Integrating Values-Based Environmental Education with Technology-Enhanced Learning: Case Exemplars in the SEAMEO Region and Beyond

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Abstract

Promoting healthy lifestyle with awareness on various values-based issues related to environmental education (EE) is the basic aspect to the survival of mankind. In the advent of digital era, technological tools and e-platforms that are available also facilitate the learning processes of Science/Mathematics and Environmental Education more flexibly in a borderless world, thus making the Sustainable Development Goal (SDG) call for goal No. 4 (Quality education) possible. This article presents case exemplars prepared by authors who are collaborating partners from different institutions in SEAMEO region and beyond in response to SDG No. 17 (Partnerships for the goals). Case study approach is used to exemplify how Science and Environmental Education supported by blended-mode platforms could be implemented. Findings are reported including documentary analysis of e-forum posts on Edmodo social learning platform and archival records extracted from 'e-Bug' online education implemented in Germany related to exemplars of technology-enhanced values-based environmental education. Printscreens of interactive e-forum discussions, reflective journals and online posts are illustrated, i.e. 'Telecare and Healthy Lifestyle' (TeleHeal) and 'Values-based Sustainable Education' (VaBSE) subthemes under the 'Learning Science and Mathematics Together' in a borderless world [abbreviated as LeSMaT(Borderless)] initiated by SEAMEO RECSAM. The analysis revealed that there are varied possibilities in which students can learn collectively to address social issues and support capacity building through integration of ICT in EE topics under the subthemes of TeleHeal and VaBSE among stakeholders of collaborative communities from within SEAMEO region and beyond through flexible e-learning. The implications of study will be discussed with suggestions for the way forward to promote EE integrating ICT from pre-school to tertiary levels in line with the aspired SDGs No. 3 (Good health and well-being), No. 6 (Clean water and sanitation) and No. 11 (Sustainable cities and communities), to name a few.

Keywords: Environmental Education; Sustainable Development Goals (SDGs); Flexible e-learning; Capacity building; Blended-mode platforms

Introduction

Background and Overview

Promoting healthy lifestyle with awareness on various values-based issues related to environmental education (EE) is the basic aspect to the survival of mankind.

In the advent of digital era, technological tools and e-platforms that are available also facilitate the learning processes of Science/Mathematics and Environmental Education more flexibly in a borderless world, thus making the Sustainable Development Goal (SDG) call for goal No. 4 (Quality education) possible. The SDG goals are interlinked with issues of policies, management, non-cooperation of industrial zones, resident issues and climate change (Refer illustration on SDGs No. 1 to 17 in Appendix A)(Sustyvibes, 2017). To bring about changes and transformation towards capacity building and collaborative learning, teaching pedagogies can integrate different kinds of learning methods such as using group work, networking for knowledge management, interschool projects as well as technology-enhanced learning (TEL) using digital tools and e-platforms.

Rationale and Objectives

Sustainable Development Goals (SDGs) of the United Nation are addressed to solve issues through educational goals. There is a delayed shift in the trends of policy makers to bring the transformation in education through the curriculum. The present curriculum in the SEAMEO region and beyond do not reflect the urgent need to integrate scientific, social and environmental issues into the curriculum for reflective thinking despite the number of research paper publications which convincingly put forward their evidence-based studies illustrate that there is a much needed change in the syllabus. With technological and digital advancement there is an opening for students and teachers to make use of the facility for both knowledge management and capacity building in schools through online learning such as Edmodo social learning platforms.

This article aims at raising awareness on values-based issues disseminated through blended-mode platforms related to environmental education (EE) and healthy lifestyle which are the basic aspects for the survival of mankind. Case exemplars mainly in the forms of printscreens of activities and extracts of e-forum posts are presented consisting curriculum ideas supported by blended-mode platforms prepared by authors who are collaborating partners from different institutions in SEAMEO region and beyond in response to SDG No. 17 (Partnerships for the goals). The following research questions are henceforth raised as guide for this study:

1. How do technological tools and e-platforms serve the aims of SDGs?

2. How do students facilitated by educators learn collectively to address social issues and support capacity building through integration of ICT in environmental education (EE)?

3. What are the factors from evidence-based contextual learning which facilitate values-based EE integrating ICT using online platforms in order to address the SDGs?

Literature Review

Promoting Healthy Lifestyle through Values-based Blended-mode Learning

'Telecare and Healthy Lifestyle' (TeleHeal) as well as 'Values-based Sustainable Education' (VaBSE) are two of the six sub-themes that promote Environmental Education (EE) and Education for Sustainable Development (ESD) prepared under 'Learning Science and Mathematics Together' (LeSMaT) in a borderless world project initiative as reported by Ng (2016a-c; 2017a-c; 2018a-b) as well as Parahakaran et al. (2016) in Ng, Devadason and Lay (2016). LeSMaT in a borderless world project was evolved from 'SEAMEO Borderless School' as one of the Golden SEAMEO students' networking project initiative that was reported by Devadason and Ng (2013). It was initiated with philosophical framework in line with UNESCO's ESD as reported by Ng, Parahakaran, Febro, Weisheit and Lee (2013; 2014).

