Empirical Research on Education for Sustainable Development in Sufficiency-Based Schools

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ABSTRACT
Education for sustainable development becomes a mantra for scholars worldwide. Yet, empirical research in the field of education for sustainable development is underdeveloped, especially in an emerging Asian economy of Thailand. Thailand has progressed toward education for sustainable development with its sufficiency-based school movement to advance sustainability in education. It aims to develop and promote a whole-of-school approach to apply sufficiency thinking for sustainable development to all school activities from management and student activities to community partnerships. Sufficiency thinking is based on a framework of Sufficiency Economy Philosophy" (SEP)—an alternative approach to sustainable development, as advocated by UNDP and resonated with UN SDG Goals. To advance the limited knowledge in the field, this research paper empirically investigates what school management practices/factors, based on the SEP theoretical framework, can significantly predict enhanced education for sustainable development in schools. Survey data stem from 240 schools in Thailand. Based on results of factor analysis, a research model for educational sustainability was emerged and proposed. Findings from multiple regression analysis suggest that SEP principles, namely virtues, prudence, stakeholder focus and enabling culture, are significant predictors of enhanced education for sustainable development in Thailand, possibly applicable in other countries.

Keywords: Education, sustainable development, sustainability, SDG, sufficiency economy, Asia, Thailand.

1. Introduction

Education is a foundation for sustainable development. Importantly, it underpins people-centered development for sustainability by focusing on social development and environmental protection (Coate, 2008; Hopwood, Mellor & O'Brian, 2005). Built on the agenda toward sustainable development by the World Commission on Economic Development (Brundtland, 1987), a global development debate on education has progressed toward sustainable development over the past few decades. The declaration of the United Nations Decade on Education for Sustainable Development (UN DESD) 2005-2014 becomes a crucial agenda for sustainable development and provides a platform for 'education for sustainable development' (ESD). Hence, a newsworthy international trend has recently headed for ESD.

Worldwide, scholars are searching for approaches to enhance ESD, based on the UN agenda of DESD (2005-2014), and to develop quality of education, resonated with and UN Sustainable Development Goals (SDGs). Both the UN DESD and SDGs

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for sustainable development are compelling but exigent for all nations, policy-makers and educators. Based on the preceding discussion, ESD becomes a central theme of this paper.

This paper argues that an education-as-usual may not lead to ESD. Indeed, an educational reform and system is needed for transformation. A statement of DESD (2005-2014) supports the argument: "More basic education as it is currently taught will not create more sustainable societies," and asserts a need for "reorienting existing education programmes" (UNESCO, 2005, p.29). A key challenging question is what an alternative approach for ESD may be.

One proposed alternative to ESD may be evident in sufficiency-based schools in Thailand, where ESD policies and practices have been implemented. Thailand is an emerging economy of South-East Asia and a leading country in the fast-growing regionalization of the Association of Southeast Asian Nations (ASEAN) Economic Cooperation (AEC). A systematic review of literature (Hallinger, 2017) identifies a lack of ESD research in developing countries. Hence, an application of ESD in developing countries, such as Thailand, may provide a new horizon on what and how to achieve sustainability in education. To extend our understanding about ESD in developing countries, this paper centres on ESD in Thailand, as the contextual focus of the study, and investigates its application in Thailand.

Responding to the rise of ESD, Thailand has move forwarded with its educational reform. The 1997 Asian financial crisis has adversely affected the country due to immoral capitalism, unsustainable thinking and imbalanced development (Thongpakde, Mongsawad, & Bergsteiner, 2016), plus lack of ESD. In 2001, an educational reform toward ESD was started by the Ministry of Education as it decided to build sufficiency thinking into the national basic curriculum (Dharmapiya & Saratun, 2016). Working together with Virtuous Youth Foundation of Thailand, a developmental program for sufficiency-based schools was cooperatively implemented. The sufficiency-based schools employ a framework of Sufficiency Economy Philosophy (SEP) (See Figure 1)—an alternative model for sustainable development (Bergsteiner & Dharmapiya, 2016), advocated by UNDP (2007) and in line with the UN SDGs (UNESCO, 2013). The SEP framework for sustainable development and principles have helped the country recover from the 1997 Asian financial crisis, and become a means for implementing sustainable development in education. With the strong partnerships between the Ministry of Education and Virtuous Youth Foundation in Thailand, the sufficiency-based school administrative management and practices appear to prosper in the nation with more than 18,600 certified sufficiency-based schools by October 2015 (Sufficiency School Centre, 2015). Although the sufficiency-based schools have been implemented over the years, research on its application towards ESD is scarce. To advance the existing knowledge in the realm of ESD, two research statements and questions for this paper focus on:

