



MAPÚA
UNIVERSITY



SCHOOL OF SOCIAL SCIENCES
AND EDUCATION



International Journal of Outcome-Based Education

Vol. 2 No. 1 September 2022

Online ISSN 2961-3132

Commentary: Navigating Education 4.0 through the Lens of Outcome-Based Education

Jonathan V. Macayan^{1*}

Jasmine Nadja J. Pinugu²

Edward Jay M. Quinto³

¹University Fellow, Mapúa University, Intramuros, Manila

²Department of Psychology, School of Medicine and Health Sciences, Mapúa University, Makati

³Center for Teaching and Learning, Mapúa University, Intramuros, Manila

*Corresponding Author: jvmacayan@mapua.edu.ph

ABSTRACT

Education 4.0 is the logical response of schools to the challenges and opportunities posed by Industrial Revolution (4.0). The modern-day industries expect new sets of outcomes, i.e., knowledge, skills, and competencies, that professionals entering the workplace must possess. How would schools then keep up with these new sets of expectations? How would schools then prepare students towards attaining the necessary outcomes relevant to the needs of industries, and of the local and global societies? This paper discusses the trends, issues, and concerns surrounding Education 4.0, and how the Outcome-Based Education framework can be used to constructively align curricular experiences to the desired outcomes of the real world.

KEYWORDS

Education 4.0, Industrial Revolution 4.0, Outcome-Based Education, constructive alignment

ARTICLE HISTORY

Received: 8 September 2022 /
Accepted: 27 September 2022/
Published: 30 September 2022/
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INTRODUCTION

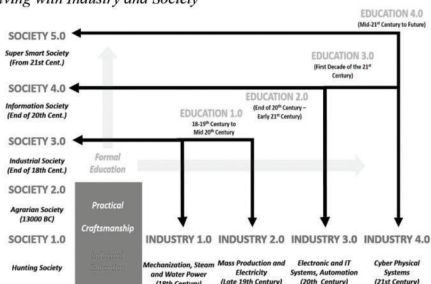
Education does not exist in a vacuum. As such, it must evolve and grow in parallel with the revolutions happening in the real world, the society and industry. If education will conveniently stay on its steady isolated course, and not co-evolve with society and industry, then, it will not serve its purpose. Needless to say, different periods of time as characterized by the kind of society existed at a particular period drove people to invent and reinvent industry that satisfied human and societal needs; thus, society and industry are naturally co-evolving. The same is expected of education – to produce people who can lead the industry productively for the benefit of the society. Therefore, a synchronized and harmonized triadic evolution among society-industry-education would be very crucial.

The fourth industrial revolution (4IR) is the current and developing force in which disruptive technologies and trends, such as the Internet of Things (IoT), robotics, virtual reality (VR), and artificial intelligence (AI) are changing the way people today live and work. The changes happen fast and seamlessly. While there are several identifiable benefits of this revolution, it is also a known fact that there can be threats and downsides of this, such as jobless future and extreme competition in the employment market (Bughin, Manyika, & Woetzel, 2017). Education 4.0 as response to 4IR should ensure that it produces students who possess competencies that will make them strive and succeed in future environments of work and society.

Figure 1 depicts how education should co-evolve with society and industry from the earliest known history up to present (21st Century).

Figure 1

Education Co-evolving with Industry and Society



Education 4.0 today is a 'buzzword' in the field of academe. While it is understandable that only few whitepapers and scholarly publications can be found to date, mainly because it is a fairly new concept, several information about this trend in education are readily and publicly available online. A common observation can be noted that in many digital documents about Education 4.0, it is explained in the light of 4IR. Also, Education 4.0 in several documents is explained using 21st century as the main context. It also noteworthy that several documents explained Education 4.0 as the new trend of education involving the massive use of various digital technologies in teaching and learning. Noticeably, however, there is paucity of available documents that explain Education 4.0 as a curricular framework with explicit goals and directions. Some important issues about this new education paradigm warrant concrete explanations. For example, what kind of education systems and processes would education 4.0 entail? What should be the critical goals of this new trend of education? Further, what skills and competencies should be more emphasized in education 4.0? This commentary intends to elucidate these important issues about Education 4.0 using Outcome-Based Education as the theoretical lens.

