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RESEARCH BRIEF

Benchmarking ICT for Education in Japan: Best Practices, Trends, Challenges and Lessons Learned for Philippine ICT-Based Education & Development

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Education in the 21st century is important in maintaining, sustaining, and extending the global benefits and opportunities of knowledge-based societies and economies. The global market today is dependent on highly skilled human capital that facilitates not only the inflow and exchange of goods and services but more so of ideas, innovations, and knowledge. Hence, an ICT-based education or technology integration in teaching and learning is a major driving force to prepare and hone learners in facing the challenges of a rapidly changing world. Our young students belong to “Generation Z” who are born between 1995–2012 and are characterized to be “more internet savvy than their Generation Y forerunners” (Schroer, n.d.). Meaning, more and more of our youths nowadays are hooked up into the use of information and communication technologies outside the four walls of a learning institution. The challenge is, how do we foster the use of ICT within the context of education? In answering that question, this project focuses mainly on inquiring: What best practices, trends, and lessons learned from Japan can we adopt and use as take-off points to guide us in the implementation and evaluation of ICT for education (henceforth ICT4E) in the Philippines? As the Philippines participates in utilizing ICT for educational and academic purposes robustly at the turn of the 21st century, this paper lays down the initiatives and programs, specifically of De

La Salle University and De La Salle Zobel, related to education technology.

This research paper will answer the following thematic questions:

1. What are Japan’s education initiatives and its overarching vision of ICT for education (ICT4E)?
2. What are the capabilities, trends, issues, and challenges of Japan schools and universities in implementing ICT4E?
3. What are the present experiences, issues, and problems encountered by the Philippines in terms of ICT integration in learning and teaching?
4. What lessons can be learned from Japan, and what recommendations can be formulated to address ICT4E problems and challenges in the Philippines?

The overarching method used in this research is benchmarking, which is originally a method used in business research and industry analysis to compare and analyze best strategies of business units or companies with high performing business organizations (Anand & Kodali, 2008; Camp, 1989). This paper, however, shall compare Japan and the Philippines. The national vision, best practices, trends, and challenges in

implementing ICT4E in Japan are analyzed and compared with the Philippine ICT4E experiences, practices, and difficulties to gain comparable and comparative insights. The paper used a systematic review of the literature to examine the contextual, technical, pedagogical, and organizational aspects of ICT4E in both countries. Field visits and observations were also conducted at Doshisha University in Japan as part of the Sumitomo Research Grant to look into how ICT4E operates in an actual classroom setting. In the Philippines, I used my personal narratives as project director of two Challenge Grant projects funded by De La Salle University and as an educator who utilizes ICT4E inside/outside the classrooms and in my advocacy projects towards a Learning Network Philippines.

Japan's Education Initiatives: Bedrock of Economic Lifelong Success

The Japanese economic miracle after WWII has been credited to its impressive ways of participating in the global market through rapid industrialization and its keenness to “compete in exports and growth rates” (Dore, 1964, p. 66). However, deep inside Japan's societal structure lies the secret to its success—investment in the education of its citizens (Kida, 1975). To be able to be competitive globally, Japan has exerted much effort to establish a life-long, sustainable, and viable education program across the nation. These socioeconomic efforts and national initiatives are well-reflected in the following:

- a) Strengthening of primary education as it gradually spurts and accelerates in secondary and higher education (Dore, 1964, pp. 69–70);
- b) The infusion of moral education in Japan's educational system (Oshiba, 1961);
- c) Well-knit organizational structure of schools from primary to graduate education (Kato, 1968);
- d) The commitment to lifelong education from early to adult learners (Maehira, 1994; Mora-Oka, 1997);
- e) Democratization of higher education (Kida, 1975);
- f) Putting-up of reputable world-class universities (Nakayama & Low, 1997; Yonezawa, 2007); and

- g) Embracing information literacy towards smart revolution (Kitada, 2003; Mitomo, et al., 2015) in ICT for education.

