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SCHOOL READINESS IN EDUCATION 4.0 IN THE CONTEXT OF BASIC EDUCATION

Arriane Mae Pahugot, Berlita Polestico, Arlene Rosales, Jesson Petalco, Michael Ochea, Chesil Amorin, Lesa Elquinto, Anna Agonia, Madel Bergamo

Corresponding Author: arrianemae@gmail.com

Abstract: This research determined the teachers and administrator readiness in education 4.0 at the identified elementary schools. The researchers used the descriptive research method to gather information about the respondents' demographic profile. The data obtained were analyzed using percentage weighted mean, significant difference between respondents' perceptions on the school readiness in education 4.0 0.05 level of significance. Based on the findings, adopting education 4.0 in schools is hampered by a lack of infrastructure and technological resources (e.g., internet connection and advance computers). Hence, administrators need to stress the need of rethinking the educational system in light of the arrival of education 4.0. Moreover, Education 4.0 will have far-reaching effects on the present education system, therefore policymakers must plan accordingly. This involves investing in human resource development, supporting with the procurement of required infrastructure, and giving appropriate resources for research and innovation. The results also indicate the urgent necessity for all institutions to enhance their IT infrastructures.

Keywords: School Readiness, Education 4.0, Basic Education

1. Introduction

The world of education has changed a lot from the learning process that is integrated with the world of digitalization, but some schools are experiencing challenges and readiness in facing the current globalization (Putra et al., 2020). As result, there are many educational institutions are still not ready in the face of the industrial revolution 4.0 with a factor of lack of facilities and infrastructure and even teachers also have limitations in technology and technology in mastering computerization and the internet (Satori, Komariah, & Suryana, 2019).

This era of revolution 4.0 will result in the transformation of ways of thinking, life, and socialism in society. This will provide a change from the many sectors ranging from, education, technology, economy, social, culture and politics. In addition, there is still a lack of digital culture, training, knowledge, and language become challenges in facing 4.0 in its implementation (Hariharasudan & Kot, 2018). Therefore, the

transformation of education and the learning process begins power competencies for teachers going forward. Teachers are required to change the perspective of education by changing methods in learning and educational concepts that are relevant to the Industrial Revolution 4.0 era (Ismail et al., 2020).

As the concept of EDUC4 gains traction in the domains of education and innovation research, several challenges about its implementation have become noticeable. For instance, managing educational systems in EDUC4 requires a manifold of digital skills for using intelligent agents, mobile technologies, cloud computing, among others (Puncreobutr, 2016; Benesova, 2017). While these skills are commonly taught in technology-intensive degree programs (e.g., engineering, computer science, information technology, among others), they are not as common in education programs that focus more on pedagogies. From this observation, it can be interpreted that university training of educators is causal to the lack of education professionals with digital skills to facilitate the implementation of EDUC4. Thus, higher education is necessary for improving the skills of the workforce that could effectively meet the implementation requirements of EDUC4 (Butt, 2020).

Several frameworks have recently surfaced, describing how EDUC4 can be applied. For instance, Thailand's higher education commission implements the third framework of its 15-year long-range plans, which focuses on improving its people's quality the so-called "Thai people 4.0" blueprint (Buasuwan, 2018). Also, Malaysia redesigned its learning and teaching curriculum to meet the unknown demands of the 4IR. With this, the Ministry of Higher Education launched the book "Framing Malaysia Higher Education 4.0: Future-Proof Talents" to develop and enhance individual potential and fulfill the nation's aspirations. Similarly, Singapore launched the Smart Nation initiative, which drives the pervasive adoption of digital and smart technologies (SNDGO,2021). These practices form some benchmarks for developing countries to follow, such as the Philippines. Economists have highlighted that anytime new technologies are brought into an economy, there is a considerable lag period for the technology to be fully adapted to a level where they generate demonstrable productivity impacts [10,11]. The difficulties arise from the fact that technology development necessitates sufficient and appropriate educational change.

Creativity is an essential human characteristic necessary in EDUC4. Puncreobutr (2016) emphasized ten powerful EDUC4 teaching tools: visual learning, evolved currencies, personalization, gamification, social media, game-based learning, connectedness, project-based learning, and digital and physical merge. The instrumentation of these tools requires teachers to become dynamic and more adaptive, unlike the conventional rigid approach to pedagogy. Empirical works in the education domain largely support the utility of these tools in learning. Despite the presence of these tools, education continues to be primarily considered through traditional lenses, which is apparent in the largely adopted formalist approaches of syntactical and formal knowledge (Oxman, 2008). However, the growth of new knowledge and its increasing availability via digital media suggest that educators need to become more flexible and creative in their instruction to be at par with industrial innovation. Infrastructure requirements (e.g., internet connectivity, digital communication suites, data centers and networks, digital hardware, among others) are essential to achieve this goal. Unfortunately, they are among the most difficult challenges HEIs need to address, especially in developing economies. Infrastructure to support information and communication technologies (ICTs) is one of the core components of EDUC4 [20], while financial resources are the drivers of educational reform (Zajda,2015). The limited resources that characterize developing countries warrant the adoption of

alternative infrastructures for implementing EDUC4. A systematic investigation of these barriers would benefit the implementation of EDUC4 in financially desperate regions.

