working definition of IR4.0, and how this definition functions in the Malaysian context. It then proceeds to explore the effects of IR4.0 on language and cultural studies in Malaysia, and finally, it outlines possible strategies to ensure that students are able to cope with IR4.0 and beyond. The work ends with a proposed teaching and learning model to educate future leaders of Malaysia, who are IR4.0 and beyond ready!

**Index Terms**—Cultural studies, Defence University, IR4.0, language studies, T&L4.0, teaching and learning model.

## I. INTRODUCTION

As Industrial Revolution 4.0 (IR4.0) made its debut about a decade ago, it is now pertinent to investigate how it changes several facets of people's life. Originated from a project launched for the German government on high technology strategy, IR4.0 was revived in 2011 in the Hanover Fair, the world's largest trade fair [1]. Most nations in the world are directly affected by IR4.0 especially in manufacturing and computerization. For higher education, here lies the challenges to prepare the future workforce. In fact, the education sector has the biggest task to ensure that the future generation is fully equipped mentally, physically, spiritually and cognitively to face the unknown challenges. Preparing the future workforce for Malaysia has never been as daunting as today, with the instability of the world's economy.

This work attempts to answer two questions, first, what are the effects of IR4.0 on language and cultural studies in Malaysia, and, second, what are the best possible strategies to prepare students to face IR4.0 and beyond. Although the discussions revolve around Malaysia, some issues may be relevant to other countries as well. Therefore, this work starts with the working definition of IR4.0, and how this definition functions in the Malaysian context. It then proceeds to explore the effects of IR4.0 on language and

cultural studies in Malaysia, and finally, it outlines possible strategies to ensure that students are able to cope with IR4.0 and beyond. The work ends with a proposed teaching and learning model to educate future leaders of Malaysia, who are IR4.0 and beyond ready!

The methodology adopts for this work is content analysis and descriptive in nature since it is a conceptual work, driven by the needs to understand the issues of addressing the effects of IR4.0 on language and cultural studies. These two studies are critical since the National Defence University of Malaysia (NDUM), where the author teaches, offers an undergraduate degree, Bachelor of Social Sciences (Languages and Cross Cultural Communication). To date the enrolment per intake for this academic programme ranges from 40 to 60 students only. The questions that must be answered include, whether the graduates of this programme are prepared to face IR4.0 since they are the graduates of language and cultural studies, and whether graduates from other academic programmes are also provided with the language and cultural skills needed for IR4.0. Despite these two questions, the author argues that at this stage, capturing and understanding the issues are more relevant, thus the methodology adopted is apt.

Before discussing further, this work has four main sections including this introduction. The next section will explore the working definition of IR4.0, followed by the third section that discusses the effects of IR4.0 on language and cultural studies. The last section closes this work by outlining possible strategies to ensure that students are able to face IR4.0 regardless of their academic programmes in higher education. At the same time, a teaching and learning model is proposed as a conclusion to this work.

## II. A WORKING DEFINITION OF IR4.0

When it comes to a working definition of IR4.0, this author would like to emphasize that it is a working definition of IR4.0 for higher education within the context of Malaysia. Higher education in the IR4.0 environment is complex; nonetheless, it promises a paradigm shift for society. IR4.0 relies on artificial intelligence, big data and automation, amongst others. Ultimately, IR4.0 will be able to transform working environment from tasks based characteristics to the human centered characteristics [2]. To cope with the challenges of IR4.0, the Ministry of Education (Higher Education), Malaysia has introduced what is known as Teaching and Learning 4.0 (T&L4.0). In general, T&L4.0 focuses on learning spaces, pedagogy, fluid and organic curriculum and technologies, supported by various pedagogies. T&L4.0 emphasizes learning without lectures, evaluation without examinations, ability of graduates to be

employed, the need for industry and academia to become one, and an education that concentrates on humanity [3].

IR4.0 ideally deals with the fourth industrial revolution in manufacturing and industry. It places emphasis on “the current industrial transformation with automation, data exchanges, cloud, cyber-physical systems, robots, big data, artificial intelligence, Internet of Things and semi-autonomous industrial techniques to realise smart industry and manufacturing goals in the intersection of people, new technologies and innovation” [4]. Accordingly, as societies face a technological revolution, the way people perceive and argue about ideas, and how they relate and make connections, change. This phenomenon is a transformation new to all.

In Malaysia, the manifestation of IR4.0 in T&L4.0 can be exemplified in Fig. 1. Teaching and learning was once teacher centered (MyHE 1.0), followed by how students were able to actively respond during classroom sessions (MyHE2.0). In MyHE 3.0, instructors became facilitators and students were expected to collaborate through the use of digital technologies. To manage IR4.0 later in their live, students are now required to *connect, create* and *construct* new ideas from their existing and new found knowledge.