These important milestones in the development of Japan's educational system can be gleaned as benchmarks or models for economic development in other countries like the Philippines. The amount, magnitude, and gravity of educational reforms initiated in Japan did not happen overnight. It was long envisioned from the outset of the Meiji Restoration during the 1870s when the “Emperor's regime gave a very high priority to education” (Kida, p. 261). This, in turn, gave rise to citizenship by education exemplified by the “idea of public education in Japan has grown out of regard for the state, and the individual is educated because he will make a more capable subject when thus trained” (Hori, 1909, p. 558). These features based on Japan's experience and history are important because any approach in putting up an ICT-based innovation and transformation in education will not prosper without taking into consideration longitudinal changes, which were grounded in the past and that have been carried out in the present. At present, Japan ranks third among countries with robust economic standing with a GDP of 4,841.2 (“List of countries by projected GDP,” 2017). Though it slips down to third after China (2nd) and U.S. (1st), the sound economic fundamentals and its heavy investment in education serve as the bedrock to embrace new challenges posed by the rapid growth of ICT and its impact to Japanese society and education.

ICT for Education (ICT4E) Vision and Framework in Japan

The document *The Vision for ICT in Education* (Japan Ministry of Education, Culture, Sports, Science & Technology, 2011) outlined the operational vision and objectives towards “making learning systems and schools in Japan suitable for the 21st century” (p. 6.). The overall direction of this vision:

...deals with the informatization of education, mainly targeting school education at elementary, lower secondary, and upper secondary schools, etc. (together with the linkage with local communities, families, and institutions of higher education). The informatization of education consists of three elements, i.e.,

information education, utilization of ICT in course instruction, and introduction of school administrative works. (Japan Ministry of Education, Culture, Sports, Science & Technology, 2011, p. 6)

These ICT4E vision and policies are top-down, in which the Japanese government sets the agenda to be carried out by various agencies down to local government units. Primarily, this is in response to the global ICT climate where technologies and innovation are now to be in place not only in industries or in commercial research and development but more so in the educational system. Countries like the U.S., Singapore, and others in Europe have embraced this strategic move to make ICT part of the 21st-century revolution in education, if not its central driving force, to societal change and development. At the same time, Japan is part of the global efforts committed to accomplish the 17 Sustainable Development Goals, specifically goal no. 4, which is to “ensure inclusive and quality education for all and promote lifelong learning” (UNESCO, 2018). UNESCO highlights its mandate as it is tasked, together with member nations, to “share knowledge about the many ways technology can facilitate universal access to education, bridge learning divides, support the development of teachers, enhance the quality and relevance of learning, strengthen inclusion, and improve education administration and governance” (UNESCO, 2018).

The defining initiative in Japan started in 2001 with the promotion of its national government towards

implementing an “e-Japan Strategy” (Aoki, 2010). This national policy statement sets the direction to utilize ICT in all sectors. Throughout the years, several policies and strategies have been carried out to achieve this goal. The Ministry of Education, Culture, Sports, Science & Technology (MEXT) and the Ministry of Internal Affairs & Communication (MIC) are two line agencies tasked to fulfill this mandate for education. In connection with this, the Japanese government has implemented several programs, as shown in Table 1, to realize its ICT4E goals (Vallance, 2008; Aoki, 2010; Hitoshi, 2017).

These projects through the years include curriculum design, promotion and cultivation of information literacy, use of digital textbooks and other online materials, acquisition of digital equipment and enhancement of online connectivity and network environment, and teacher training and introduction of ICT for school administrative works (Japan Ministry of Education, Culture, Sports, Science & Technology, 2011, pp. 9–29). These comprehensive initiatives were undertaken since 2001, and in 2014 alone, ¥167.8 billion has been allocated to promote and implement programs and projects related to ICT4E (Oshima & Muramatsu, 2015, p. 6).

e-Japan Strategy

Japan is a leading country in terms of manufacturing cars, electronics, appliances, personal computers, gaming devices, and many others since the postwar era. It has also created a global market for consumers who are attracted by Japanese popular cultural products like “manga, anime, novels, films, character goods,