Blended-mode activities implemented under TeleHeal and VaBSE sub-themes provide students a chance to express their views freely as well as promote lifelong learning among working adults. Hence this can be a tool to establish students' Higher Order Thinking (HOT) and independent learning skills as reported by Santhiram, Parahakaran and Vighnarajah (2013). The aim of LeSMaT-TeleHeal project is to enhance the communication of participants across the boundary. The online posts shared by participants can be viewed by other participants. The collaborative approach will be beneficial for the education system. Many topics have been included in TeleHeal topics such as safety, health, childcare, hygiene and more as reported by Parahakaran et al. (2016) in Ng, Devadason and Lay (2016). It gives participants a wider range of knowledge for discussion among themselves and have an integrated approach towards meeting the educational goals of the SDGs.

Sustainable Development Goals and Research Studies Integrating Technology

The formulation of Sustainable Development Goal (SDG) was a plan initiated for the prosperity of people (Takayuki, Kenichi & Seiya, 2017). Several goals were set to be achieved by the year 2030 for both developing and developed countries. The goals can only be achieved with the joint effort of government, stakeholders and corporate companies. Seventeen (17) SDGs can be classified into 3 major groups such as social, economic and environmental sustainable development.

One of the goals of the SDG is to improve the quality of education (i.e. SDG No.4). A previous study for integration of values into online mode for teacher and trainee teachers in language learning reported by Parahakaran, Ng and Ooi (2017) focused on improving the quality of education by integrating values into language learning [Refer sample online post as part of pilot study activities in Appendix B(i)]. The recommendations stated in the study emphasized that the passages uploaded must be short and easy for learners as well as teachers to use. The time provided to learners must be flexible and instructors must ensure that enough teacher training is provided to teachers for online learning as well as knowledge to use the platform. For example, Edmodo is a platform which requires the learner to scroll for previous comments. Hence the platform takes time for participants to engage in interactive discussion and this can be enabled if teachers or learners are proficient in using the platforms. There is also a need to engage with learners to understand their difficulties as well as their requirement to have more time to engage in meaningful learning. Experience gained from this study was further applied in values-based science and health education integrating ICT [Refer sample online post as part

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of pilot study activities in Appendix B(ii)]. Information and Communication Technology (ICT) is one of medium to contribute to SDG. With the advancement of Internet of Things (IoT), information can be obtained anytime and can be transferred without boundaries. Efficient changes can be made through the contribution of technology. The role of ICT in education has become important for learners to gain information and to communicate. This can be seen with the increase of online programs and usage of computers in formal education.

Achieving SDGs can be possible through education supported by ICT. Research has shown several SDGs such as good health and well-being (goal No.3), sustainable cities (goal No.11) and climate changes (goal No.13) can be addressed using ICT (Wu, Guo, Huang, Liu & Xiang, 2018). The research studies conducted by Roubaie (2010) revealed that poverty can be eased through ICT in Muslim countries. It was done by empowering the nation with well-developed ICT infrastructure and human efficiency. With the knowledge being transferred to people, productivity started to increase. Empowering people can be done by building digital literacy (Figueiredo & Kramer, 2012). When opportunities are created for the poor by developing ICT projects, poverty can be lessened by helping to reach targets expected for achieving the SDG goals. The study by Cecchini (2013) showed that the level of poverty has been reduced in India by providing support to the less economical group through ICT projects in the market sector, healthcare and education. Healthcare (SDG No.3) is an important goal in sustainability development. It is evident that the use of ICT has been efficient in healthcare field (Wu & Song, 2018). Studies have been conducted where smart health used mobile application for health services as reported by Solanas et al. (2014) as well as Skubic, Guevara and Rantz (2015) who studied home monitoring system to monitor healthcare.

The issues related to SDG No.6 'clean water and sanitation' are many. The Urban wellbeing, Housing and Local Government Minister Noh Omar predicted the spread of Zika virus in Selangor on September 5th, 2016.The report stated that Selangor has the highest number of dengue cases in 2017 with 13, 306 between January and March 2. This is an issue related to water and health. The death of 55 people recorded Nationwide in Malaysia included 18 from the State of Selangor. The statistics reported by the Health Ministry indicated high levels of victims in many states. Clearly this type of issue reflects that there is a need to educate the upcoming generation to cooperate and work for a healthier environment (Omar, 2016).

There are growing educational, health and economic issues in Asian and the African regions, which are related to water and sanitation problems (Czikus, 2011; United Nations Development Programme, n.d.). For example, ninety percent of wastewater is discharged untreated in these regions while across the globe eight hundred and eighty four million people have no access clean drinking water (Czikus, 2011). Solving these types of social, economic and health issues requires networking and cooperation from across the various sectors together with focus on local level implementation strategies. The growing educational, health and economic issues in Asian and African countries related to Water and Sanitation problems are reflected in several studies and reports (Czikus, 2011; United Nations Development Programme, n.d.).

