

Technology and Education: A Deterministic and Instrumentalist Philosophical Approach

Abdul Shukor Shamsudin¹, Ayotunde Adetola Adelaja^{1*}, Taofeek Adejare Owoseni²

¹Universiti Utara Malaysia Sintok, Kedah State, Malaysia

²Baze University, Abuja

*Corresponding author. Email: ayoadelaja@live.com

ABSTRACT

Over the past few decades, enormous studies examining the significant contribution of technology adoption and usage in the education industry have emerged. Albeit, miniatures of this literature tend to focus on the outcome of massive (total) dependence of these technologies. To achieve the study objective, the authors engage instrumentalism, and determinism, philosophical approaches to investigate the potential outcome of full dependence of education technology in the pedagogical process in the education industry. Exhuming works of literature on technology adoption and usage in the education industry, and how the two philosophical approaches are being used in the field of philosophy, the conceptual findings reveal that using the instrumentalism approach to identify the potential outcome of educational technologies for the pedagogical process, there are bigger chances of producing a high level of effective and efficient students over traditional education. However, complete technology usage can be a complete disaster for the education industry if education is commercialized to the extent that students view education as a determining substance with lesser value. With this, the authors remark that education management should envision and present education technological adoption and usage as a mediating substance that the students needed to reach greater heights.

Keywords: *determinism, education industry, education technology, instrumentalism, philosophy*

1. BACKGROUND

The significant role of education cannot be underestimated. Educated minds are capable of seamlessly changing the world and make it a better place to live. Through education, countless innovations and creativity have emerged over time. Over the decades, the education industry has witnessed several changes in terms of policies not limited to internationalization, blended and flexible learning, structure, delivery method, and the recent fourth industrial revolution 'IR 4.0' [1, 2].

Despite the several changes brought to our society by the educated minds, the education industry remains among the industry that least experience

and is adamant about changing. The teaching mode remains arguably the same since education has been formalized [3, 4]. Some few decades back, the industry has adopted a significant amount of technologies to enhance the pedagogy process. However, comparing the technological adoption rate in the education industry with industries such as health, transportation, and agriculture, the adoption rate seems to be on a lesser side [5, 6, 7].

Technologies adoption in the education industry has, over the years, present some significant benefits. Examples of which include limiting the barriers of accessing educational institutions across the globe. That is, someone in a remote area can easily access ongoing live lectures in the cities. As

such, scholars have been keen on examining the effect of these technologies on several educational aspects. For example, the effects of technology on students' behavior [8, 9], students' performance [10, 11], and pedagogical effectiveness or cognition [12].

Findings from these investigations had yielded continuous debates in the education industry. Therefore, giving births to two different emerging schools of thought, 1) technologies as a positive channel to achieve educational success [13, 14, 15]. 2) technologies as distractions and barriers to deep engagement, having a negative influence on students' performance [16, 17].

Notably, the ongoing arguments concerning technology's effect on students' education lead to the creation of several education policies not limited to, 1) the restriction of technological devices that includes the likes of laptops, smartphones, iPads, tablets among other gadgets, in some educational institutions or when the lectures are ongoing. On the other hand, other institutions encourage technology usage for educational purposes irrespective of the time or functions. With these ongoing issues and arguments, the education industry can be argued to be among the industry that is disillusioned in adopting technologies for its 'process' operations.

Further insights into the available earlier studies reveal that educational technologies at any education level were examined as channels supporting traditional education pedagogy [8, 13, 14, 17].

Meanwhile, consideration into the recent global happening 'COVID-19 pandemic' has caused a paradigm shift in the sense that the educational industry has limited chances of survival without the massive adoption and dependence on technology to carry out its primary teaching activities 'pedagogical process.' Considering the recent paradigm shift from technology as a support system to full dependence on technology, the objective of this paper is, therefore, to conceptually argue the consequences of the paradigm shift from the lens of determinism and instrumentalist philosophical thoughts.

2. PHILOSOPHY OF TECHNOLOGY IN THE EDUCATION INDUSTRY

Technology adoption among educational institutions is gaining more attention as the day passes by. Its objectives, usage, and engagement among educational institutions remain the same. However, the subjective perception of its effects, consequences, and usage varies among different educational actors, resulting in several viewpoints (philosophy).

