

# English Language Teaching in the Era of Industry 4.0: A Literature Review

College of Teacher Education,  
Surigao State College of Technology – Del Carmen Campus, Surigao City, Philippines  
colesremuel@gmail.com

**Abstract:** *Fourth Industrial Revolution, coined as Industry 4.0, is the current buzzword that provides challenges, opportunities, and threats among individuals from all walks of life. This phenomenon is said to be an era of massive technological innovation and advancements that significantly affect the labor market and the academe today. Specifically, this fusion of digital transformation has influenced the paradigm shift of teaching English as a second language*

**Keywords:** Refrigeration Compressor Technology, Innovations, Recent Developments

## I. INTRODUCTION

Fourth Industrial Revolution, coined as Industry 4.0, is the current buzzword that provides challenges, opportunities, and threats among individuals from all walks of life. This phenomenon is said to be an era of massive technological innovation and advancements that significantly affect the labor market and the academe today. Specifically, this fusion of digital transformation has influenced the paradigm shift of teaching English as a second language.

Relatively, this paper intends to explore the concepts of Industry 4.0 and its implications in the domain of 21<sup>st</sup> century teaching-learning particularly in language education. With this knowledge-based economy and this ever competitive world of work, insights and arguments from varied perspectives are herein discussed to formulate a conclusive statement of this relevant issue.

The fourth industrial revolution (the fourth IR) is the phase of knowledge expansion where the boundaries among physical, digital and biological fields are unclear (Schwab, 2016). Stearns (2018) argues that “the industrial revolution was the most important single development in human history over the past three centuries.” Industrial revolution could be argued to be a major development, change, or transformation that has taken place in the history of human society; from the use of machines, telecommunications, electricity, to new developments in the form of technology. Any industrial revolution changes government policies and the way the government provides services to various communities, and influences both the social and economic aspects of society. Vries (2008) explains that “industrial revolution” refers to the occurrence, during the transition from a pre-industrial to an industrial society, of modern economic growth; in other words, a sustained and substantial increase of gross domestic product per capita in real terms.

Furthermore, the 4IR or FIRE is about the digital revolution happening at the current moment. The 4IR has ushered in new possibilities and opportunities for society. It is built up from the continuation of many successes of the previous revolutions. The 21st century has different challenges that will need new ideas to solve them. The 4IR encompasses different emerging technologies. The new revolution encompasses new ideas, new possibilities, new creations, and new inventions. This new revolution is about breaking frontiers. Schwab (2016) points out that the new revolution is “characterized by a much more ubiquitous and mobile internet, by smaller and more powerful sensors that have become cheaper, and by artificial intelligence [AI] and machine learning.” During the turn of the century, the use of mobile devices increased dramatically.

Hence, this paper shall further unravel the implications of FIRE on education particularly in the teaching of English as L2. This may have brought a challenge and/or opportunity for the academe to reshape and re-invent relevant changes. It is but a necessity for educators to be fully equipped with technological innovativeness and creativity as tools elevating education in the digital age.

## II. DISCUSSION

The following displays varied viewpoints on Fourth Industrial Revolution or FIRE on the context of education particularly the domain of teaching English as Second Language. Further arguments and analyses are provided based on the claims from different researchers and experts.

The recent rapid advancement of technologies provides everyone with many new capabilities and, at the same time, changes the ways people live, study, work, and interact with others, as Schwab (2017) signifies that the new industrial revolution with its —fusion of technologies across the physical, digital, and biological worldscauses shifts not only across all industries, but also towards society, and reshapes governments, institutions, systems of education, and many others. This industrial era requires people to have creative insight, collaborative team work, and adaptively toward culture differences, including intercultural and interpersonal skills (Penprase, 2018).

In the framework of English education, especially in the teaching and learning context, this circumstance indicates that English teachers have to develop interactive forms of pedagogy and put emphasis on multiple disciplines and cultural perspectives, in order to cultivate students [human] capacities and skills, as well as their language proficiency. It appears that self-directed learning and thinking also should be well-developed since technologies are exponentially developed and require people to update their skills and teach themselves about the latest technologies and industries continuously. It is in line with what Wheelers (2013) suggests about pedagogy [education] that —Pedagogy is leading people to a place where they can learn for themselves. It is about creating environments and situations where people can draw out from within themselves, and hone the abilities they already have, to create their own knowledge, interpret the world in their own unique ways, and ultimately realize their full potential as human beings.

