



Strengthening the Teacher's Efficacy in the Adoption Education 4.0

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ABSTRACT

This research determines the level of teacher's efficacy in education 4.0 at the identified schools in the district 1 of Consolacion Cebu. The researchers used the descriptive research method to gather information about the respondents' demographic profile, significant difference for the perception of the respondent groups. The data obtained were analyzed using percentage weighted mean, with 0.05 level of significance. Based on the findings, schools have limited resources and facilities in attaining education 4.0. With the transition to Industry 4.0, school administrators should emphasize the urgency to redesign the education system. Further, policymakers should think of the global impact of education 4.0 on the current education system and provide for appropriate human resource training and development, support for infrastructure acquisition, and enough budget for research and innovation. Results also suggest that there is a need an immediate need of upgrading IT infrastructure and furthering research initiatives in every school especially during this time of pandemic.

1. INTRODUCTION

Education 4.0 is the new buzzword, and it is disrupting our traditional concept of schooling, teaching and learning. A new generation of learners has invaded our schools replacing the millennials the Generation Z or the Internet Generation (iGen) learners who are not only tech-savvy, but also technology-dependent, practically born with a Smartphone in their hands and regard technology as essential as air and water. They have never seen the world without the internet, and thus cannot imagine living without being connected. They are the true archetype of digital natives. They live and breathe technology. Growing up connected to the cyberworld using different devices enables them to process and absorb tons of information 24/7. The hyper-connected environment they grew up in taught them not only the skills, but also more interestingly, the habits to switch tasks effortlessly (Selamat et al., 2017).

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. Education 4.0 essentially uses technology-based tools and resources to drive education in non-traditional ways. This means that students are no longer in traditional classrooms learning from teachers using textbooks, pens and papers only. Instead, with Education 4.0, you can have remote students that sign into their classrooms using the internet through modes like massive online open courses or video chat or dialing in through voice calls, to learn materials that are more dynamic in nature with peers who might or might not be learning at the same pace as them (Berger &Engzel, 2020).

Moreover, many of today's children will work in new job types that do not yet exist, with an increased premium on both digital and social-emotional skills in the coming years. The gap between education and jobs is further widened by limited innovation in learning systems, which were largely designed to mirror factory-style growth models. At the same time, school closures caused by the COVID-19 crisis have further exposed the existing inadequacies of education systems around the world. Without action, the next generation will be unprepared for the needs of the future, creating risks for both productivity and social cohesion. There is an opportunity for public and private sector leaders to reset primary and secondary education systems, and co-design content and delivery that deliver on children's needs for the future (World Education Forum, 2020).

Recent reports of JIC (2020) stated that although it is difficult to accurately predict the future, it is clear that jobs in 2030 will be very different from the jobs of today. The technological changes in the workplace mean that education will have to change too, to take advantage of the possibilities of technology for education and to provide a workforce capable of exploiting rapidly evolving technologies. One important theme in Education 4.0 is the need to rethink how teachers best support their students' learning, making the most of uniquely human online or face-to-face interactions, and allowing

technology to support where it can. The way in which the digital and physical campuses blend and interact will also be key. We're already seeing a couple of large-scale moves in this direction, aiming to support students to become highly engaged, independent learners.

Moreover, according to Schwab (2019) we must develop a comprehensive and globally shared view of how technology is affecting our lives and reshaping our economic, social, cultural, and human environments. There has never been a time of greater promise, or greater peril. Education plays an important role in ensuring the skill-readiness of the labor force. General education, as well as vocational education, have a critical role to play in making the labor force industry-ready (Penprase, 2018; Suson & Ermac 2020).

Despite the advancement in technology innovations, the education sector has been reluctant in accepting technology to facilitate teaching and learning, although the use of robots in education, particularly in teaching science, technology, engineering, and mathematics (STEM) subjects, has been around since the 1980s. Moreover, the use of technology has been predominantly limited to a didactic approach of teaching and learning, whereby teaching is facilitated with the use of a personal computer and the provision of electronic teaching materials (Tymon, 2018).