Table 1
Strategies and Projects of ICT4E Vision in Japan

<i>e-Japan Strategy</i>	
Project	Years Covered
1. Rainbow Plan	2001-2005
2. Future School Project	2010-2013
<i>Smart Japan ICT Strategy</i>	
3. Dream School Project	2014-2015
4. Leading Education System Demonstration Project	2014-2017
5. Programming Education Program	2016-present

game programs, cosplay cafes, karaoke and so on” (Aoiki, 2010, p. 854). However, ironically, observers and scholars criticized Japan because it took a sluggish start in embracing ICT4E (Aoiki, 2010; Crafts, 2004 as cited in Vallance, 2008). There are long-held perceptions and studies concerning the low Internet and computer literacy skills of the Japanese (Japan Ministry of Education, Culture, Sports, Science & Technology, 2011; Aoiki 2010). However, a deeper analysis suggests that they are more proficient than they are perceived to be (Lockley, 2013). In fact, research studies (Kageto, n.d.; Vallance, 2008, Kusano et al., 2013; Oshima & Muramatsu, 2015) emphasized the positive and constructive directions of schools and universities to adopt various technologies in teaching and learning. Hence, the future of education starts with the dynamic relationship among different stakeholders (government, academe, industry, and international partners) to embrace ICT4E and its success in the long run.

In adopting an e-Japan strategy, several ICT4E initiatives started under the auspices of MEXT and MIC. This stage can be characterized as capacity-building programs to infuse transformation in curriculum, pedagogy, learning environment, training, and support for teachers and administration. Ismail (2014) specified in her study the specific plans laid out from the Information Technology in Education Project (ITEP), which includes the following:

installation of computers with Internet access in all ordinary classroom by 2005; creation of training opportunities for teachers to improve their computer skills and enable them to use computers in teaching their subjects; development of visual and video contents appropriate for teaching; research and development of teaching method that use high speed network; and creation of teaching material portal site at the National Institute for Educational Policy Research. (p.11)

Drawing out specific plans and then implementing those into concrete deliverables from an ambitious ICT4E vision can be slow at the onset. In fact, Ismail (2014) pointed out that in “2003 only 29.2% of classroom in public schools were connected to the Internet” (p. 12). In an ICT4E masterplan, the biggest hurdle comes from the amount of investment

to be poured in infrastructure development. It is very expensive, as reflected in the national budget of Japan (Oshima & Muramatsu, 2015).

However, in 2015 MIC presented a white paper (cited in Hitoshi, 2017, p. 5) that shows that Japan has reached 100% broadband connectivity for households since 2009 and that in 2014 ultra-high-speed broadband is 99.9% accomplished. The correct approach really in any ICT4E revolution is to upgrade IT infrastructure completely and to invest heavily in a fast Internet connection. This technical approach will evolve, develop, and improve other sectors like business, commerce, banking and finance, transportation, media, communication, and education, which are dependent on ICT.

With that report and emphasizing the accomplishment of Japan’s national government, in general, and of MIC, in particular, Japan’s ICT4E has entered into a new era.

Smart Japan ICT Strategy

This stage can be characterized as the smart revolution in Japan’s ICT4E. Smart revolution is a tactical and strategic paradigm shift that focuses on the strength of unifying and diversifying technological innovation towards achieving optimum outputs, effects, and transformation in different sectors. Thus, Japan’s investment in technology and IT infrastructures as a unifying force creates diversity in infusing the right mindset, directing concerted plans, and creating multiple effects that affect human resources, societal institutions, industries, development policies, governments, and peoples here and abroad. It is a driving force towards glocal change and development. The key term is smart connectivity in a glocal setting. Mitomo Fuke and Bohlin (2015) defined this revolution succinctly:

The smart revolution is so spectacularly pervasive that is blurring boundaries between the real and the virtual worlds. The birth of intelligent technology marked the shift from the concept of mobile phones to that of smartphones. It is no longer simply about handheld devices that allow users to communicate with each other; it is about providers of highly advanced applications and functions, which rely on an ever astonishing ability to fit computing into our pockets. (p. 1)

It is also at this time that several research works and studies were conducted to review and evaluate existing and continuing ICT4E programs in Japan.

Research Works and Practices of ICT4E Adoption in Schools and Universities in Japan

There are four areas in ICT4E conceptualization and implementation: technical, pedagogical, organizational, and contextual. The technical aspect, as discussed earlier, is the most important requirement in any technology-based education reforms as it concretely accounts for IT infrastructure development and enhancement. The pedagogical aspect deals with curriculum design aligned with 21st-century realities of learners, capacity and competency building of teachers, materials development, and technology integration in teaching and learning. The organizational aspect refers to administrative support, ICT4E policy development and implementation in the school, class management support, and training for teachers. The contextual aspect is the most important element in any ICT4E conceptualization and implementation as this refers to ICT global and social impact, government vision and policies, economic and market demand, and other cultural, political, historical, and local realities that affect or influence the need or opposition for ICT4E. This means that ICT4E is not just a piecemeal strategy or join the bandwagon campaign. It entails closer analysis and reflection on how to do things and why we

should do things in the first place. In Table 2, the four elements of ICT4E are specified vis-à-vis the ICT4E initiatives they entail.