> (1) what school management practices/factors, based on the SEP framework, underline sustainability in the sufficiency-based school context;
> (2) to what extent the sufficiency-based school management and practices can predict enhanced sustainability towards ESD.

ESD has indeed become a critical quest for international scholars. Yet, existing literature on ESD is limited since most reviews of research in the past decade are

piecemeal with little comprehensive empirical research (Wals & Kieft, 2010). Hallinger's (2017) systematic review of research stresses that less than one-third of ESD journal literature is empirical studies. In particular, studies that explore the relationship among multiple factors that link to ESD policies, programs and practices are still underdeveloped to date (e.g. Tucker & Izadpanahi, 2017; Tuncer et al., 2005). This research study thus responds to a call for more empirical research that builds and tests models of ESD (e.g. Olsson et al., 2016; Pauw et al., 2015), especially using advanced statistical analyses to expand the existing literature (e.g. Kolleck, 2016). Hence, this empirical study intends to develop a research model for ESD by examining multiple factors linking to sustainability, based on the SEP framework for sufficiency-based schools.

In particular, this empirical study aims to contribute to the existing literature in significant ways. First, it suggests a theoretical advancement by employing the SEP framework as one alternative approach to ESD, as advocated by the UNDP, aligned with UN DESD and resonated with the UN SDG Goals. Second, statistical analyses and results from the empirical examination can bridge gaps in the literature. Ultimately, the paper may advance our currently-limited knowledge in the ESD realm.

Literature review, research methodology, results, conclusion and implementations are described in the subsequent sections.

2. Literature review

Historically, a debate on education and sustainable development and an origin of the UN DESD and ESD has been rooted at the United Nations Conference on Environment and Development (UNCED), or the Earth Summit, held in Rio de Janeiro in 1992 (Wals, 2012). In 2002, the Johannesburg World Summit on Sustainable Development (WSSD) provides an overarching theme of the ongoing interest in education and sustainable development. The 2002 Summit reiterates the importance of the UN DESD and ESD, as it indicates that education and learning is a fundamental root of sustainable development (UNESCO, 2005).

The ultimate goal of the UN DESD is "to integrate the principles, values, and practices of sustainable development into all aspects of education and learning. This educational effort will encourage changes in behaviour that will create a more sustainable future in terms of environmental integrity, economic viability, and a just society for present and future generations" (UNESCO, 2005, p.6). The UN DESD stresses that ESD is everyone's business, not an option, but a priority (UNESCO, 2005). The heart of ESD lies in educating people to understand and address the global issues of environmental, societal and economic sustainability that affect individual nations and communities, while the key challenge of ESD centres on what and how to educate the future generations to deal with complex issues that threaten planetary sustainability (UNESCO, 2007). Essentially, ESD needs to be promoted at all educational levels to build capacity for community-based decision-making, social tolerance and environmental stewardship to ensure quality of life using techniques that promote participatory learning and higher order thinking (UNESCO, 2007). Moreover, ESD should take on an innate idea of implementing locally relevant and culturally appropriate programmes by

considering the three spheres of sustainability – environment, society (including culture), and economy (UNESCO, 2005). It suggests that ESD may not be universally applicable since it should address the local contexts of these spheres. As such, this paper takes on ESD and its application in the context of sufficiency-based schools in Thailand.