Policy makers can resolve issues and comply to the requirements for the SDGs by integrating flexible formal learning as a wide system approach. When blended learning is combined with skills based training through collaborative approaches, students are able to have direct experiences. Hence the current curriculum should be more flexible to align skills-based blended learning experiences in students. There are many online educational resources, web tools and network of technologies for students to learn. Edmodo is an example of a tool for borderless learning as reported by Parahakaran (2015) with various research and development

activities reported by Parahakaran et al. (2016) and other evidence-based research output as reported by Ng, Devadason and Lay (2016).

Flexible Formal Learning in Collaborative Communities for Capacity Building

Traditional formal education requires learning to happen in physical settings. Changes in learning is important to achieve SDGs (Makrakis & Kostouls, 2012). Transformation in learning is essential to shift the thinking of learners. Flexible formal learning is now possible with the integration of ICT because learning can happen without time constrains. Radical improvement is being made in learning with the help of ICT advancement. Through the flexible formal learning with ICT learners have opportunity to participate in authentic learning that improves their metacognitive skills. The transformation of education to flexible formal learning can address the SDG of quality education. ICT enables learners from around world to learn within a set curriculum (Paas, 2008). Learning process can be empowered by use of ICT because it gives experimental experience for learners. Flexible learning provides learners the autonomy where and where learning occurs (Shurville, Browne & Whitaker, 2008). Thus, flexible formal learning with ICT provides an opportunity to serve the aim of SDGs.

In education, ICT has been used as tools by educators in classroom for teaching and learning process related to sustainability. It is important to educate learners about the current issues in world today such as poverty, pollution, natural resource depletion and so on. ICT will be a medium to communicate with more learners and enhance learning process to educate SDGs. Learners would gain insight of the issues through exchange of information from all over the world and draw a solution for collaborative problem-solving of sustainability issues. They can learn issues associated with sustainable development and engage themselves to find solutions. They are able to share or reflect their experiences through flexible formal learning. Traditional formal learning limits students' learning on their own (Takayuki, Kenichi & Seiya, 2017). Construction of idea or active learning can take place when there is space for action (Makrakis & Kostouls, 2012).

With the aid of ICT and well-planned curriculum, instructors are able collaborate with leaners in meaningful learning. The collaboration through ICT gives chance to learners to share ideas, brainstorm and reflect issues associated with SDGs. Collaborative communities are connected through social media and network and enable transfer of knowledge and visual objects related to sustainable development (Wade, 2012). With the aid of ICT dialogic communication has supported social learning. Social learning theory has been used to explore issues related climate change, education and ecosystems management for sustainability (Wals, 2007). The platform created through collaborative communities enable students to establish their ideas worldwide.

A study conducted previously on 'Redefining Teaching and Learning Methods for Asian Communities to Inform Policy Changes through TeleHeal Collaborative Learning Platform' (Parahakaran et al, 2016) resulted in a diverse number of views from teachers and students. A teacher for technology was interviewed on whether students would be more competent if they had virtual courses in primary schools and secondary schools. The response given was that if the courses were planned purposefully and systematically before implementation, students could adapt even at the primary level before they reach the secondary level. Another study also reported that teachers' well-equipped preparation with ICT tools and facilities is one of the main factors in success of technology-based teaching and learning (Ghavifekr & Wan Athirah, 2015). Hence the lessons integrated with ICT have to be planned well ahead and should also be well designed at any levels.

Various types of collaborative learning is available in internet such as ePals (Paas, 2008). Many countries are connected in ePals through live classroom discussion. Another similar portal is the International Education and Resource Network (iEARN). This site provides opportunity for learners to conduct projects collaboratively. In Finland, an online platform was initiated to create the awareness for SDG. ENO-Environment Online is a platform where 400 schools from 104 countries involved to communicate about environmental themes. The communication among different parts of world create awareness of SDG (Paas, 2008).

Collaborative communities enable students to explore issues around world without even leaving their classroom. Data information stored in one country can be accessed by another student from other parts of world for their research purposes. For example in US Globe Program stores meteorological information collected around the world into distributed data. This helps students to track the pollution issues in other parts and work out for solutions to achieve the goals the SDGs.

Methodology

Case study approach involving qualitative data analysis (mainly from archival records and observation) is used to exemplify how Science and Environmental Education (EE) supported by blended-mode platforms could be implemented. Findings are reported including documentary analysis of the policy and practice of values-based EE integrating Information and Communication Technology (ICT). Archival records extracted from 'e-Bug' online education (with illustrative lessons based on didactical material about Hygiene-Infection and Vaccination) implemented in Germany related to exemplars of values-based EE that promote healthy lifestyle are analysed. Printscreens of interactive e-forum discussions, reflective journals and online posts on Edmodo social learning platform under the sub-themes 'Telecare and Healthy Lifestyle' (TeleHeal) and 'Values-based Sustainable Education' (VaBSE) subthemes under the 'Learning Science and Mathematics Together' in a borderless world [abbreviated as LeSMaT (Borderless)] initiated by SEAMEO RECSAM are also illustrated.