Integration of Elements Towards Best Practices

As articulated earlier, a smart revolution is now happening in Japan. The predominance of smartphones, iPads, and tablets are integral devices for ICT4E nowadays. The use of PC and bulky hardware are diminishing inside the classroom. Given that learning takes in a more personal or individual pacing, devices for learning must be personalized too. These smart devices can also be used for collaborative, collective, and group learning through applications, tools, and most especially through the use of the Internet. How is this translated into the classroom setting? One approach is to change the set-up of the classroom from traditional to an ICT-based environment. Hitoshi (2017) noted that in the Future & Dream School Projects the government provided “one laptop/tablet PC for each student and teacher, Interactive White Board (IWB) in each classroom, optical fiber connection, applications, software and digital educational materials available via the Internet” (p. 12).

This learning environment of the future is happening now in 20 model schools, and empirical results show the need for local governments to prioritize this transformation inside the classroom (Creating the Learning Environment, n.d. p. 6.). The other approach is mobile learning (Lockley, 2013) wherein learning

Table 2
Japan's ICT4E Elements, Initiatives, and Rationale

Elements	Initiatives	Rationale
Contextual	Interlinking of 21 st -century global realities & local paradigm shifts; national vision; robust economic, cultural, political, and historical integration	Why's (national framework, ICT4E vision from national to local schools/universities)
Technical	Adequate IT infrastructure, high-speed Internet connection	How to's (Implementing strategies in 3 interlocking contexts)
Pedagogical	Systematic and comprehensive curriculum, teacher training, materials development, technology integration in teaching, & learning	
Organizational	Top-down administrative support, class management support, & training	

takes place beyond the classroom and that it can happen anytime, anywhere, through the use of mobile devices and the Internet.

The recent advancement is now in cloud computing (Aoyama, 2010; Appiahene, et al., 2016; Mitomo, 2017). The National Institute of Standards and Technology defined cloud computing as “a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” (cited in Beal, 2018, par.1). This new technology makes it possible to access learning materials anytime, anywhere, without the need to install several applications in the device. It is not also dependent on a specific device. Learning tools and applications can be accessed using smartphones, tablets, PCs, smart TVs, and others for as long as they can access the Internet with high-speed connectivity. The storage and deployment of information can also be managed properly using cloud computing technology.

At Doshisha University, a learning commons is set up inside its library that housed a remarkable innovative learning environment. There are several multimedia rooms equipped with state-of-the-art technologies like big-screen computers, high capacity printers, smart TV, wireless speakers, audio-visual equipment, among others. During my visit, students are allowed to use printers to print their materials unlimitedly. They can also use discussion rooms to conduct meetings and do collaborative academic and research works and utilize all available devices and equipment unsupervised. This is an exemplar of a future learner-centered environment established at Doshisha University.

Philippines’ ICT4E Experiences, Practices, and Difficulties

The Philippines developed its own “Five-Year Information and Communication Technology for Education Strategic Plan” (Department of Education, 2007) but it did not materialize due to change in political leadership. President Gloria Macapagal Arroyo was replaced by President Benigno S. Aquino in a national election in 2010. There was a plan during the time of President Arroyo to set up a department for ICT and to put up a national broadband infrastructure

in collaboration with ZTE of China. However, this was marred by controversy and accusations of plunder and graft and corruption. President Aquino or Pnoy instead revamped the curriculum to include a two-year Senior High school before proceeding to college. Unfortunately, the Department of Education in the new administration of President Benigno S. Aquino did not include an ICT4E framework in the new K to 12 curriculum. The absence of ICT-based strategies and provisions makes the new curriculum problematic and out of tune concerning present realities of learners and the demands of industries to hire people who are adept in the Internet and communication technologies, among other life-long learning skills.