Furthermore, Wals (2012) asserts that ESD advocates and practitioners need to look for alternative teaching and learning strategies and more interactive methods to engage various stakeholders. UNESCO has put forward in its 2014 Aichi Nagoya Declaration on Education for Sustainable Development (ESD) toward practice: "… the potential of ESD to empower learners to transform themselves and the society they live in by developing knowledge, skills, attitudes, competences and values required for addressing global citizenship and local contextual challenges of the present and the future, such as critical and systemic thinking, analytical problem-solving, creativity, working collaboratively… making decisions in the face of uncertainty, and understanding of the interconnectedness of global challenges and responsibilities emanating from such awareness" (UNESCO, 2014, section 8). The UN has further accentuated on ESD in 2015 Inchoen Declaration on 2030 education to elevate the fourth goal of the UN SDGs (UNESCO, 2015).

Since the inception of the UN DESD, the global debates and discussions have been headed for ESD. Diverse scholars and researchers (e.g. Cebrián & Junyent, 2015; Dharmapiya & Saratun, 2016; Wals, 2010, 2012) have paid much attention to ESD as it represents an integration of sustainability in education across the globe. Wals (2010, 2012) notes that ESD requires transformative social learning to deconstruct existing ways of learning, to vitally reflect on the values, beliefs and worldviews and co-create new shared meanings that can contribute to sustainability. Tilbury (2011) suggests that the principles of ESD should include futures thinking, critical and creative thinking, participation in decision-making, partnerships, interdisciplinary and systemic thinking. An expert review commissioned by UNESCO underscores that key learning processes should be aligned with ESD in terms of collaboration and dialogue, engagement with the "whole system", innovation and active and participatory learning (Tilbury, 2011). Dharmapiya and Saratun (2016) point out that ESD is a holistic approach toward cares for environmental, societal and economic sustainability; thus, a whole-of-school approach is key for implementation. Realization of the UN DESD agenda and SDG Goals is challenging and may take enduring effort in implementing ESD successfully. Although ESD appears promising in the global scale, critics (e.g. Gokool-Ramdoo and Rumjaun, 2017) point out that there is still a missing instrument for education systems to fully embrace sustainable development (UNESCO, 2016).

In Thailand, an application and implementation of ESD policies and practices has been evident through its educational reform and movement of sufficiency-based schools in Thailand. Indeed, ESD becomes a strategic instrument for educational reform to transform values into virtues and change our interaction with society and the environment (Dharmapiya & Saratun, 2016). The country has progressed toward ESD with its sufficiency-based school program to advance sustainability in education. The program has been well taken and become the movement aims at developing and promoting a whole-of-school approach to apply sufficiency thinking for ESD to all

school activities from management and student activities to community partnerships, consistent with the literature (e.g. Rogers, 2002; Tilbury, 2011).

In this paper, a sufficiency-based school refers to a regular primary/secondary school that employ a framework of Sufficiency Economy Philosophy (SEP), based on its key principles of virtues, knowledge, moderation, reasonableness, prudence for decision-making and practice, toward achieving a balanced life and sustainability (Dharmapiya & Saratun, 2016). The SEP framework for sustainable development, advocated by UNDP (2007) and resonated the UN SDGs (UNESCO, 2013), has been integrated into Thai school curricula, from primary to the higher secondary levels, with an emphasis on learning from practical experience and group reflection. The framework enable people and schools to instil the right values and mindset toward sustainability as well as guiding appropriate behaviours in school administration, classrooms and children's decision-making (Dharmapiya & Saratun, 2016).

To conclude, the sufficiency-based schools has embraced ESD based on the UN DESD's (2005-2014) recommendation to question, rethink, and revise education from pre-school through high schools to incorporate more principles, knowledge, skills, perspectives and values related to sustainability in the three domains (i.e. environment, society and economy), as well as expanding to include culture as the fourth domain. To achieve the UN DESD and SDG goals, the sufficiency-based schools develop ESD values and principles inherent in sustainable development (UNESCO, 2005, 2014, 2015). Overall, the implementation of ESD in the sufficiency-based schools is consistent with the UN DESD and the forth UN SDG goal. Particularly, the sufficiency-based school program applies ESD in an holistic and interdisciplinary milieu using the whole-of-school approach, focusing on locally relevant and culturally appropriate values, and enhancing quality of education toward sustainability.