Furthermore, the advancement in ICT is undoubtedly rapidly transforming the culture of work. Teachers need to be prepared to use and adopt technology as technology enhances student's learning, teachers should understand the fact that 21st-century classroom must provide technology-supported teaching materials (Padmavathi, 2016). Training, development workshops and school policy should be redesigned to positively influence teachers' adoption and use of technology (Sun, Strobel, & Newby, 2017). Teacher's usage of technology will come out with the powerful learning environments. Moreover, it will transform the educational process of learning and teaching in where the learners will deal with knowledge in a constructive and active way. The technology is not only considering as a tool, which can be added for existing teaching methods but also nowadays the new technologies by the fourth industrial revolution is seen as a modern instrument to enhance and support new ways of learning and teaching process.

On the other hand, the four industrial revolutions seen in the world were technology driven, and the use of various technologies assists the government and the private sector to experience growth at a quick pace. In current times, various new concepts and ideas are brought to life due to the use of technology. Ideas such as virtual worlds, smart cities, big data, Internet of Things (IoT), and AI have taken centre stage in driving development in the new era. Another similarity in these revolutions is the improvement of lives and the ease of doing business and providing services. Hence, Education in the 4IR (HE 4.0) is a complex, dialectical, and exciting opportunity that can potentially transform society for the better. The 4IR has different implications for many other sectors of life. As such, it holds both opportunities and challenges for education. Through the use of different components of the 4IR, such as IoT, 3D printing, quantum computing, and AI, the education sector could be transformed completely to offer solutions to new challenges.

In general, it can be gleaned that the convergence of developments in digital world has created a great chance for educators to move forward, innovate, and integrate technologies in teaching language across disciplines.

According to Butler-Adam (2018), one of the implications of the 4IR in the education sector has to do with curricula, teaching, and learning – rather than with robotic tutors. In other words, there must be cross-sector teaching and learning. Students and educators from various fields need to learn about the different factors involved in the successful implementation of the 4IR. As Butler-Adam (2018:1) explains, students studying the basic and applied sciences need to understand the political and social nature of the world in which they live, and, in turn, students who study the humanities and social sciences need to understand at least the foundations on which AI is based and how it operates. Given the statement above, the 4IR drives the idea of a multidisciplinary field, whereby humanities and social sciences join technologies to solve problems. The 4IR and the development of biotechnology and AI fundamentally challenge assumptions about humans and their relationship with the natural world. 4IR liberal arts programmes should be

developed to account for the social dislocations from the 4IR. The 4IR curriculum, in general, should respond to political and social tensions resulting from the rapid pace of technological advancement (Penprase 2018).

On this note, Teacher Education Institutions (TEIs) in the country should revisit the existing curricula whether they address the pressing demands of this highly digitalized generation. With that, Education 4.0 best fits and aligns to the world of industry and society.

In terms of teaching and learning, online instruction and the expanding use of AI necessitate new guidelines to provide a theoretical basis for digital pedagogy (Penprase 2018:221). Digital literacy is a basic prerequisite for students to develop adaptive capabilities to participate in the global digital society, to benefit from the digital economy, and to derive new opportunities for employment, innovation, creative expression, and social inclusion (Brown-Martin 2017).

Any digital education strategy should consider the impact of change on the education system. This presents a wicked problem. Changes could affect the quality of the graduates if students are not well prepared and there is insufficient investment in resources (Marshall 2016:295). Education is particularly susceptible to wicked problems, especially in terms of quality measures (Marshall, 2016). Conceptualizing and operationalizing quality measures, performance indicators, and educational outcomes become increasingly challenging in a contested space of educational change and strategy (Marshall,2016).

Furthermore, the successful implementation of the 4IR in education will require appropriate skills. Skills are required to implement, manage, and work with new technology, and with one another (Butler-Adam, 2018). The required set of skills is very important in order to achieve the goal of obtaining the best results from new technology. Gray (2016) argues that in the near future, approximately 35% of skills that are considered important in today's workforce will change. Hence, anew sets of skills will be required for the new revolution and for the use of new technology. For instance, those working in sales and manufacturing will need technological literacy skills (Gray 2016). As new technologies create new jobs (such as social media experts), job displacements will also occur (e.g. toll booth operators) (Nordin and Norman 2018:1). In addition, the 4IR has a potential implication in terms of moral and ethical decisions that must be taken into consideration. Technology shapes people's lives in many ways.