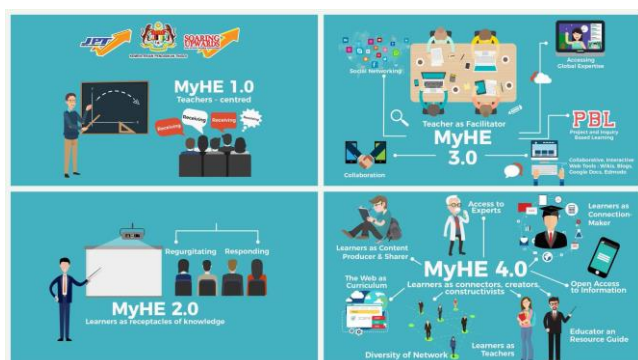


Fig. 1. The transformation of higher education delivery in Malaysia [5], [6].

What makes IR4.0 challenging is, according to the World Economic Forum 2015, an estimated 65 percent of kids enrolling in primary education today will end up working in jobs that have not been created yet. This is because automation and artificial intelligence are change agents in IR4.0 that will make certain groups of employees redundant. Some jobs will be replaced with new workers with the needed skills or with machines that do the job cheaper and faster. Therefore, students in higher education today do not study for their future vocation, rather they study to face the unknown! Unlike their grandparents facing Industrial Revolution 1.0 or 2.0 (IR1.0 or IR2.0 respectively), students today must be well-equipped with the *weapons* such as getting familiar with artificial intelligence and big data [7].

As illustrated in Fig. 2, the progressive movement of the revolution can be mainly contributed to the pervasive dependent on technology. Fig. 2 complements Figure 1 in the sense that they move in the same era of technology and industry; this suggests that the demand of the real world dictates the demand in the education sector.

What can be discerned from all these discussions is this: the working definition of IR4.0 in higher education is the ability of academics and students to apply, amongst others, automation, data exchanges, robots, big data, artificial

intelligence and Internet of Things to realise course delivery, course assessments and course communication in Malaysian higher education.

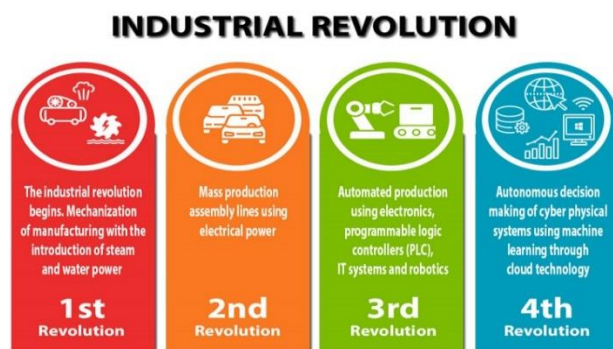


Fig. 2. The Industrial Revolution from the first to the fourth [7].

### III. EFFECTS OF IR4.0

#### A. On Language Studies

As much as IR4.0 is about automation and big data, language skills must not be ignored. The effectiveness of maneuvering and convincing others become more central in this era of IR4.0. The need for *better* communication and collaborative skills will be far more important than ever [8]. Subsequently, there are three main effects of IR4.0 on language studies in higher education. They are explained in the next paragraphs.

Firstly, mastering multiple languages becomes so significant today. As technological advances are not exclusive to one nation only, the need to learn from each other increases, and this demands for language proficiency in not only English but others as well. To ensure this, parents, education systems, society and the government must play active roles. The institutes of higher learning, for example, should offer foreign language courses that cater to this demand. These courses must not be offered at the basic level only; they must continue to train students to speak eloquently and effectively.

Secondly, the approaches to teach language courses must be improved. Regardless of the languages taught, a systematic approach and assessment must be implemented. All skills must be given equal emphasize during the teaching and learning of the language courses. Further, those students majoring in language studies must be given ample space and opportunity to practice the language that they are majoring in. As suggested by Hussin [9], there are various innovative ways to retain students’ attention during language studies, and these ways are assisting students to face IR4.0 effectively.

Thirdly, language studies students must learn other skills including creative thinking and entrepreneurship. As argued by Brown-Martin [10], there are three key areas where “humans beat machines,” and two of these include creative endeavors, where everything from scientific discovery to creative writing and entrepreneurship requires language competency, and social interaction since robots just do not have the kind of emotional intelligence that humans do.

### B. On Cultural Studies

Cultural studies are a broad area of study. To simply define cultural studies is not easy but the author opines that for the purpose of this work, cultural studies refer to “how cultural practices relate to wider systems of power associated with or operating through social phenomena, such as ideology, class structures, national formations, ethnicity, sexual orientation, gender, and generation” [11]. There are two effects of IR4.0 on cultural studies explained next.

Firstly, IR4.0 changes the power relations between humans and technology. People are more connected to the Internet and are easily influenced by whatever is shared online. According to a 2025 and beyond trend prediction, 10 percent of people will be wearing clothes connected to the Internet, more than 50 percent of home appliances will be connected to the Internet, and that 80 percent of the world's population will have Internet presence [12]. As much as society tries to preserve cultural practices, the world would have to assimilate and adapt to these changes in power relations, the relations between people and technology and amongst people.