Data Analysis

This section reports the findings of case study to exemplify how Science and Environmental Education (EE) supported by digital tools and blended-mode platforms could be implemented in response to Research Questions (RQ) 1 to 3 involving respondents participating in Edmodo's social learning platform from within SEAMEO region (e.g. Malaysia, Philippines, Indonesia, Thailand and other nationalities) as well as beyond (e.g. Germany).

Values-based Environmental Education Activities on E-platforms to Promote SDGs

In response to Research Question 1 'How do technological tools and e-platforms serve the aims of SDGs', printscreens illustrating sample activities in line with various SDGs are reported.

An analysis was made by the second co-author on the archival records extracted from an online education implemented in Germany related to exemplars of technology-enhanced values-based environmental education. The EU web-based learning programme entitled 'e-Bug' was implemented in grade 7 (14 years) in a school in central Germany, in the state of Hesse. The

online lessons are based on didactical material about 'Hygiene - Infection and Vaccination' in support of SDG No. 3 (Good health and well-being) as illustrated in the following Figure 1.
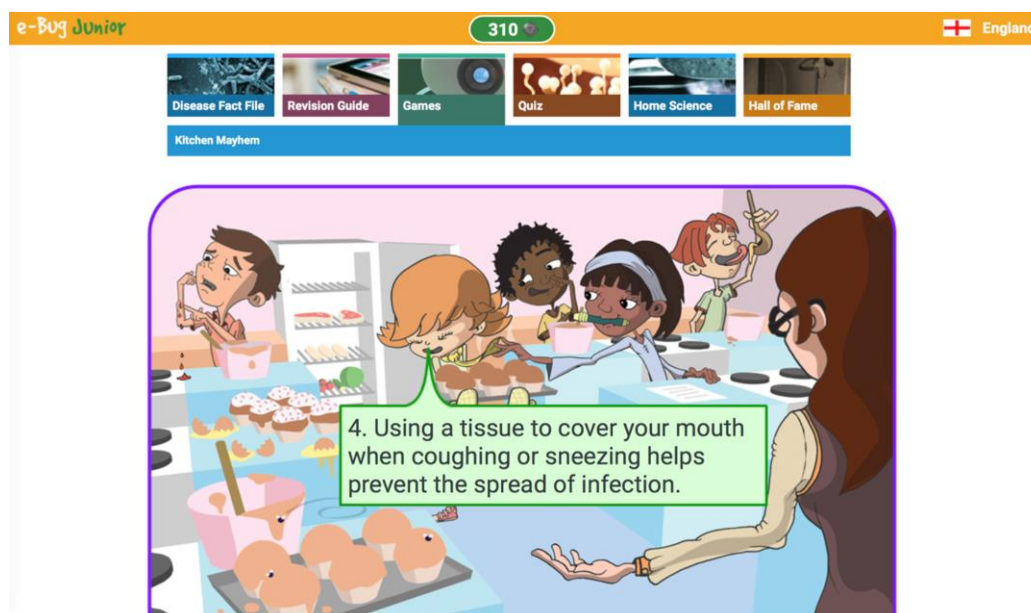

Figure 1. Screenshot illustrating the information on the website www.e-bug.eu.

The 16 states in the Federal Republic of Germany have set very own teaching curricula and only a national framework was found. The teaching of curriculum in a school in the state of Hesse, Germany is based on an orientation to competence, formulation, learning outcomes, skills orientation. Meaning that it is more important to lead students to take part in a conversation about hygiene, microbes, infection, vaccination, etc. than just to collect information given by the teacher or their textbook. In the State of Hesse, Public Health is part of the content for the teaching of Biology but not as a core topic. Upper Secondary Schools (year 15/16 +) normally do not include Health in their Biology Curriculum. Students in grade 7, 8, 9 (year 13 - 15) may find this topic correlated to HIV and national standard vaccination against Measles, Mumps and Rubella (MMR). Students in primary schools are taught principles of hygiene, hand hygiene and teeth hygiene. The public awareness on health topics is focusing every year on vaccination telling people to check their certificate of vaccination [https://www.impfen-info.de/impfpass/].

Teachers and students from the beginning to exam classes are inspired by the motivating and informative videos, quizzes, games, text in context and FAQs on this web-based learning programme entitled 'e-Bug' [www.e-bug.eu]. This programme will be celebrating 10-year Anniversary in January 2019 showing partners all over the world with country specific websites additional to the original website with translation made into the English national curriculum and specific national didactical concepts in each country. English, Biology, Health and Community Projects as well as 'Content and Language Integrated Learning' (CLIL) are the target subjects under this programme. Texts from quizzes, videos and games are translated into English language to teach global awareness and competence!

The link of the successfully implemented portal [www.e-bug.eu] was posted by the second co-author of this paper onto SEAMEO LeSMaT (Borderless) Edmodo social learning platform

under TeleHeal sub-theme as an effort to promote students' networking in support of SDG No.17 (partnerships for the goals) as reflected in the following printscreen in Figure 2.