According to Rocafort (2019) OIC-Regional Director of DepEd CALABARZON, stressed out that the level of basic education of today's generation should be levelled up to 4.0, in which students and teachers should be equipped with the use of technology and gadgets to make learning more accessible. Rocafort explained that if there is industry 4.0 where machines and robots are to be used in our industry more likely in agriculture, therefore, there must be evolution in our education. Fedena (2018) emphasized that education 4.0 is a school of thought that encourages non-traditional thinking when it comes to imparting education.

Moreover, many of today's youth will fill roles that do not yet exist; as a result, the importance of technological proficiency and soft skills will only grow in the years ahead. Limited innovation in learning systems, which were mostly meant to mimic factory-style development patterns, contributes to the widening gap between education and employment. Meanwhile, the COVID-19 problem has forced the closure of schools, shedding light on the already-apparent shortcomings of education systems worldwide. The next generation will face threats to productivity and social cohesion if we do nothing to prepare them for the challenges of the future. Leaders in both the public and private sectors may take advantage of a window of opportunity to redesign elementary and secondary education to better meet the requirements of today's and tomorrow's youth (World Education Forum, 2020).

The use of robots in education, especially in teaching science, technology, engineering, and mathematics (STEM) topics, has been around since the 1980s, but the education system has been slow to adopt technology to assist teaching and learning despite advances in technology. Additionally, the use of technology in the classroom has mostly been restricted to a didactic approach, whereby a personal computer and electronic teaching materials are used to support instruction (Tymon, 2018). Secretary Briones of the Philippines also said that there is a wealth of information at students' fingertips in the digital era thanks to advances in artificial intelligence that are making education more accessible by removing linguistic and geographical obstacles. The problem is to train students to examine and interpret the massive amounts of information that are now available to them. With the arrival of education 4.0, it is imperative that we, as educators and the institutions that prepare them, have the competence to choose which data is most useful. She also mentioned the need of teaching students to synthesis this information and make sense of a dynamic environment. Noting that the caliber of educators has a significant impact on student performance. The education secretary also made note of the educators who were recognized for their groundbreaking approaches to the classroom with international honors. She said, "This is what we want our students to take away so that they can go out into the world and be creative and adaptive to the challenges they face" (Department of Education, 2020).

2. Purpose of the Study

This research determined the teachers and administrator readiness in education 4.0 at the identified elementary schools. The level of school readiness in adopting education 4.0 related to teaching and learning practices, infrastructure requirements. The significant difference between respondents' perceptions on the school readiness in education 4.0 and issues and concerns were included.

3. Research Methodology

The descriptive method of research was used in this study, which described data and the characteristics of the population under study. This method answered the questions who, what, where, when, and how. In particular, the current situations of the respondent groups in terms of the school readiness in education 4.0. This research included the INPUT-PROCESS-OUTPUT approach. The INPUT Included the level of school readiness in education 4.0 includes teaching and learning practices and infrastructure requirements. The PROCESS considered the administration of questionnaire, data consolidation, presentation, analysis and interpretation using statistical software.

4. Results and Discussions

Table 1. Teaching and Learning Practices

Teaching and Learning Practices	Teachers		Administrator	
	Mean	VD	Mean	VD
Boost students' creativity through digital enablers	4.80	A	4.16	A
Use technology-based assessment tools (ex. Kahoot, Quizlet, etc.	4.20	A	4.18	A
Develop 21st-century skills (ex. problem solving)	4.02	A	4.42	SA
Teach digital citizenship (technology ethics, social, ethical and legal responsibilities)	4.22	SA	4.22	SA
Use individualized modular instructional materials	3.45	SA	4.10	A
Expose students to more participatory learning through field experiences	4.36	SA	4.26	SA
accommodate multiple learning styles through flexible assignments	4.24	SA	4.32	SA
Grand Mean	4.18	A	4.24	SA