Secondly, cultural studies become more relevant in order to ensure that one's heritage is maintained. As communication and the way people do things change dramatically, documentations of *old ways of doing things* must be done. This is where graduates of cultural studies must ensure that despite the advancement of technology and the demand of IR4.0 skills, they are still able to be culturally competent by being able to differentiate yet appreciate their roots and apply soft skills such as critical thinking, where robots are not able to perform. To ensure continuity of IR4.0 and beyond, the future workforce must realise that as far as artificial intelligence is able to perform translation between languages, it still lacks the cultural input that defines translation practices.

## IV. CONCLUSION

### A. Potential Strategies

The existing approaches and skills provided to graduates are aplenty and mostly still relevant. Notwithstanding this, additional skills are needed such as on cultivating innovation and creative and critical thinking. According to Xing and Marwala [13], there are four potential strategies in equipping students to face IR4.0, including utilizing wearable assisted teaching, learning and training technology (see Ezenwoke *et al.* [14] and Engen, Geaver & Mifsud [15] for more ideas on wearable technology), embracing Massive Open Online Courses (MOOCs), cultivating innovative talents and generalizing blended learning. What these suggest are similar strategies to Hussin [16], who argues that students today must be trained to be using technology and to be familiar with automation so that graduates can be data savvy and comfortable with artificial intelligence [17].

These four strategies do not apply to language and cultural studies only, they can also reach other fields of studies. For example, using MOOCs and blended learning allow future graduates to connect, create and construct new ideas beyond the four walls of their classroom. They can invite discussions or initiate projects across nations, or they

can ask questions to experts anywhere in the world. Students learn to be more responsible of their learning, and they ultimately learn by doing and by making mistakes.

### B. A Teaching and Learning Model

T&L4.0 empowers learners to structure their learning paths. It is characterized by personalization of the learning experience, where students have complete flexibility to be the architect of their own future and have the freedom to aspire, approach and achieve personal goals by choice. Increased innovation in teaching methods, demand for an improved higher education experience and availability of better learning opportunities supported by technology have been the major drive for this shift towards personalization [18].

The author opines that this proposed teaching and learning model (see Fig. 3) could assist academics to understand their roles in educating and inspiring future workforce. Basically, it can be proposed that the model for teaching and learning must include these components and two levels. 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 and course assessment relationships.

All the potential strategies mentioned previously are the platform for this model. Wearable technology, MOOCs, innovations and blended learning could be used as the learning environment. At the same time, they could also be used as part of the course delivery and course assessment methods. Nonetheless, this model must first be validated and tested before further improvement to it can be done. At best, some variables may differ depending on the needs of each higher education provider.

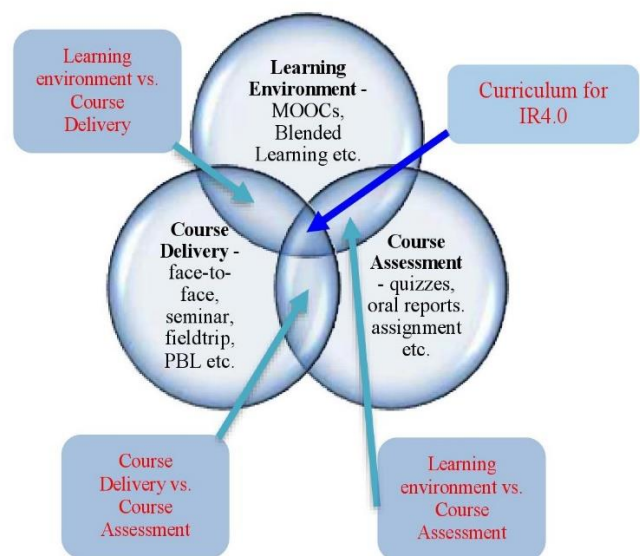


Fig. 3. The proposed teaching and learning model for IR4.0

### C. Final Remarks

The proposed model for IR4.0 (see Fig. 3) provides



flexibility for academics and students to choose what suits them best. Despite this, the most important aspect to be addressed is the position of language and cultural studies in the midst of IR4.0. As society is swamp with automation and artificial intelligence, language and cultural competency must come handy for the graduates to survive the unknown!

To conclude, this work has provided a working definition of IR4.0 to frame the discussion in the context of Malaysian higher education. It has also briefly explained three and two effects of IR4.0 on language and cultural studies respectively. At the end, this paper highlights four potential strategies to cope with IR4.0 and beyond, and offers a proposed teaching and learning model for educating the future workforce. Despite being untested, the proposed model could be a starting point for academics to start pondering on their teaching strategies, and perhaps to apply new methods to equip graduates on embracing IR4.0 and beyond.

#### CONFLICT OF INTEREST

The author declares no conflict of interest.

#### AUTHOR CONTRIBUTIONS

The author is responsible for all the research activities documented in this paper, and has approved the final version.

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