President Rodrigo Duterte was elected as the new president in 2016, and within one year of his presidency, created the Department of Information and Communication Technology (DICT) through Republic Act No. 10844. However, there is still no national ICT4E vision, much less a clear policy direction in the Philippines. What the DICT has is the TECH4ED program, which “stands for Technology Empowerment for Education, Employment, Entrepreneurship, and Economic Development, is a program that provides ICT-enabled services to communities that have minimal access or no access to ICT and government services” (DICT 2020, par.1).

Without a clear-cut mandate from the national government, schools and universities are left with their own resources and strategies to cope with the global demand for ICT4E as prescribed by UNESCO and UN’s SDG for universal and inclusive education.

Unlike the Japan experience, Philippines’ absorption of ICT4E can be characterized in Table 3.

It is in the sectors of education, commerce, and government that the entry of ICT in the Philippines took place (Nuncio, 2010, p. 57). It was in 1994 when Philippine Network Foundation (PHNET) was established with the Department of Science & Technology, University of the Philippines (UP), De La Salle University, Ateneo de Manila University (ADMU), and University of San Carlos (USC) as institutional members (Nuncio, 2010, p. 57). Since then, many private schools and universities opened courses and subjects in Computer Science. ICT4E was used as a marketing strategy to attract students to enroll in public and private educational institutions and as a way to enhance modalities of learning delivery, learning content, and facilitation of teaching and

Table 3*Philippines' ICT4E Elements, Initiatives, and Rationale*

Elements	Initiatives	Rationale
Pedagogical	No ICT4E curriculum in public schools except in private schools; uneven teacher training, materials development, technology integration in teaching, & learning—only private schools take the initiative.	
Contextual	Aware of 21 st -century global realities; no national vision for ICT4E; and economic, political, and historical events disrupt long-term ICT4E continuity.	How to's (Swim or sink mentality)
Organizational	Minimal administrative support; class management support & training focused on traditional pedagogies; sporadic ICT4E initiatives taken mostly by private schools.	
Technical	Inadequate IT infrastructure, slow Internet connectivity	

learning. The University of the Philippines, which is the premier state university, is the pioneer in the distance and open education. Other state universities and private institutions of learning followed suit. The strategy from a conventional modular distance education has evolved to include e-learning and education technology in the delivery of content, communication with students, and facilitation of learning in an online environment (Arinto, 2016; Sumande et al., 2016; Bagarinao, 2015; Bandalaria, 2007).

In the age of smart revolution, mobile devices are also utilized in the Philippines for teaching and collaborative learning (Roxas & Urano, 2012). Also, in this age, new platforms are used in e-learning like the introduction of e-books (De Luna, 2015) and the presence of different learning management systems like SAKAI, Edmodo, Canvass, Genio, Vibe, Pearl, and others. However, these tools and platforms are only available to private schools and colleges that can afford a subscription. For public schools, the Department of Education (DepEd) has designed a learning resource portal that serves as a repository of learning materials for K to 12, ALS, and professional development (<https://lrmds.deped.gov.ph/>). Related to this is the cloudification of my.eskuwela (Llantos, 2017) for out school youth funded by DepEd, which is a learning content platform used as an ALS in the Philippines (Budharani & Espiritu, 2014). This effort to adopt cloud computing technology to rescue an important government project on ICT4E has shifted to

“focusing on the software features instead of worrying on finding funds for the initial IT infrastructure...” (Llantos, 2017, p. 685).

Training programs are also designed to measure teachers' ICT competency levels in the Philippines (Marcial, 2017; Marcial & de la Rama, 2015; Magallanes, 2014). Different attitudes and perceptions pervade among teachers. Some of them translated this into slight use of technology in the Central Visayas region and, thus, a need to improve teachers' ICT4E competencies (Marcial & De la Rama, 2015). Ironically, findings show also that teachers guide students regarding ICT social and ethical behavior without “actual social and ethical practices in ICT” (Marcial, 2017, p. 96). As science education materials abound on the internet, most teachers have a “positive attitude toward ICT integration” (Magallanes, 2014 p. 659). These studies, however, show varying results as to how teachers can be highly motivated in delivering courses in different learning areas. There is a need to systematically and comprehensive study teachers in the Philippines regarding their ICT4E awareness, readiness, and utilization.