Table 1 shows the school readiness in terms of the teacher teaching and learners' practices. Data shows that the statement refers to boosting students' creativity through digital enablers got the highest weighted mean of 4.80 which verbally described as strongly agree, while the statement refers to use of individualized modular instructional materials got the lowest weighted mean of 3.45 which verbally described as agree. Overall, teacher's respondent got the average weighted mean of 4.18 which verbally described as agree. Administrators on the other hand, the statement refers to develop 21st-century skills (ex. problem solving) got the highest weighted mean of 4.32 which verbally described as strongly agree, while the statement refers to the use individualized modular instructional materials got the lowest weighted mean of 4.10 which verbally described as agree. Overall, administrators' respondents got the average weighted mean of 4.24 which verbally described as agree. This indicates that it was perceived by the respondent groups that schools are now ready for the education 4.0 in terms of teaching and learning practices.

Table 2 shows the school readiness in terms of the infrastructure requirements. Data shows that the statement refers to has an office that takes charge of the ICT needs for teachers and learners got the highest weighted mean of 3.18 which verbally described as moderately agree, while the statement refers to has technology that provides access

to blogs, vlogs, wikis, google classroom got the lowest weighted mean of 3.02 which verbally described as moderately agree

Table 2. Infrastructure Requirements

Infrastructure Requirements	Teachers		Administrator	
	Mean	VD	Mean	VD
Has an office that takes charge of the ICT needs for teachers and learners	3.82	A	3.20	MA
Has a stable internet connection which is accessible both for teachers and students	3.12	MA	3.10	MA
Has available teaching and learning spaces that provide greater opportunity for collaboration	3.08	MA	3.16	MA
Has digital infrastructure which provides open access to the repository of information	3.12	MA	3.04	MA
Has technology that provides access to blogs, vlogs, wikis, google classroom	3.02	MA	3.08	MA
Has a computer laboratory with internet connection	3.18	MA	3.60	A
has remote and virtual laboratories for learners	3.03	MA	3.10	MA
Grand Mean	3.19	MA	3.18	MA

Overall, teacher's respondent got the average weighted mean of 3.19 which verbally described as agree. Administrators on the other hand, the statement refers to has a computer laboratory with internet connection got the highest weighted mean of 3.60 which verbally described as agree, while the statement refers to the has digital infrastructure which provides open access to the repository of information got the lowest weighted mean of 3.04 which verbally described as moderately agree. Overall, administrators' respondents got the average weighted mean of 3.18 which verbally described as agree. This indicates that it was perceived by the respondent groups that schools are moderately ready for the education 4.0 in terms of infrastructure requirements.

Table 3. Test of Significant difference for teaching and learning practices

z-Test: Two Sample for Means		
	Variable 1	*Variable 2*
Mean	4.184286	4.237143
Known Variance	1	1
Observations	7	7
Hypothesized Mean Difference	0	
z	-0.09889	
P(Z<=z) one-tail	0.460614	
z Critical one-tail	1.644854	
P(Z<=z) two-tail	0.921228	
z Critical two-tail	1.959964	

Table 3 shows the significant difference between the group respondents statistically significant difference in terms of teaching and learning practices. The data shows that the p- value P (T<=t) two tail (0.921228 gives us the probability that a value of the z-statistic (-0.09889) would be observed that it is less than in absolute value than

z Critical two tail (1.959964). Since the p-value is greater than our alpha 0.05, hence the data does not reject the null hypothesis that there is no significant difference between group respondent's perception on school readiness in teaching and learning practices.

Table 4. Test of Significant difference for teaching and learning practices

z-Test: Two Sample for Means		
	Variable 1	*Variable 2*
Mean	3.194286	3.182857
Known Variance	1	1
Observations	7	7
Hypothesized Mean Difference	0	
z	0.021381	
P(Z<=z) one-tail	0.491471	
z Critical one-tail	1.644854	
P(Z<=z) two-tail	0.982942	
z Critical two-tail	1.959964	

Table 4 shows the significant difference between the group respondents statistically significant difference in terms of teaching and learning practices. The data shows that the p- value P (T<=t) two tail (0.982942) gives us the probability that a value of the z-statistic (0.021381) would be observed that it is less than in absolute value than z Critical two tail (1.959964) Since the p-value is greater than our alpha 0.05, hence the data does not reject the null hypothesis that there is no significant difference between group respondent's perception on school readiness in infrastructure requirements.