In the Philippines, secretary Briones likewise mentioned that with AI increasing access to education by breaking through language and physical barriers, there is so much data available for the 21st century learners. The challenge is to teach our learners how to analyze, how to make sense of the data that they are being flooded with. We have to develop the capacity not only for the learners, but for us teachers and for us institutions producing the teachers to discern what data is relevant in the advent of education 4.0. She also cited the need to teach the learners how to synthesize these data and how to make sense of the world which is always changing. Pointing out that the quality of learners is largely shaped by the quality of teachers. The Education Secretary also mentioned the teachers who won global awards in recognition of their teaching innovations. This, she added, "is what we want our learners to absorb to be able to innovate and be relevant to the changing time (Department of Education, 2020).

2. RESEARCH METHOD

The researchers used the descriptive research method to gather information about the teacher's readiness in education 4.0 together with sets of questionnaires as data gathering instruments. The data gathered were treated by the aid of statistical software utilizing 0.05 level of significance. The results will serve as basis for crafting a policy that promote globally competitive educator in our country, particularly in Consolacion Cebu. The study will be conducted at Nangka Elementary School, Cabangahan Elementary School, Panoytoy Elementary School, located in Consolacion Cebu, DepEd Consolacion District 1. The school is headed with competitive principals. DepEd District 1 of Consolacion stands with the world in solidarity highlighting the role of frontline workers. The respondents of the study will be the elementary teachers and school head of Nangka Elementary School, Cabangahan Elementary School, Panoytoy Elementary School, located in Consolacion Cebu. They are handling different advisories respectively.

Teachers Efficacy. This questionnaire was adopted from the study of Alda et al (2020) their study determines the readiness of teacher education institutions in the Philippines for Education 4.0 in the areas of faculty, teaching and learning, infrastructure, and research as perceived by the administrators and teachers. The data gathered will be analyzed, and interpreted in order to arrive at a more conclusive statements and implications of the results.

3. RESULTS AND DISCUSSION

Faculty Readiness

Faculty readiness to teach online as a state of faculty preparation for global education in terms of teaching.

Table 1. Faculty Readiness

Faculty Readiness	Administrator		Teachers	
	Mean	VD	Mean	VD
Technologically literate	4.33	SA	3.85	A
Skillful in the use of learning management system, google classroom, and online class modality	3.67	A	3.20	A
Accept the vital role of technology in the 21st century and beyond	4.00	A	3.80	A
Integrate digital technology in teaching and learning	4.00	A	3.70	A
Attend seminars and conferences to enhance my technological and pedagogical skills	3.67	A	3.60	A
Experiment new approaches using technology	3.67	A	3.40	A
lead in the development of innovative materials	3.00	MA	3.50	A
Collaborate and build partnerships from other schools	4.00	A	3.60	A
Grand Mean	3.79	A	3.58	A

Table 1 shows the teacher readiness for education 4.0. Data shows that the statement refers to accept the vital role of technology in the 21st century and beyond, integrate digital technology in teaching and learning, and collaborate and build partnerships from other schools got the highest weighted mean of 4.00 which verbally described as agree, while the statement refers to lead in the development of innovative materials got the lowest weighted mean of 3.00. This indicates that teachers have difficulties in developing their own innovative materials due to lack of resources or technological resources that enhance their teaching.

Teachers' response on the other hand, technologically literate got the highest weighted mean of 3.85 which verbally described as agree, while the statement refers to skillful in the use of learning management system, google classroom, and online class modality got the lowest weighted mean of 3.20 which verbally described as moderately agree. According to Boholano and Dayagbil (2020) despite the participants' claim that they are technologically literate, most of them, although they are good at manipulating digital tools, have little exposure to learning management systems and other online class modality. Learning Management Systems or LMS provides both teachers and students informational content and educational resources online. LMS is a way to ease the work of educators by giving them a chance to take advantage of numerous eLearning opportunities and platforms which are flexible.