Coping with Challenges: Innovative Projects in ICT4E Philippines

The most active participating learning institutions towards adopting and implementing ICT4E are private schools and universities because they do not rely on

funding from the government. It is a swim or sink response to the realities of 21st-century education and the changing learning styles of students nowadays. It is sad to note that quality education in the Philippines means parents and students need to pay more. Quoting a CHED official, “quality education in the Philippines is expensive” (Michelle15815, 2014, 14:03). As mentioned above, only private learning institutions can afford to build, design, and operate an ICT-based teaching and learning environment. This paper shall highlight the case of De La Salle Santiago Zobel (DLSZ) and De La Salle University (DLSU), both are Catholic schools run by the De La Salle Brothers in the Philippines. DLSZ caters to students from primary education up to Senior High School, whereas DLSU offers university degrees in Liberal Arts, Engineering, Education, Science, and Computer Studies.

In terms of pedagogy, both institutions adopt the 21st-century education framework and thus gives premium on the shift from teacher-centric to learner-centered pedagogy. In DLSU, several in-house teacher trainings on learner-centered pedagogy, blended learning, outcomes-based education, Lasallian Guiding Principles, and authentic assessment are continuously conducted to equip teachers and enhance their teaching competencies. For DLSZ, off-campus trainings are conducted in coordination with Apple, Google for Education, Microsoft Philippines, and other ICT4E partners.

Inside all classrooms in DLSU, a technology-enabled learning environment (TELE) is set up, which includes equipment like multimedia projector, Thin Client computer, LCD monitor, speakers, and wireless presenter with a laser pointer. DLSZ is more advanced as it uses smart TV in all classrooms, which run using wireless connectivity and Apple-based technology. All teachers and students in DLSZ have their own iPad, whereas professors in DLSU practice the bring your own device (BYOD) if they will conduct hybrid classes. Both schools are using learning management systems (LMS), that is, SAKAI (2018) for DLSU and PEARL (2018) for DLSZ. However, because both institutions are using Google cloud for email, storage, shareware services, Google Classroom and Google Docs are also available as a learning management system.

The administrators of DLSU and DLSZ are supportive in pushing for ICT4E. Allocated funds are set aside for teachers’ training and ICT competency

building programs, and research and development. They both have a coordinating office for ICT4E that is tasked to provide in-house seminars and training, conduct evaluation studies on pedagogy, and perform as a meeting point or communication hub on the use of its respective learning management system. Aside from this, an IT office is also in place in both schools, which is tasked to supervise, monitor, and facilitate different IT services. This office is also in charge of Internet connectivity inside the campus using the latest broadband technology and cloud computing technology.

However, the biggest problem still lies in slow Internet connectivity in the Philippines. In general, there is no national broadband infrastructure in the Philippines, which makes it difficult for all sectors in the country to embrace the full benefits of ICT for development and education. For Internet connectivity, Filipinos mostly rely on telecommunication companies by subscribing to the Internet or data plans. Private holdings and companies like Globe Telecoms and PLDT/Smart Telecoms are the major players in the ICT sector in the Philippines. However, given this setback in the technical landscape of ICT in the Philippines, private universities are doing their share to bridge the digital divide and to use the Internet as key gateway in making education accessible to all.

Learning Network Philippines: DLSU Challenge Grant Projects on ICT4E

As mentioned earlier, the government, specifically through DepEd, state universities, and private higher learning institutions, have played a vital role in pushing for an ICT4E in the Philippines. The learning resource portal and my.eskuwela of DepEd are pivotal projects to inclusive education in the Philippines because they both serve the needs and welfare of public school students who are mostly from low-income families and of out-of-school youth who are often neglected in social development programs. Private higher learning institutions with their funding and resources are essential partners for ICT4E in the Philippines through collaborative, multisectoral social development projects.

In 2012, as DLSU positioned itself to become a research university, a Challenge Grant was launched. I and collaborators from different colleges formed a team to submit a proposal dubbed as the “E-learning

Outreach Program for Public Basic Education.” This proposal was approved and was given funding to proceed with the team’s action research. The said project interweavingly captured three important research thrusts of the university: “(a) protect the welfare of women, youth at risk, and other vulnerable sectors of society, (b) create wealth and resources to bridge the various societal divides, (c) Influence policy, governance, and the management of institutions” (URCO Research Areas and Goals, 202011, p. x)2). The project took two years (2013–2015) to complete, highlighting its objective to provide an “e-learning outreach program that is multisectoral, collaborative, and commitment driven...that focuses on providing relevant and useful computer and internet literacy coursework for public elementary pupils” (Nuncio, et al., 2015 p. 1).