Figure 2. Screenshot from TeleHeal sub-portal illustrating sharing of information on e-Bug.

The interactive discussions on values-based environmental education further extended to other aspects e.g. values in science and protection of human dignity as discussed in 'Values-based Sustainable Education' (VaBSE), another sub-portal of LeSMaT as illustrated in *Figure 3*.
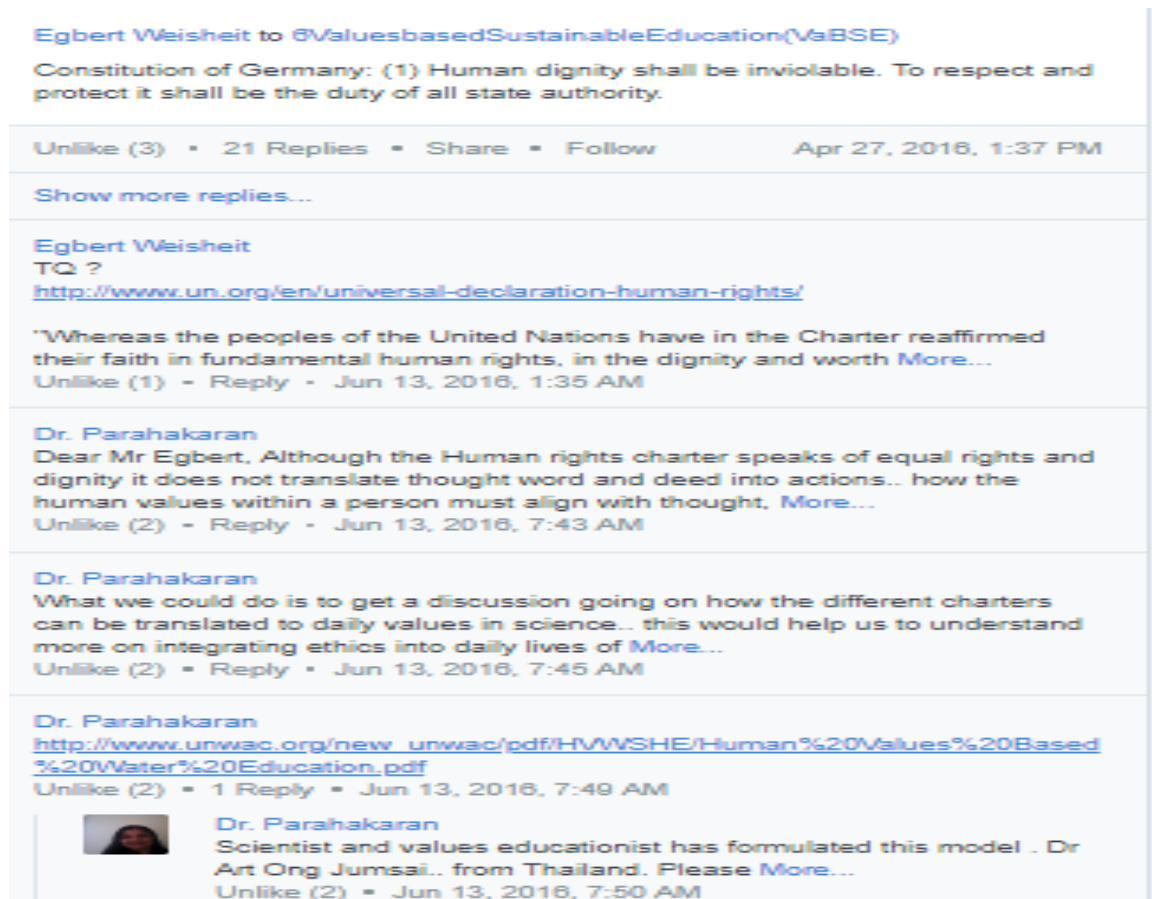
Figure 3. Screenshot from VaBSE sub-portal illustrating discussions on human rights, values in science and protection of human dignity to promote SDG No. 17.

Addressing Social Issues and Supporting Capacity Building through EE integrating ICT

In response to Research Question 2 'How do students facilitated by educators learn collectively to address social issues and support capacity building through integration of ICT in EE', screenshots illustrating sample activities related to interactive e-forum discussions posted related to EE integrating ICT topics under the subthemes of TeleHeal and VaBSE are reported. The analysis revealed that the availability of technological tools and e-platforms facilitate the learning processes flexibly with varied possibilities in which students guided by teachers can learn collectively to address social issues and support capacity building in a borderless world among stakeholders of collaborative communities from within SEAMEO region and beyond through flexible e-learning integrating ICT in EE topics under the subthemes of TeleHeal, VaBSE and others under LeSMaT (Borderless) student networking project initiative.

The following figures with printscreens of asynchronous e-forum discussions and e-tasks posted on LeSMaT-TeleHeal sub-portal are evidences of flexible blended-mode learning supporting SDG No. 4 (Quality education) as well as reflecting the concerns of stakeholders on environmental issues to promote SDG No. 6 (Clean water and sanitation) among stakeholders of collaborative communities.