The philosophy of technology adoption in education is synonymous with the illustration of a Necker cube given by philosopher Ihde. The interpretation people give to the object 'cube' is based on the angle in which it is being viewed. Hitherto, retaining its objective interpretation, irrespective of how it is being considered. In this study context, technology represents Ihde's Necker cube, while technology applications are how the cube is seen. Thus, the arguments of technologies adoption on education, be it positive or negative, can, therefore, be subjectively true. Nevertheless, one should bear it in mind the flow of education inputs, processes, and outputs change not irrespective of the magnitude of technological adoption [18].

From a phenomenological viewpoint, Ihde classifies the relationship between human, environment, and technology into seven relationships, namely, mutual constitution, background relations, hermeneutic relations, and embodiment relations. These relationships present a different perception of how we see or perceive the technological effect [55]. These relationships present the world view and objectivity on the relationship between humans and technology [19, 20].

The technological adoption process at any educational level is almost the same at every institution. For example, the adoption of social media to support the traditional education and not the 'full' adoption of technologies in an automated form is what we are experiencing today as a result of the global pandemic where physical school activities ranging from pedagogical process to library use are somehow fully automated [21, 22, 23].

Considering this, the objectives of this conceptual study tend towards determining the perceived outcomes of full technology adoption in the

education industry on students' performance, efficiency, and effectiveness in the labor market. To our best knowledge, studies in this regard are at their infancy stage. To achieve these stated objectives, the researchers employed the instrumentalist and deterministic philosophy approaches by Carl Jasper and Hadeggar philosophies on technology.

3. TECHNOLOGY IN THE EDUCATION INDUSTRY

The use of internet services has gradually redefined the educational process. Thus, some critical educational services such as application and enrolment processes are no more carried out via traditional use of paper and pen but had virtually been moved to conventional approaches over the Internet.

Although educational services such as learning and teaching 'pedagogy' had also been conducted over the Internet. Albeit several studies had investigated e-learning, education technology adoption, factors that enhance, contribute, or influence users to study using contemporary technologies [24, 25]. These studies can be categorized as process studies that are only concerned with technology adoption, with fewer scholars given attention to the results or consequences of technology usage in the education industry [26].

4. DEBATES ON THE EFFECTS OF EDUCATIONAL TECHNOLOGIES.

Technologies in the education industry are numerous. However, for clarity and simplification, education technology in this study is reduced to electronic gadgets such as laptops, smartphones, iPads, tablets, and social media sites. All these are standard technologies used in supporting conventional education and, they are also the dominant platform used for the pedagogical process during this trying time via the Internet.

Most of the available studies on technological adoption in the educational industry examine technology as an educational support system. Nevertheless, their philosophical view can be categorized under the instrumentalist view because they believed that pedagogical technologies are channels to attain high cognitive level, support the learning process among students enhance their

behavior, self-esteem and study performance in the classroom [27, 28, 29, 30, 31, 32].

Investigating the behavior of students on technology adoption and the pedagogical process by employing a control and treatment group, the study of [28] supports both deterministic and instrumentalist view of technology among the samples (teachers) surveyed. [28] argue that the introduction of technology causes a transformative approach to teaching in some teachers while the students perceive a shift in their learning behavior via interactive, media-rich, and exciting new environment.

Critics of educational technologies have it that the use of technologies has reshaped the socialization among both students and academic staff, limiting the contact barriers, yet, no real relationship could be established [33, 34, 35]. Meanwhile, technology advocates pen the importance and usefulness of pedagogical technologies to be; accessing information about the subject matter, ability to multitask, increase cognitive because of the interactive and colorful environment [28, 29]. Contrarily, [36, 37] are critical on the significant negative relationship between multitasking and students' classroom performance measured by cumulative grade point average (CGPA), self-regulated learning, and self-esteem.

5. DETERMINISM VIEW OF TECHNOLOGY

The determinist view of technology argues that man cannot and will not control technology. This school of thought believed technology is autonomous, and it is controlling man, and it is, therefore, shaping their history [38]. Under the view of technology as determinist, [39] argues technology to be the principal actor that brings social changes to man's social life. For example, the advent of the Internet and the new media has transformed human socialization, communication, and knowledge sharing.