Two pilot public schools participated in this project—Hen. Pio Elementary School in Makati City situated in an urban area and Pulo Elementary School in Cabuyao City, Laguna, situated in a provincial area. The project conducted a series of social preparation to orient school administrators, parents, and pupils from selected Grades 1–6 and to introduce them to the project. Not all pupils participated as other parents did not give consent. The participating pupils attended e-learning courses on hardware and software use, introduction to Internet search, educational games, and netiquettes. Findings showed that regardless of age group, gender, and socioeconomic background, pupils are willing to learn all these courses and inherent competencies if given such opportunities. For instance, in one session, pupils learned how to use the PowerPoint and they created slides presentation in one day.

Barriers to the e-learning outreach program included lack of ICT4E training for teachers, low appreciation of some parents, and low commitment of schools to continue the project once technology transfer has been completed. The fundamental importance of an e-learning outreach program can be realized if different sectors in the community can act together despite present difficulties and challenges. One major challenge is that the national government has no strategic direction and policies on how to implement ICT4E in public schools. As mentioned above, ICT literacy, practice, and adoption are not included in the new K to 12 curricula. The results of the study were presented to key policymakers like the Department of

Education and Commission on Higher Education in 2015 during the first Learning Network Conference. This conference was attended by almost 150 public and private school teachers all over the Philippines, and it was free of charge. Google for Education Philippines, Apple, and Acer Philippines collaborated with the DLSU Challenge Grant team to host this event.

In 2016, I and my new research collaborators submitted another proposal to DLSU’s Challenge Grant Program (Nuncio, et.al, 2016). This time the focus is on teacher training and developing e-learning materials for teaching and learning. Based on the success of the first Learning Network Conference, the project was dubbed as “Learning NetworkPH: A Roadmap to Blended Teacher Training Towards ICT4E Competencies Building.” DLSU gave funding support to this project, and it is at the moment still being completed. The first part of the project is already complete, and it entails designing a web portal as a repository of online materials, applications, and tools for teacher’s use. A web designer was commissioned to develop the WeLearnPH (<https://welearnph.wixsite.com/welearnph>) and the Learning NetworkPH (2018).

The first website contains online materials aimed to provide Senior High School teachers a baseline repository of e-learning websites, blogs, educational games, applications, quizzes, songs, films, and videos that can be used in teaching and learning. WeLearnPH website is divided into five learning areas—Filipino, English, Social Studies, Math, and Science. All these learning areas have learning outcomes, content standards, and performance standards based on the new Senior High School curriculum of DepEd. The team members, along with their research assistants, navigated the Internet to curate online materials and then eventually uploaded it to WeLearnPH web portal. The criteria for online material curation are based on the guidelines and competencies of DepEd’s curriculum.

The second website was developed to serve as the online community of ICT4E teachers. Here, the announcement of trainings and conferences is posted. The “learning network” is also the guiding principle of the research team. As explained in the website:

The Learning NetworkPH promotes education for all by providing reliable elearning materials, safe and learner-friendly sites and open source education technology platforms for learning and

teaching all for free. It is our vision to harness information, ideas and knowledge through crowd sourcing, open sharing and collaboration to reach all types of learners regardless of age, culture, faith, gender and social status via the internet. From a social network and Web2.0 paradigm, we boldly claim to initiate and to usher in a new revolution towards transforming cyberspace as a learning network. The Learning Network above all should be the paradigm of all our internet experience and that De La Salle University shall lead the future towards that direction. (Learning NetworkPH, 2017, par. 4)

I am also the head of the Filipino cluster, and I went further to create an online dictionary for teachers and students of Filipino. The website is called Diksyonaryo Filipino (<https://diksyonaryofilipino.net>), which is a learner's dictionary. It is designed to help students at all levels and even international students to aid them in their language education using Filipino as a medium for communication and learning. During the 2nd Learning NetworkPH Conference held last May 2017, Prof. Hitoshi Mitomo of Waseda University was the keynote speaker. He talked about "ICT in Education: The Case of Japan." That conference was attended by 120 plus teachers all over the country. During this conference, WeLearnPH and Diksyonaryo Filipino were launched.