Table 5. Issues and Concerns

ISSUES AND CONCERNS	RANK
Lack of ICT resources	3
Facilities are not equipped with advance technology	5
Computers are slow and not applicable in current set-up	4
Lack of training in relation to new trends of computer	6
School has no stable internet connection	1
Not all Classrooms have computers and internet	2

Table 5 shows the issues and concerns perceived by the respondent groups. Data shows that School has no stable internet connection was rated as rank no. 1, and followed by not all Classrooms have computers and internet, lack of ICT resources, facilities are not equipped with advance technology and lastly Lack of training in relation to new trends of computer. Moreover, it can be noted that school is now reading in teaching and learning practices in line with education 4.0 while, infrastructure requirement was rated low which considered as moderately ready in adopting the education 4.0. For the significant differences findings shows that there is no significant difference between the respondent groups, hence the null hypothesis was not rejected. While the most perceived issues and concerns was internet connection is not stable in the schools.

5. Conclusion

This research determined the teachers and administrator readiness in education 4.0 at the identified elementary schools. Based on the findings, adopting education 4.0 in schools is hampered by a lack of infrastructure and technological resources (e.g., internet connection and advance computers). Hence, administrators need to stress the need of rethinking the educational system in light of the arrival of education 4.0. Moreover, Education 4.0 will have far-reaching effects on the present education system, therefore policymakers must plan accordingly. This includes investing in the development of human resources, assisting with the purchase of necessary infrastructure, and allocating sufficient funds for research and innovation. The findings also point to the pressing need of improving all schools' IT systems and boosting their research endeavors.

References

Aliakbari, M. & Faraji, E. (2011). Basic principles of critical pedagogy. *2nd international conference on humanities, historical and social sciences IPEDR* 17, 77–85.

Butt, R.; Siddiqui, H.; Soomro, R.A.; Asad, M.M. Integration of Industrial Revolution 4.0 and IOTs in academia: A state-of-the-art review on the concept of Education 4.0 in Pakistan. Interact. Technol. Smart Educ. 2020, 17, 337–354.

Buasuwan, P. Rethinking Thai higher education for Thailand 4.0. Asian Educ. Dev. Stud. 2018, 7, 157–173.

Benešová, A.; Tupa, J. Requirements for Education and Qualification of People in Industry 4.0. Procedia Manuf. 2017, 11, 2195–2202.

Hariharasudan, A., & Kot, S. (2018). A scoping review on Digital English and Education 4.0 for Industry 4.0. Social Sciences, 7(11). https://doi.org/10.3390/socsci7110227

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafora, N., Jordta H., and Wenderotha M.P.; 2014, Active learning increases student performance in science, engineering, and mathematics, PNAS, Vol. 111, no. 23, pp. 8410–8415

Kaptelinin, V., Kuutti, K. & Bannon, L. (1995). Activity theory: basic concepts and applications: a summary of the tutorial given at the east west HCI95 conference. In Brad Blumenthal, Juri Gornostaev & Claus Unger, (Eds.). *Human-computer interaction* (pp. 189-201). Berlin/Heidelberg: Springer. (Lecture notes in computer science, 1015/1995).

Kuutti, K. (1991). Activity theory and its applications to information systems research and development. In H-E. Nissen, H. K. Klein and R. Hirscheim (eds.), *Information systems research: contemporary approaches and emergent traditions*, (pp. 529-549). Amsterdam: Elsevier.

Ismail, S., Ruswandi, U., & Erihadiana, E. (2020). The competence of millennial Islamic education teachers in facing the challenges of industrial revolution. *Nazhruna: Jurnal Pendidikan Islam*, *3*(3), 389-405.

Keesing-Styjes, L. (2003). The relationship between critical pedagogy and assessment in teacher education. *Radical Pedagogy* 5, 1–19.

Oxman, R. Digital architecture as a challenge for design pedagogy: Theory, knowledge, models and medium. Des. Stud. 2008, 29, 99–120

Puncreobutr, V. Education 4.0: New challenge of learning. St. J. Humanit. Soc. Sci. 2016, 2, 92–97. 13.

Putra, P., Mizani, H., Basir, A., Muflihin, A., & Aslan, A. (2020). The Relevancy on Education Release Revolution 4.0 in Islamic Basic Education Perspective in Indonesia (An Analysis Study of Paulo Freire's Thought). *Test Engineering & Management*, *83*, 10256-10263.

Smart Nation and Digital Government Office. Smart Nation: The Way Forward. Available online: https://www.smartnation.gov. sg/files/publications/smart-nation-strategy-nov2018.pdf (accessed on 10 April 2021).

Satori, D., Komariah, A., & Suryana, A. (2019). Character education in the era of industrial revolution 4.0 and its relevance to the high school learning transformation process. *Utopia Y Praxis Latinoamericana*, *24*(5), 327-340.

Zajda, J. (Ed.) Second International Handbook on Globalisation, Education and Policy Research; Springer: Dordrecht, The Netherlands, 2015.