Teaching and Learning Practices

Effective teaching / learning practices are evidence-based teaching strategies implemented with fidelity and informed through data to produce.

Table 2. Teaching and Learning Practice

Teaching and Learning Practices	Teachers		Administrator	
	Mean	VD	Mean	VD
Individualized teaching	4.00	A	3.75	A
Gamification and simulation	3.33	MA	3.15	MA
problem and inquiry-based teaching and learning	3.33	MA	3.55	A
Augmented and virtual reality	3.67	A	3.55	MA
Boost students' creativity through digital enablers	3.33	MA	3.40	MA
Use technology-based assessment tools (ex. Kahoot, Quizlet, etc.	3.33	MA	3.75	MA
Develop 21st-century skills	4.00	A	3.50	A
Teach digital citizenship	3.33	MA	3.90	A
Use individualized modular instructional materials	4.00	A	3.55	A
expose students to more participatory learning through field experiences	3.00	MA	3.20	MA
accommodate multiple learning styles through flexible assignments	3.33	MA	3.60	A
Grand Mean	3.52	A	3.54	A

Table 2 shows the teacher teaching and learners practices for education 4.0. Data shows that administrator believes the teachers possessed individualized teaching, develop 21st-century skills and use individualized modular instructional materials got the highest weighted mean of 4.00 which verbally described as agree, while the statement refers expose students to more participatory learning through field experiences got the lowest weighted mean of 3.00. This indicates that teachers have difficulties in exposing students to more active learning approach using digital resources. Teachers' response on the other hand, teach digital citizenship got the highest weighted mean of 3.90 which verbally described as agree, while using gamification and simulation got the lowest weighted mean of 3.20 which verbally described as moderately agree. This indicates that teachers have difficulty in manipulating advance technology in integrating for teaching. According to Berger and Engzell (2020) Technological change may have the effect of undermining rather than empowering workers and their children especially in the teaching and learning practices. They added that the interplay between automation on one hand and the distribution of bargaining power and access to educational opportunities on the other should be studied. This entails the teachers need to upgrade their skills in using technology in teaching.

Infrastructure Requirements

Infrastructure refers to the advance facilities that are attached inside the school that help teachers and school administrators to promote globally competitive graduates.

Table 3. Infrastructure Requirements

Infrastructure Requirements	Teachers		Administrator	
	Mean	VD	Mean	VD
Has an office that takes charge of the ICT needs for teachers and learners	3.33	MA	3.80	A
Has a stable internet connection which is accessible both for teachers and students	3.33	MA	3.40	A
Has available teaching and learning spaces that provide greater opportunity for collaboration	3.00	MA	3.60	A
Has digital infrastructure which provides open access to the repository of information	4.00	A	3.45	A
Has technology that provides access to blogs, vlogs, wikis, google classroom	3.33	MA	3.40	A
Has a computer laboratory with internet connection	4.00	A	3.65	A
has remote and virtual laboratories for learners	3.33	MA	3.60	A
Grand Mean	3.48	A	3.56	A

Table 3 shows the data on infrastructure requirements for education 4.0. Data shows that the statement refers to digital infrastructure provides open access to the repository of information, and has a computer laboratory with internet connection got the highest weighted mean of 4.00 which verbally described as agree, while the statement refers to has available teaching and learning spaces that provide greater opportunity for collaboration got the lowest weighted mean of 3.00. Teachers' response on the other hand, school has an office that takes charge of the ICT needs for teachers and learners got the highest weighted mean of 3.80 which verbally described as agree, while the statement refers to school has a stable internet connection which is accessible both for teachers and students and school has technology that provides access to blogs, vlogs, wikis, google classroom got the lowest weighted mean of 3.40 which verbally described as agree. This indicates that teacher agree that there is some technological infrastructure in the schools that help them being productive. Moreover, the availability and accessibility of high-quality and updated infrastructure among teacher education institutions is a crucial foundation of conducive learning environments. It facilitates instructional quality, thus improve student outcomes. Educational institutions can respond to Industry 4.0 by harnessing the potential of digital infrastructure.