Next, a framework of Sufficiency Economy Philosophy (SEP) that the sufficiency-based schools employs to achieve ESD is described.

3. Research framework: SEP

A whole-of-school approach of the sufficiency-based schools employs a framework of Sufficiency Economy Philosophy (SEP) based on Bergsteiner & Dharmapiya (2016). The SEP was reiterated by the late King of Thailand, His Majesty King Bhumibol Adulyadej as an approach to social responsibility and sustainability in Thailand after the 1997 Asian financial crisis (Piboolsravut, 2004). According to Dharmapiya & Saratun (2016), the SEP framework comprises the key principles of virtues, knowledge, moderation, reasonableness, prudence for decision-making and practice, plus action principles (based on 23 SEP "work principles" and 23 Avery & Bergsteiner's (2011) leadership and management practices of "Institution of Sustainable Leadership" (ISL)), toward achieving a balanced life and sustainability. It essence highlights that those people who strive to be virtuous with shared values that concern for other and society at large and knowledgeable are more likely to be moderate, reasonable and prudent decisions that benefit themselves and their communities in the way that maximizes and balances economic, social, environmental and culture outcomes of sustainability (Wibulswasdi, Piboolsravut & Pootrakool, 2010).
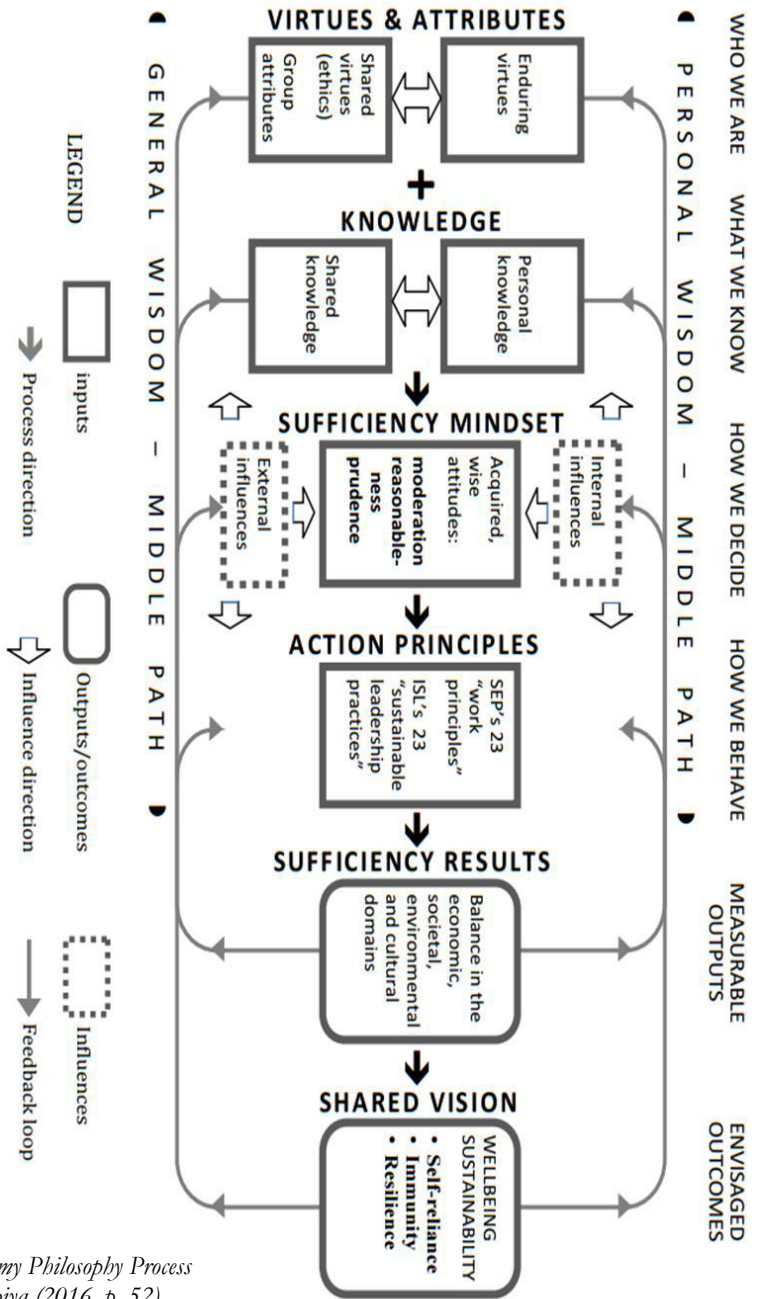
Figure 1. The Sufficiency Economy Philosophy Process
Source: Bergsteiner & Dharmapiya (2016, p. 52)