The following Figure 4 is an exemplar on how video (digital tool) posted on TeleHeal subtheme (Edmodo social learning e-platform) was used as introductory guide digital resource for blended-mode activity to address EE issue that impact human's life in support of SDG No.6.

Figure 4. Use of video digital tool as introductory guide to address EE issue that impact human's life in support of SDG No. 6 (Clean water and sanitation).

The following Figure 5 is an exemplar on how PowerPoint with guided instructions, Excel file for the calculation of sustainable water use, E-survey entitled 'Water Attitude Scale' (WAS) prepared in Google form (digital tools)[URL: http://goo.gl/forms/qzyhztVsQs] posted on E-forum and Open Assignment (Edmodo learning platform) were used to support capacity building through blended-mode activities to address EE issues that impact human's life in support of SDG No.4 (Quality education) and SDG No. 6 (Clean water and sanitation).
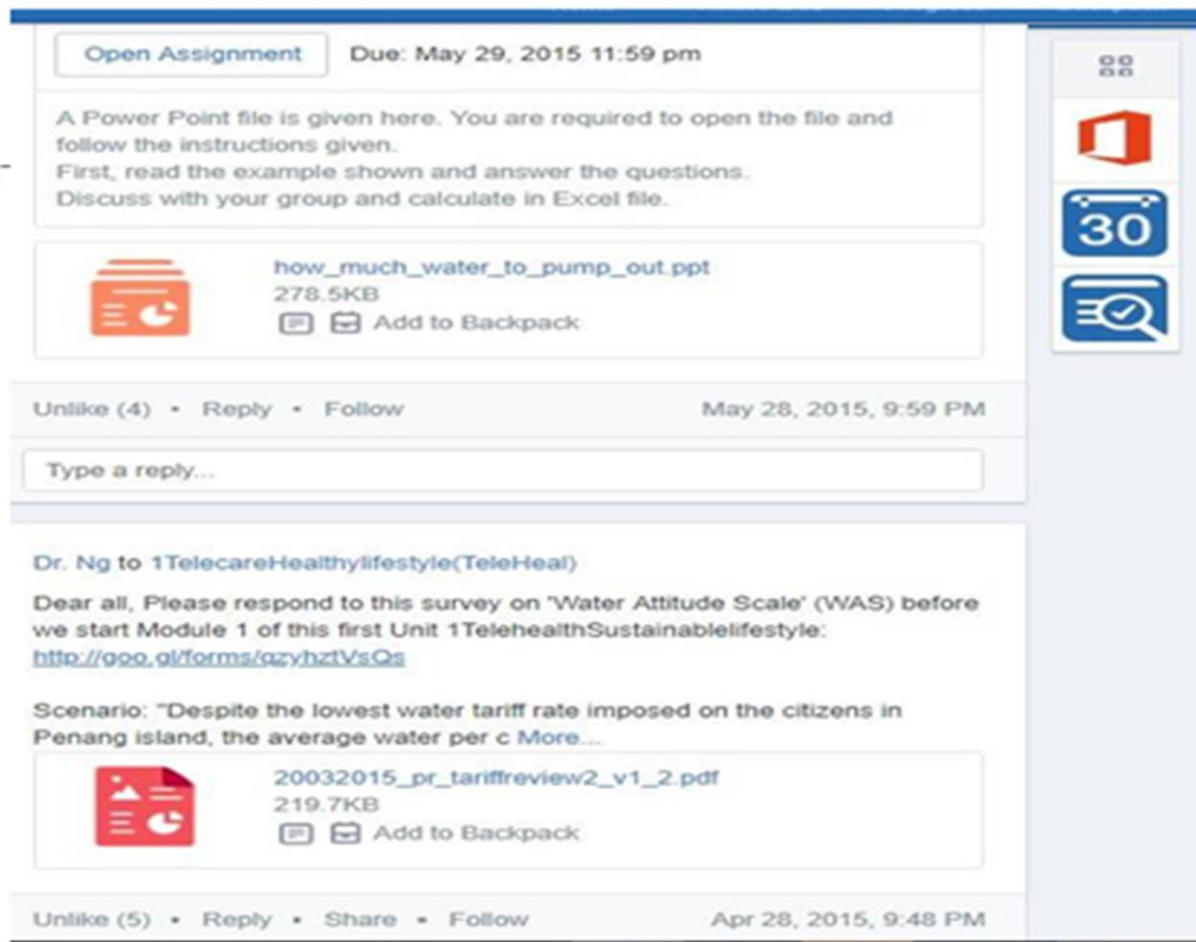
Figure 5. Exemplary use of digital tools posted on e-platform to promote sustainable water education in support of SDG No. 6 (Clean water and sanitation).