With the wide use of new technology in business, government, and other spheres of life, a number of dynamic changes are taking place. Hooker and Kim (2019) argue that new technological advancements such as the AI revolution could lead to a more radical outcome; it could displace workers on a scale that have not been seen before. This could lead to a large fraction of the population losing employment opportunities. However, many authors, researchers, academics, and policymakers disagree regarding the point made above. On the one hand, some people argue that the new revolution will lead to increased job creation. On the other hand, the argument is the demise of current or future jobs due to the wide use of technology.

The rapid growth of technological innovations and industries bring great impacts on English education in Indonesia. Schwab (2017) signifies that the era of education driven by the industrial revolution 4.0 was called Education 4.0. Education 4.0 is education which responds to the needs on Industry 4.0 where smart machines work alongside human-professionals, utilizes the potentials of digital technologies, personalized data, open sourced contents, and the globally-connected, technology-fuelled world of humanity, and establishes lifelong learning to grow and survive even to play a better role in the society (Fisk, 2017). Digital learning process in the era of Industrial Revolution 4.0 demands curriculum reorientation, hybrid / blended learning, and life-long learning (Ahmad, 2018).

English teachers may come across challenges within the process of English language teaching, especially now—when technologies and innovations grow rapidly. Brown (2001) states that when someone chooses to be a language teacher, he may encounter challenges more than what is expected as he should assist language learners[students] to learn English as a foreign language successfully. In the context of education 4.0, Zimmerman (as cited in Pannen, 2018) acclaims that students must be provided with particular capacities involving scientific skills, technology, engineering and mathematics, the internet of things, and lifelong learning, where in English teachers are challenged in many ways. Those pressures push the English teachers to adjust their roles within language learning, in order to fulfil their responsibility of becoming English teachers. Additionally, the roles played by a teacher in the learning processes develop an engagement between the teacher and students which may produce a harmony of powerful learning, or disagreement, rejection and disinterest (Zevin, 2010). Henceforth, it can be inferred that how teachers position themselves in the learning process, influence the learning itself. In other words, the teachers are challenged to be very

selective in choosing the roles they bring into the class or the lesson. They are also expected to arrange the lesson thoughtfully involving the instructions and contents—knowledge, skills, and attitudes, which can equip students with characters and literacies to deal with the industrious world of technology.

Recently, students are living within digital world; they are surrounded by industries and technology advancements. These conditions require teachers to arrange lessons which utilize the innovations provided by the technology itself, which meet the need of Industrial Revolution 4.0, i.e. conducting hybrid/blended learning and online learning. Accordingly, the teachers are challenged to occupy themselves with ICT-literacy. Besides, Schwab (2017) affirms that Industry 4.0 generates continuous changes in wide-ranging fields and rapid emergences of technology breakthroughs. Therefore, a lifelong learning should be endeavoured and maintained, and curriculum needs adjustment to meet the requirements of Education 4.0, as a part of Industrial Revolution 4.0, that —develops both technical mastery and a deep awareness of ethical responsibility toward the human condition (Penprase, 2018). The previous challenges become tasks for the educational practitioners to deal with. Further studies seem needed to be executed in order to find the best ways to resolve the challenges due to the Industrial revolution 4.0.