The concept points the way for recovery that can lead to a more resilient, balanced and sustainable development, better able to meet the challenges arising from globalization and other changes (UNDP, 2007), in line with the UN SDGs (UNESCO, 2013). Hence, the SEP application for ESD is proposed as an alternative approach to sustainable development. Figure 1 illustrates the SEP process, as described by Bergsteiner &

Dharmapiya (2016), and its elements that are used to examine ESD in the sufficiency-based schools.

Based on the SEP model, this paper further intends to (1) investigate the elements underlying the SEP-based management practices that drive sustainability in the Thai sufficiency-based schools towards ESD, (2) identify a simplified research model for ESD and (3) examine an extent to which the sufficiency-based school management and practices significantly drive results in the four spheres of sustainability in education.

4. Research methodology

A cross-sectional survey was used to collect data from 240 sufficiency-based schools in all regions across Thailand. A mail survey method was employed for the data collection. Respondents were asked to voluntarily participate in the study using a judgment sampling to allow researchers to purposively collect data based on a sufficiency-based school database from the Virtuous Youth Foundation who keeps and maintains a reliable, up-to-date database of the sufficiency-based schools in Thailand. The respondents consist of three key school stakeholders (i.e. school leaders, teachers and committees). They were asked about their perceptions regarding what and how SEP principles are practicing in the schools and results toward sustainability to allow the researchers to understand the holistic management and practice, based on the SEP framework, in the Thai sufficiency-based schools. Prior survey distribution, two expert panels had reviewed and validated the questionnaire to ensure its validity. The questionnaire includes question items regarding school management process, administration, linking to the key SEP principles (i.e. virtues, knowledge, moderation, reasonableness, prudence and action principles for decision-making and practice), as discussed previously and illustrated in Figure 1, in the context of Thai sufficiency-based schools. Additionally, question items with regards to the four spheres of sustainability results based on UNESCO (2005), comprising balanced outputs from environment, culture, society and economy, are also included. Data were collected using a valid and reliable sufficiency-based questionnaire assessing the SEP principles and sustainability results in schools. The survey data were tested using five-point Likert scales (1 = 'Strongly disagree' to 5 = 'Strongly agree'; 6 = 'Don't know'). Having collected data, further statistical analyses were employed and detailed in the following sections.

5. Hypotheses

Unidimentional factors underlying sufficiency-based schools for ESD were constructed, using Exploratory Factor Analysis (EFA). In this study, the factors can be categorized into two domains: (1) independent variables or predicting factors and (2) dependent variables or criterion factors. The predicting factors are proposed to be independent variables in this study. They consist of eight factors, namely virtues, knowledge, moderation, reasonableness, prudence for decision-making and practice, stakeholder focus, enabling culture and environmental orientation. And, the criterion factors are proposed to be dependent variables; they result in sustainability and balanced outputs from environment, culture, society and economy. All factors are consistent with