Evidence-based Factors Facilitating Values-based Blended-mode Contextual Learning

In response to Research Question 3 'What are the factors from evidence-based contextual learning which facilitate values-based EE integrating ICT using online platforms in order to address the SDGs', printscreens of contextual learning activities are shown with elaborations. The analysis revealed that the meaningful engagement of teachers as facilitators on Edmodo's social learning platform is an important factor to lead the discussions of various topics related to EE integrating ICT such as the concern about promotion of healthy lifestyle with awareness on various values-based issues related to EE and healthcare through TeleHeal sub-portal (Refer the following Figure 6 to Figure 8). Findings from observation data also showed that the questions or e-forum posts prepared that were addressed to students online must be well structured to engage them to think of their local issues, social equity as well as address appropriate attitudes and behaviours required to achieve the SDGs.

Multimedia or digital tools, e.g. Video on contextual learning scenarios, PowerPoint that guide contextual project/ problem-based learning such as calculation of water use using Excel file, E-survey to elicit responses on sustainable water use ethics (as illustrated in Figure 4 and Figure 5) were illustrated in the previous section. E-polling, E-assignments e.g. scientific journal and e-portfolio with schedule of submission posted on e-forum (as illustrated in the following Figure 6 and Figure 7) available on Edmodo can also be used to facilitate project-

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based activities and collaborative networking that provide a wide range of discussions so that students are able to have an integrated approach to support the communities they are involved.

Figure 6 illustrates case exemplar in which E-polling digital tool available on Edmodo was used to obtain responses from participants about the main dimension of access to Telecare.
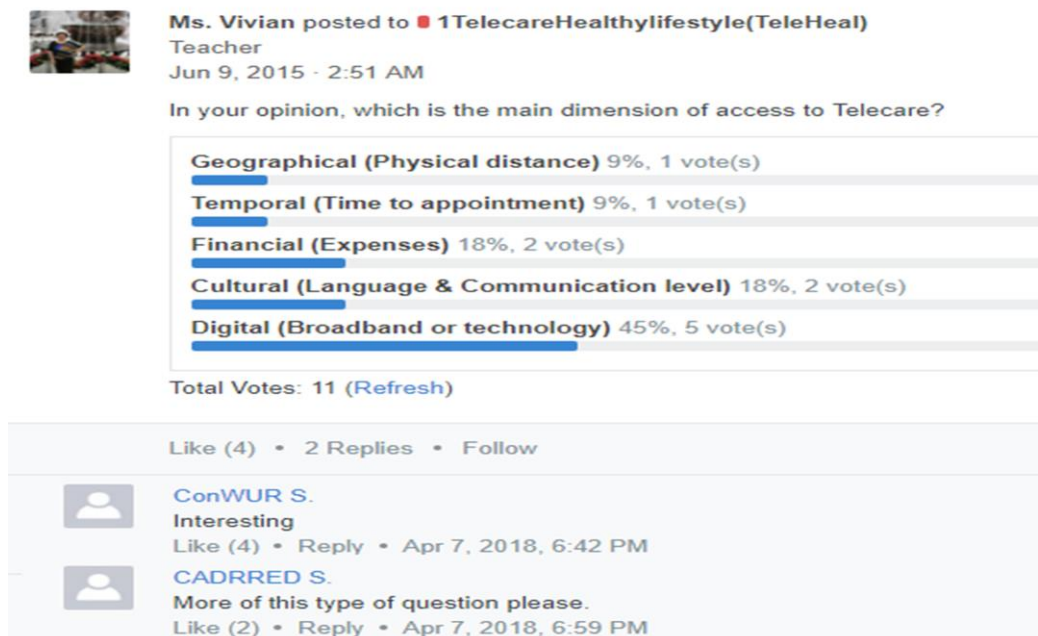
Figure 6. Exemplary use of E-polling digital tool available on Edmodo to obtain responses from participants.

Figure 7 illustrates case exemplar in which E-assignments e.g. scientific journal and e-portfolio with schedule of submission posted on e-forum were facilitated on Edmodo e-platform.
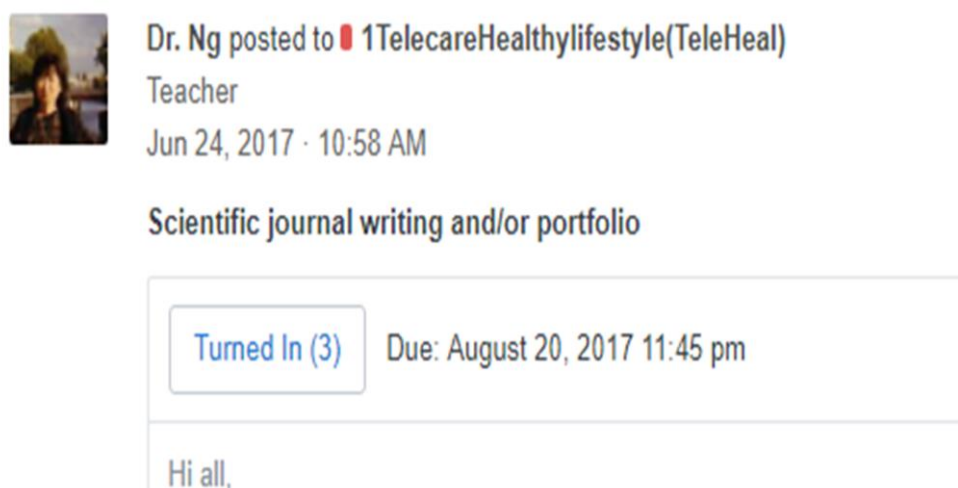
Figure 7. Exemplary use of E-assignment digital tool available on Edmodo to assign tasks with schedule of submission such as scientific journal and e-portfolio.