Industry 4.0 brings several implications towards English teacher covering English competencies, formal teacher education, and teachers' professional development. First, regarding to English competencies, teachers need to be proficient in using spoken and written English productively to deliver English lessons and to manage classes, and need to be IT-literate. Second, in the context of formal education, English teachers should revisit the curriculum and evaluate the lessons, and all related matters, which are expected to fulfil the requirements of English education in the era of Industry 4.0. English teachers must know and have accesses to technology-oriented professional development, and be able to teach and share knowledge through current ICT and social media communicatively and intellectually. Furthermore, since the teachers are expected to be the agents of social change, they must capable developing learning activities which require students to practice a lot not only at school but also outside of school that may develop community engagement. The rapid growth of technology and science also push the teachers to be tenacious in improving their professionalism in order to encounter the globally-connected education in the era of Industry 4.0. In this case, teachers are advised to collaborate with professional English teacher or teaching organization. Third, in terms of teachers' professional development, English teachers must be qualified and having the competencies to be professional English teachers—they should continuously upgrade their skills, which are in line with the digital technology advancement. The teachers may strive for professionalism by joining English teacher forums, building self-motivation, joining both formal and informal professional development activities, such as: workshops, trainings, seminars, conferences, and researches. At last, teachers also should conduct reflective teaching to ensure that their professionalism develops and meets the expectation of the latest Educational world.

Additionally, Schwab (2017) mentions that Industrial Revolution 4.0 brings impacts toward individual, covering identity, moral, and ethics, human connection, and management of public and private information. Since an English teacher is a person (individual), these impacts are also applicable to English teachers. Technology enables English teachers to do things easier, faster, and in more efficient ways, as well as provides the teachers opportunities for personal development. However, it leads the teachers to a rapid change of technologies which demands continuous adaptations. As a consequence, some teachers may resist it and are unable to follow the changes, which results in a gap of technologies. Moreover, identity, moral, and ethics may become debatable issues, since the advancement of technologies, such as artificial Intelligent, internet, synthetic biology may replace the existence of teachers, even diminish human capacities. This implies that the teachers must maintain and endeavor human characters within teaching and learning processes to make themselves as well as the students ready to work together with smart machines, without losing their human characters. Next, the industrial revolution tightens the individual and collective relationship with technologies. This condition may negatively influence the social skills and ability to empathize. This condition urges the teachers to take actions such as planning, instructing, and administering assignments which support the collaborative works and social interactions of the students within the technology based learning. The globally-connected technology advancement also requires people to manage their public and private information wisely. Therefore, while utilizing technological applications for teaching, the English teachers must be selective and wise in sharing information namely when it relates to personal data, to avoid misuses of personal data.

Industrial revolution 4.0 arouses the need for optimizing the roles of teachers in English language learning, since the teachers as the agents of change in Education are needed by the students to grow and survive within the revolution. There are many roles of teachers, for example as controllers, monitor and evidence gatherers, feedback providers, prompter and editors, resource and tutor, organizer or task-setter, comprehensible input provider, and facilitator, etc. In this case, the English teachers must be able to determine which roles to be employed in a particular context of learning, pertaining to the learning objectives and activities planned to be carried out by students within the globally-connected, technology-based learning. The industrial revolution brings about challenges and implications, including the need to improve English proficiency, formal teacher education, teacher's professional development, and also some individual issues.

According to Butter-Adam (2018), there are implications that arise for institutions of education are at least twofold. Firstly, researchers in relevant disciplines face the challenge of making AI increasingly more sophisticated and useful, not just in manufacturing or planning but also in the direct service of society. The work of scientists, policymakers, social workers, educationists and many others whose duty of care it is to aim for the achievement of the 17 Sustainable Development Goals can all benefit from sophisticated AI applications. Whether the goal is quality education, decent work, climate action, affordable and clean energy or sustainable cities, there are already AI options of value and importance, yet more can and should be developed. But there are also other ways in which research (perhaps of a different nature) is important. In the realms of voice and facial recognition, for example, current systems are based on American and European norms, so that (for example) African or Chinese accents or facial features remain marginal. AI needs to be revolutionised and deracialised – and this requires research and interventions from scholars and scientists, a new activism, that goes beyond the creation of new algorithms.<sup>3</sup>

The second implication has to do with curricula, teaching and learning – rather than about robotic tutors. To succeed as a member of society, and as an employee, in the era of the Fourth Industrial Revolution, numeracy, literacy and an understanding of how the world operates are all essential. Students studying the basic and applied sciences need also to understand the political and social natures of the world in which they live. For the same reasons, students who study the humanities and social sciences need to understand at least the foundations on which AI is based and operates. This is a different kind of decolonisation of curricula – even requiring, perhaps, some of the elements of the kind of education provided (at least at first-year level) by liberal arts colleges.