Education 4.0 is highly related to innovation. According to Morrar et al. (2017, p. 15), "industry 4.0 represents a shift toward an innovation-based economy with knowledge, data, and the IoT as central concepts". Most colleges and universities in the Philippines do not have remote and virtual laboratories essential in the fourth industrial revolution. Some universities have virtual laboratories for electronics, manufacturing, and other areas but these are not enough for innovations. This indicates that we need to develop our school into a technological infrastructure that meets the needs of the learners.

Research Programs and Initiatives

The Researchers Initiative (RI) pairs students in Global Crossroads, Health Professions, Intersections, and Women in Math, Science, and Engineering Living-Learning Communities with faculty mentors to work on various aspects of research. Students apply in fall and work in spring.

Table 4. Research Programs and initiatives

Research Programs and Initiatives	Teachers		Administrator	
	Mean	VD	Mean	VD
Research undertakings are geared towards innovations	3.33	MA	3.20	MA
There is an allocated budget for research activities	3.33	MA	3.20	MA
Research outputs are used for policy recommendations	3.33	MA	3.25	A
Some research outputs generate new models for teaching and assessment	3.33	MA	3.45	A
There is multidisciplinary collaboration in the conduct of research	3.00	MA	3.20	MA
There is a local partnership in research projects	3.67	A	3.40	A
International partnership is evident in the conduct of research activities	3.00	MA	3.15	MA
There is a program for action research mentoring and coaching	3.00	MA	3.10	A
Grand Mean	3.25	A	3.24	A

Table 4 shows the data on research programs and initiatives. Data shows that the statement refers to there is a local partnership in research projects got the highest weighted mean of 3.67 which verbally described as agree, while the statement refers to there is multidisciplinary collaboration in the conduct of research, there is a program for action research mentoring and coaching and international partnership is evident in the conduct of research activities got the lowest weighted mean of 3.00. Teachers' response on the other hand, some research outputs generate new models for teaching and assessment got the highest weighted mean of 3.45 which verbally described as agree, while the statement refers to there is a program for action research mentoring and coaching got the lowest weighted mean of 3.40 which verbally described as agree. Bland et al. (2005) concluded that, "when individual faculty's research productivity is the goal, nothing substitutes for these four factors: recruiting faculty with a passion for research; providing them with formal mentoring programs; facilitating their networks; and providing time for them to do research". To answer the call of Education 4.0, high levels of research productivity as well as developing and maintaining an influential culture of research should be evident. Thus, institutions desiring to create a culture of research must give high regard in the acquisition of relevant resources for faculty development. This indicates that research is need in this advent of education 4.0.

Table 5. Test of Significant Difference

Source of Difference	Mean	n	Std dev	t	tcrit	p-value
Teacher	3.48	20	0.0000	0.6320	2.0796	0.5342
Administrator	3.51	3	0.0000			

Table 5 shows the significant difference on the teacher efficacy in education 4.0. Data shows the there is no significant difference between the respondent groups, hence the null hypothesis was not reject

4. CONCLUSION

This research determines the level of teacher's efficacy in education 4.0 at the identified schools in the district 1 of Consolacion Cebu. Based on the findings, schools have limited resources and facilities in attaining education 4.0. With the transition to Industry 4.0, school administrators should emphasize the urgency to redesign the education system. Further, policymakers should think of the global impact of education 4.0 on the current education system and provide for appropriate human resource training and development, support for infrastructure acquisition, and enough budget for research and innovation. Results also suggest that there is a need an immediate need of upgrading IT infrastructure and furthering research initiatives in every school especially during this time of pandemic.

RECOMMENDATION

The main goal of this study is to gain knowledge on the level of readiness of the teachers in adopting education 4.0 that helps learners to become a globally competitive graduate or student in general. It is recommended that public schools need support from tech industry, particularly on the private sector.

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AUTHORS CONTRIBUTION

All authors discuss the results and contributed from the start to final manuscript.

CONFLICT OF INTERESTS

The authors declare that they have no competing interests.

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