It draws insights from a critical document analysis of four reputable online sources. The analysis involves coding of document's essences into themes, similar to FGDs and interviews (Bowen, 2009). More specifically, the target contents are those that are available online (e.g., blogs, webpage, etc.) published by reputable organizations. These digital documents typically explain, describe, or define what Education 4.0 is or what it should be as follows:

1. Graham, C. (2018). *What is Education 4.0?* Intellitek. www.intellitek.com/what-is-education-4-0/.

2. Pederby, D. (2022). *Preparing for Education 4.0*. Times Higher Education. <https://www.timeshighereducation.com/hub/jisc/p/preparing-education-40>

3. Fedena@. (2018). *How Education 4.0 Can Transform the Schools' Stakeholders Experience?* Fedena@. <https://fedena.com/blog/2018/10/how-education-4-0-can-transform-the-schools-stakeholders-experience.html>

4. Future Ready Education. (2019). *Future Ready Education, What is Education 4.0? How you can adapt to this learning environment?*. Future Ready Education. <https://www.future-readyedu.com/what-is-education-4-0-how-you-can-adapt-this-in-the-learning-environment/>

These documents were sourced through a simple Google search, using the cue word 'Education 4.0'. Then, they were validated using specific criteria, namely credibility of the source, validity of information, and correctness of data. Then, the sources were shortlisted. Securing right to use of the documents should have been the next step, but since these documents are digitally available (online) for public use (reading, downloading), this step was skipped. Nevertheless, careful handling of data was ensured so as not to misrepresent and misinterpret the essences of the source.

Analysis used was systematized content analysis. This involves steps that are commonly used in thematic approach. In the process of reading the texts, commonalities and differences were carefully noted and recorded. Then, these commonalities and differences are grouped according to categories, and were consequently labelled using appropriate codes (coding process). The frequency-rarity continuum was also developed to present common and varied textual features found in the select samples of documents.

Typifications of Education 4.0

In the documents, Education 4.0 is typically described as modern-day education or education of the 21st Century. As discussed in several documents (online), the new education paradigm may pose various challenges and opportunities both for students and educators, particularly in the areas of career pathways alignment and in technological competence. Specific results of document-analysis involving four (4) digital documents are presented in Table 1.

Table 1 Frequency (Rarity) Results Involving Digital Documents (N=4) on Education 4.0			
Coded Contents	Frequent	Rare	Few
Alignment to Industry 4.0	√		
Use of Digital Tools/Technology	√		
Remote and Personalized Learning		√	
Redesigning/Re-engineering of Assessment		√	
Experiential Learning			√
Future-focused education (Jobs/Career)		√	

Note: Frequent = occur in all documents; Rare = occur in at least 2 documents; Few = occur in at least 1 document

Evidently, Alignment to IR 4.0 is well emphasized in all the specimen documents. This means that the intended goal of Education 4.0 is to address the impending expectations and changes in the industry and business sector. Another highly evident emphasis of Education 4.0 is on the massive use of Digital Tools/Technology in instructional and assessment delivery. This depicts the kind of learning environment (e.g., resources, spaces, networks, etc.) that fits the modern-day education (4.0). Further, majority of the specimen documents characterized Education 4.0 by Remote and Personalized learning, Redesigned/Re-engineered Assessment, and Future-Focused Curriculum (Job or Career related). Only one document emphasized the relevance of Experiential Learning in the new set-up of education.

Education 4.0 in the lens of Outcome-Based Education

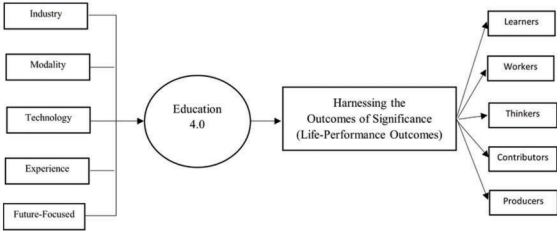
All the documents reviewed in this investigation agree that education 4.0 is a logical response of the academic sector to the challenges and opportunities imposed by the industrial revolution (4IR). Thus, modern-day education must be adaptive and updated relevant to the movements and changes in industries. Also, the documents emphasized the importance of redesigning education delivery by integrating advanced technology in the educative process. There is an inclination to a more extensive demand for connectivity (online) in education. It can also be noted in some of the documents (Rare) that there is a need to make education more flexible and updated by looking into the potential of fully online offerings (remote learning), as well as the implementation of adaptive learning approach (personalized, hybrid, and flexible) where learners' diversities are importantly considered in terms of selection/choice of learning tools, preferred manner or approach of demonstrating learning outcomes, and the like. Further, some of the documents emphasized the importance of