Figure 8 illustrates case exemplar of interactive e-discussions posted on e-forum of TeleHeal.

Figure 8. Interactive e-discussions posted on e-forum of TeleHeal reflecting the concerns of human's health to promote SDG No. 3 (Good health and well-being).

Conclusion

Summary and Limitations

The article reports the findings of case study to exemplify how Science and Environmental Education (EE) supported by digital tools and blended-mode platforms could be implemented in response to Research Questions (RQ) 1 to 3 involving respondents participating in Edmodo's

social learning platform from within SEAMEO region (e.g. Malaysia, Philippines, Indonesia, Thailand and other nationalities) as well as beyond (e.g. Germany). There are evidences of the integration of values-based EE with technology-enhanced learning in support of SDGs No. 3 (Good health and well-being), No. 4 (Quality education), No. 6 (Clean water and sanitation), No. 17 (Partnerships for the goals), to name a few. The implementation of TeleHeal in online platforms such as Edmodo has shown that there are varied possibilities that students can learn collectively to address social issues and support capacity building. The study also focused on reviews of teachers' understanding of online programs related to the SDGs, students' participations and perceptions as well as mapping of some changes that are required to address social issues.

However, students' involvement in sub-theme such as TeleHeal and VaBSE can still be improved. It was found teachers in the SEAMEO region were not able to participate fully due to various constraints faced in terms of time, accessibility to Internet, resources available and heavy work duties. Hence the implementation of Edmodo social learning platform has not been fully leveraged on to promote EE-ICT to reach wider audience. Moreover, this study covers only the blended-mode of information dissemination as well as reports of project work completed (but not the full details of project-based activities that have been organised offline either in real classroom or field work) and presented through digital platforms. In fact, the intention of the researchers were to look at how digital platforms can conform to the needs of SDGs and this paper provides an overview of how capacity building can result in meaningful learning. The integration of curriculum and blended learning should be accommodated through policy changes in order to produce a generation who are able to provide solutions for issues in report of United Nations Development Programme (n.d.).

Implications and Suggestions for the Way Forward

There are several ways knowledge can be disseminated using online platforms. The need to use technology has become necessary to bridge the gap of rural and urban issues in order that the aims of SDGs are achieved. Many Universities use their own Learning Management systems which are in a closed loop where participants are learners from the Universities. The opportunities are wider when learners are involved in collaborative learning platform such as Edmodo which is becoming increasingly popular. These platforms help in disseminating information and allow people to collaborate, create and share their work online. Although technology can support attitudinal changes and increase competency in knowledge and information sharing, students are still required to work hands-on in real life contexts.

However the findings of this study brought about the following implications that could make impact on policy and practice for health science and environmental education integrating ICT:

- More policies for education should integrate online learning including interactive materials with funds provided for resourceful and interactive learning using online media tools.

- New policies must integrate curriculum changes including continuous learning of topics through a well structured and meaningful work rather than a one off project that provides information and does not extend learning experience which are hands on.

- Policies should be set for above-mentioned capacity building and educators can use collaborative methods to extend transnational knowledge across borderless learning.

- A broad transdisciplinary areas for discussion in the curriculum should be provided as reported by Ng (2018) so that all social, economical, health and 'Science, Technology,

Engineering, Arts, Mathematics' (STEAM) related issues can be addressed more comprehensively. Students should be able to understand that their living contexts have various issues as well as that these issues are complex and cannot be solved by prioritising on one issue alone as compared to the rest. The SDGs should therefore be a unique part of the curriculum where subjects are integrated and students should be presented with scenarios or problem-based learning contexts to think critically as well as solve problems with flexibility of time and space.

- Experience learnt from the study inspired the authors to publish series of essay on Media 8 platform to promote healthy lifestyle, the first essay was published entitled '*Integrating values education to promote healthy living'* [URL: http://bit.ly/telehealarticle1]

The following are some suggestions for the way forward:

- More R&D activities should be conducted with preparation of research/evidence-based papers to be disseminated.

- Instructors should provide a well designed curriculum as reviews of studies and the online teaching as well as learning in Edmodo provide evidences that the e-forum can be extended to a more structured process and increase participation.

- Policy makers can ensure that students' scholarship and assessment must include their contribution to the society through participation of local issues and needs of the society rather than as a one-off project to fulfil the needs of the assignment. This will ensure that students become good citizens and work toward as a values-based sustainable environment.

Acknowledgement

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Appendix A

Sustainable Development Goals (SDGs) Number (No.) 1 to 17

Appendix B

Values-based Learning in (i) Language (Parahakaran, Ng & Ooi, 2016) via ICT

Values-based Learning in (ii) Science and Health Education Integrating ICT