The second phase of the research project is to conduct training workshops for the five learning areas by May 2018 using the web portal and online learner's dictionary. The third Learning NetworkPH conference was held in May 1-5 2019. The theme of the conference was "Igniting Holistic and Innovative Learning Through Technology."

Conclusion: Lessons learned from Japan and recommendations for the Philippines

This study has used the method of benchmarking to compare and analyze the contextual, technical, pedagogical, and organizational aspects of Japan's and Philippine ICT4E cases. Japan is a leading country in technology and innovations and is doing its best to translate these developments by integrating technology in education. It has reached the era of the smart revolution. The Philippines, meanwhile, is catching up as it is being challenged to adopt ICT4E through the help of the academe, industry, and the government.

There are many lessons and recommendations that the Philippines can reflect on in terms of policy interventions, formulations, and adoption. Some of these recommendations are already in place in the paper, but the four points below summarize the essential findings and insights regarding ICT4E in Japan and the Philippines:

1. Japan has been steadfast in anchoring educational reforms based on its long tradition of educational thrusts and sociocultural history. This has become the bedrock of their economic miracle and the fundamental societal drive towards rapid industrialization and modernization. The Philippines, on the other hand, must ground educational reforms on a solid national vision for economic development and sustainability. Education reforms are altered and modified alongside the rise of new leaders of the country. There has been no long-term, sustainable, and feasible educational agenda that can face the test of times and the challenges posed by rapid global transformations brought about by information technology. It is recommended that ICT4E national vision and strategic policies must be placed that will be free, if not less mitigated, from political manipulations and interventions. An independent Commission on National ICT for Education and Development is therefore proposed that will draw a 5 to 10-year strategic plan for the Philippines.
2. Japan, known for its leadership in technological innovation and advancement, has realized the importance of investing in building and enhancing ICT infrastructure, which translates to high-speed Internet connectivity and adoption of cloud computing technology. This technical aspect in any ICT4E framework is the starting point to all bold plans in the implementation of strategies and programs in the country related to education technology, e-learning, and 21st-century pedagogy. A poor Internet connection like in the Philippines will frustrate any attempts to design, operate, and adopt ICT4E framework and action plans. The establishment of the Department of Information and Communication Technology (DICT) in the Philippines is not enough. The Philippine

government must allocate a substantial budget to invest in ICT infrastructures. There have been attempts to downplay the so-called monopoly of major telecommunication companies in the Philippines, but a strong policy statement, proactive legislation, and progressive national leadership are needed to realize an ICT4E Philippines.

3. Strong support to State universities and public schools is well provided for by the Japanese government to trickle down onto grassroots level its national vision for ICT4E. In the Philippines, the government must do something to balance the opportunities and access of students using ICT. Societal divide also means digital divide in the Philippines. Only rich students can have the full benefits of ICT4E. Public schools have little or no access at all to the Internet, if not to online educational materials. Teacher trainings are also inadequate, and many schools and universities, whether public or private learning institutions, are left to a “swim and sink” mentality. This kind of attitude is detrimental to national growth and development. Social inequities are further widened when only well-funded and privately owned learning institutions can compete in the market. The government must also recognize the efforts and initiatives of higher education institutions by adopting policy recommendations made from rigorous research projects on ICT4E. A multisectoral, collaborative, and commitment driven partnership must be placed among different stakeholders—government, industry, academe, parents, and the community.
4. Online learning contents must remain free and available to all students, teachers, school administrators, and all types of learners. As we migrate to Web2.0, we also witness the transformation of social networks to learning networks (Learning Network, 2017) through shareware, crowdsourcing, massive open online courses (Moocs), serious games, blended learning, and e-learning outreach program. These different modalities must be and should always remain free. Bottomline is that universal access to education can only then become truly ubiquitous, inclusive,

equitable, and responsive to the changing social, economic, and technological landscape, and most importantly, to the needs and abilities of learners today if knowledge is freed from a consumeristic business model. Not only Japan or the Philippines will benefit from this, but all countries cutting across social, cultural, political, and economic differences and barriers.

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Declaration of ownership

This report is my original work.

Conflict of interest

None.

Ethical clearance

This study was approved by the institution.

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