The second implication has further requirements: people must have the skills required to implement, manage and work with the new technology, and with one another. And, not least, to be problem solvers, to be adaptable, and to be able to express themselves in both the written and spoken word – and to make the kinds of ethical and moral decisions that are not ever likely to become successful elements of AI. This challenge is one to which educators will have to rise.

The fourth industrial revolution has its influences on the teaching process within the new era of industry 4.0 (Abdelrazeq et al., 2016). The concept “Teacher 4.0” enlarged to cover the current teaching methods used in the higher education field. Therefore, education needs to adopt new teaching methods to be able to embrace the fundamental changes happening with new technology. Consequently, a new concept of teaching must be considered. This new concept called: “Teacher4.0”, teachers will stand in front of a virtual audience or in a traditional classroom while wearing smart augmented reality devices. The Teacher 4.0 realizes the development and the evolution of these technologies (Karre, Hammer, Kleindienst, & Ramsauer, 2017). Innovative technologies were used to introduce new teaching methods to come up with new teaching scenarios.

### III. CONCLUSION

This ever challenging era of technology paved the way for educators to refrain status quo. The old practices in the academe may be useful but relevant changes should as well be embraced. In the mode of instructional delivery, integration of ICT should be reinforced to position learners in the most equipped learning environment – practical useful in the labor market.

With the Job Enabling English Proficiency (JEEP) Program of Surigao State College of Technology, Education 4.0 is prevalent as it employs computer-driven classes for students.

Lastly, this onslaught of modernity should further teach ELT educators that innovation and creativity be made on top in the 21<sup>st</sup> century teaching-learning. The FIRE in Education should continually be burning.

**REFERENCES**

- [1]. Ahmad, I. (2018, February 16). Pendidikan tinggi —4.0l yang mampumeningkatkandayasaingbangsa. Makassar, Indonesia: BelmawaRistekdikti. Retrieved January 14, 2019, from <https://fri2018.unhas.ac.id/wp-content/uploads/2018/02/Presentasi-Intan-Ahmad.pdf>
- [2]. Aoun, J. E. (2017). Robot-proof: Higher education in the age of artificial intelligence. Cambridge: The MIT Press. Retrieved from <https://muse.jhu.edu/book/55644>
- [3]. Butler-Adam J. The Fourth Industrial Revolution and education. S Afr J Sci. 2018;114(5/6), Art. #a0271, 1 page. <http://dx.doi.org/10.17159/sajs.2018/a0271>
- [4]. Brown, H. D. (2001). Teaching by principles: An interactive approach to language pedagogy. San Fransisco: Longman.
- [5]. Fisk, P. (2017). Education 4.0 ... the future of learning will be dramatically different, in school and throughout life. Retrieved from <https://www.thegeniusworks.com/2017/01/future-education-young-everyone-taught-together/>
- [6]. Fullan, M. G. (1993). Why teachers must become change agents. Educational Leadership, 50(6). Retrieved January 14, 2019, from <https://michaelfullan.ca/wp-content/uploads/2016/06/13396031680.pdf>
- [7]. Harmer, J. (2007). How to teach English. Harlow, England: Pearson Education.
- [8]. Harmer, J. (2012). Teacher knowledge: Core concepts in English Language Teaching. Edinburgh, England: Pearson Education.
- [9]. Harmer, J. (2015). The practice of English language teaching (5th ed.). Harlow, Essex, England: Pearson Education.
- [10]. Pannen, P. (2018). Mempersiapkan SDM Indonesia di era Iindustri 4.0. Jakarta, Indonesia: Ministry of Research, Technology, and Higher Education. Retrieved from <http://sdgcenter.unpad.ac.id/wp-content/uploads/2018/09/Kemenristekdikti->
- [11]. Millenials, M. (2018). This is how artificial intelligence will impact your job for better and worse. Forbes. 2018 January 16 [cited 2018 May 03]. Available from:
- [12]. Mempersiapkan-SDM-Indonesia-di-Era-Industri-4.0.pd
- [13]. Penprase, B. E. (2018). The fourth industrial revolution and higher education. In N. W. Gleason, Higher education in the era of the fourth industrial revolution
- [14]. <https://www.forbes.com/sites/danielmarlin/2018/01/16/millennials-this-is-how-artificial-intelligence-will-impact-your-job-for-better-and-worse/#164ba5e44533>