redesigning education delivery by integrating advanced technology in the educative process. There is an inclination to a more extensive demand for connectivity (online) in education. It can also be noted in some of the documents (Rare) that there is a need to make education more flexible and updated by looking into the potential of fully online offerings (remote learning), as well as the implementation of adaptive learning approach (personalized, hybrid, and flexible) where learners' diversities are importantly considered in terms of selection/choice of learning tools, preferred manner or approach of demonstrating learning outcomes, and the like. Further, some of the documents emphasized the importance of designing curriculum that is future-focused. This is highlighting the anticipation of the kinds of competencies and skills that will be demanded in certain jobs that are not yet invented at present but would most likely exist in the next 10 to 20 years. Such changes are critically driven by the shifts in industry (4.0). A particular document (Few) emphasized the importance of "Experiential Learning". Simply put, this process places premium on "learner's hands-on experience" (acting or doing) as the most important factor of knowledge as opposed to rote and didactic learning. This is crucial to ensure that students are prepared into tangible demonstration of the desirable skills and competencies in actual work setting. This is also very much aligned with the paradigm and premises of Outcome-Based Education, which place importance on the actual demonstrations of what a student can do more than what they know theoretically. Outcome-Based Education (OBE) puts emphasis on demonstrable skills and competencies (Macayan, 2017; Macayan, 2021; Stroll & Spady, 2021; Spady, 1994). In the context of 4IR, it is fundamental that Education 4.0 must genuinely prepare students to perform real-life roles; and thus, learning experiences in school should be more or less inclined toward authentic experiences. The succeeding discussions explain the most important goal that Education 4.0 must emphasize through the OBE paradigm and premises.

Proposed Framework: Crucial Goal of Education 4.0

Figure 2

Crucial Goals of Education 4.0: Harnessing LPOs



Education 4.0 as a logical response to the current industry revolution must prepare students to face impending challenges by harnessing their skills and competencies that will make them future-proofed. This means that education must focus on molding characters and abilities that will make students survive proximal and distal contexts and experiences, not only in their chosen profession but also in life in general. Thus, its curriculum should not only focus on skills that are directly relevant in addressing the expectations of 4IR, which are mostly technology and automation related skills. It is crucial to recognize that some skills will stay and remain important despite all the changes entailed by the industrial revolutions.

Future proofing of graduates relies on the focus and goals of education systems (Collier, 2021). This requires thorough understanding of patterns and developmental trajectory of the ever-changing technology and processes that significantly impacted the society, work, and industries over the past decades. While it is expected that new skills or abilities will emerge in the future as a result of societal and industrial revolutions, this does not mean that all skills that are relevant at present will be discarded and will be deemed obsolete. Some skills can be perpetual, especially those that are inherent to humanity

(e.g., social skills, survival skills, adaptation skills, etc.), while some skills that people learn from life experiences and upbringing can be enduring (e.g., empathetic skills, creativity, etc.). Further, schools should also recognize that some skills that are considered in the recent years and at present as advanced will become common and less relevant or less marketable in the coming years. Thus, the challenge for education system in the process of future proofing are harnessing the perpetual and enduring skills, anticipating the emerging skills, and recalibrating the eroding skills.

The malleability and, to some extent, instability of skills-focused curriculum can have potential setbacks particularly in future-proofing graduates. Hence, in designing the curriculum, the anticipation and preparation for future life roles should be clearly identified and ascribed more succinctly over relative skills or abilities. In the process of developing curriculum, it is crucial to clearly envision what should be the ultimate purpose or the desired goal of Education 4.0. Spady (1994, 1998, 2018) explained that schools must ensure that the system is sending out graduates in the real world who are equipped with the necessary competencies and characteristics to successfully perform real-life roles. These roles are not merely confined on specific technical or career-related responsibilities, but rather on wider and more encompassing sets of desired skills and qualities that education system must harness among students to guarantee that they are well prepared to face vast challenges in real life before they graduate. These desired graduate attributes are called Life-Performance Outcomes or LPOs: Self-Directed Learners, Collaborative Workers, Complex Thinkers, Community Contributors, and Quality Producers. These LPOs were further elaborated and improved as explained in Spady (2021).

The anticipation and preparation for the vast roles as described in LPOs that each graduate shall be performing outside the school is the future-proofing mechanism in OBE. As emphasized by Collier (2021), 'the future can be viewed in multiple perspectives..., that there is no single future for which to plan.' It can be surmised then given the multifarious dimensions of the future, education reforms should not only focus on a single factor, like the Industrial Revolution 4.0, but should more importantly focus on harnessing the outcomes that will matter in performing real-life roles – the outcomes of significance.

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