Similarly, technology such as those found in the transportation system have significantly redesigned human settlement, mode of transportation and has dictates public infrastructures that include road signs, road shapes and types of house that can be built in a particular area [40, 41, 42]. One of the founders of the determinist view, Heidegger posited

three claims on technology determinism. These are, 1) technology is not an instrument and can never be an instrument; instead, it is a way of understanding the world; 2) technology is beyond human control. Thus, it cannot be human activity; 3) it is known to be the most dangerous that risk us to see through the lens of technology.

Under the determinist technological view, there are thoughts that, at one point, through the negligence and ignorance nature of man technology will take over, and this will be the end of humankind [43, 44]. This is because the technologies we have developed in a way in which human beings never expect; thus, humans are less prepared for its consequences. Examples of this type of technology is that of polythene bags popularly called plastic bags. Through technology, the polythene bags are produced in multitude via the innovative process. However, the consequences of this innovation include land pollution that enhances global warming [45, 46].

In the education system, such innovativeness is happening. [47] referred to these phenomena are sometimes as commercialization of the education system. Several education institutions are now offering certified courses with less attention to students' prior qualifications or students' intellectual capacity. The danger here is, sooner or later, if this is not checked, yes, there will be many graduates with less required educational skills; as such, the educational value is in danger. Considering the unforeseen consequences of technologies instead of presenting education institutions as being advanced by adopting and implementing several pedagogical technologies, what should be a significant concern is the result of such adoption on a broader sense and not just institution advancement.

6. INSTRUMENTALIST VIEW OF TECHNOLOGY

Contrary to the determinist view that upholds the notion that technology innovation autonomously dictates our social life. Instrumentalist approach sees technology as a tool or the channel man use in achieving their goals after having a clear understanding of the complex interrelationship between man and his environment [49, 50]. In this type of relationship, technology adheres to the command and responds to the impulses generated in

a different place. Examples of this type of relationship is that between man and car. Instrumentalists argue that man is in control of the car; therefore, they drive it at their wish and desire to visit any place of interest. Conferring to the definition given by Carl Jasper, technology implies a means to an end. That is, we use technology to produce technology to achieve our goal. Therefore, to achieve high students' performance, there is a need to implement educational technologies.

Similarly, in education, instrumentalists argue that with the help of technologies such as the Internet, social media, tablets, and other smart devices students are able to access communicate with less hassle, access educational information that is beyond reach without technology availability, consume this information and share to different geographical location in no time implying openness in communication argued by [51].

7. DEDUCTION, RECOMMENDATION, AND CONCLUSION

In summary, several available pieces of evidence reveal that pedagogical technologies are used as a support mechanism for the traditional educational process 'learning and teaching.' These studies present the positive and the unprecedented consequences of these technologies adoptions despite being used as a support mechanism to traditional education. The authors, therefore, deduce the potential outcome of adopting full-scale technologies for the pedagogical process. These deductions revolved around the deterministic and the instrumentalist philosophy of technology.

From the instrumentalist approach, pedagogical technologies possess some great significance to the pedagogical process in the education industry.

The benefit of adopting educational technologies is not limited to undeterred information access, increased course engagement, especially when the course has an interactive environment. It is also believed that adopting educational technologies help both students and lecturers attain a high cognitive level, support the learning process, enhance their behavior, self-esteem, and student performance (27, 28, 29, 30, 31, 32).

Contrary to this view, the determinist school of thought holds that although educational technologies might be a good idea, nevertheless, warns against the potential consequences due to the autonomous nature of technology itself and the danger it presents. The potential consequences of adopting educational technologies are not limited to students' disengagement that can hinder their performance, multitasking, cyberbullying, among others.

Furthermore, the determinist view warns against the devaluation of the education industry because of the mass commercialization of education certificates from the institutions that are more concerned with a monetary return [52, 53, 54].

From these findings, the authors conclude that pedagogical technology adoptions are significantly based on their benefits. However, to avoid unprecedented consequences, the following recommendations were put forward. These are: 1) the objectives of the educational technologies must be made open to all actors and stakeholders, 2) pedagogical technologies should be made based on institutional needs, and 3) security protocols that limit social media usage during classroom or study time, and within the school, premises should be implemented. This might be a difficult task; however, with constant trolling and measures development, there will be a breakthrough.

To better understand the conceptual effect of technology adoption for pedagogical purposes, it is advised to examine the role of technology as a mediator between students and the institution environment. The mediation approach is not being covered in this study; therefore, serving as one of the several limitations that might help us understand better the examined relationship. In light of this, further investigations are suggested.

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