SEP principles and model while aligning with the UN DESD and SDG Goals for ESD. Based on the EFA, a research model for ESD in the context of the sufficiency-based schools emerges. Figure 2 depicts the proposed emerging research model for ESD.
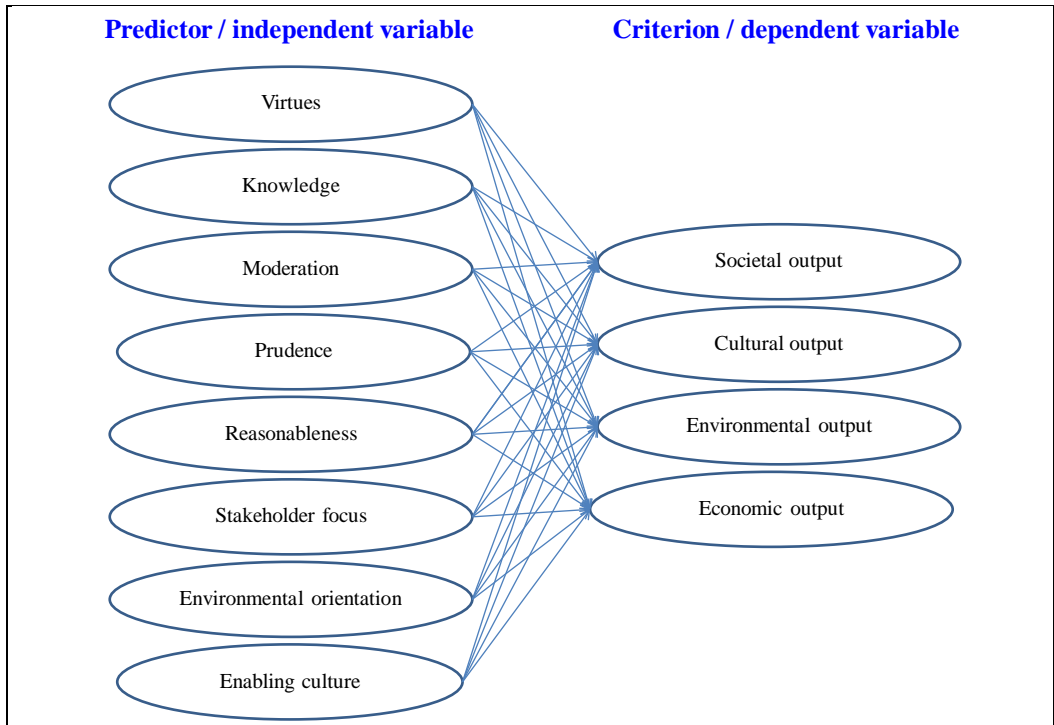

Figure 2. Emerging Research Model for ESD.

Based on the emerging research model for ESD, the following hypotheses are proposed to examine predicting relationships among variables.

H1: Virtues significantly predict balanced a) societal output, b) cultural output, c) environmental output and d) economic output towards ESD.

H2: Knowledge significantly predicts balanced a) societal output, b) cultural output, c) environmental output and d) economic output towards ESD.

H3: Moderation significantly predicts balanced a) societal output, b) cultural output, c) environmental output and d) economic output towards ESD.

H4: Prudence significantly predicts balanced a) societal output, b) cultural output, c) environmental output and d) economic output towards ESD.

H5: Reasonableness significantly predicts balanced a) societal output, b) cultural output, c) environmental output and d) economic output towards ESD.

H6: Stakeholder focus significantly predicts balanced a) societal output, b) cultural output, c) environmental output and d) economic output towards ESD.

H7: Environmental orientation significantly predicts balanced a) societal output, b) cultural output, c) environmental output and d) economic output towards ESD.

H8: Enabling culture significantly predicts balanced a) societal output, b) cultural output, c) environmental output and d) economic output towards ESD.

6. Results

To ensure robustness and reliability of the study, results from the EFA were tested. Based on statistical analysis, the reliability test indicates acceptable results with high Cronbach Alphas of all variable that fall within the acceptable ranges 0.819 – 0.957, according to Hair et al. (2010). The underlying factors for ESD are proven to be valid and reliable in the context of the sufficiency-based schools. Therefore, the results respond to the first research statement and question of this paper. Subsequently, the valid and reliable factors can be employed for further multivariate data analysis.

Multiple regression analysis (MRA) was employed to test the hypotheses, as presented previously and illustrated in Figure 1. The robust multiple regression models with all eight predictors and criterion variables produce results of R^2, adjusted R^2, F-statistics, and p-value, both unstandardized and standardized coefficients, as summarized in Table 1.

Table 1. Summary of Multiple Regression Results

Dependent Variable (Criterion)	Independent Variable (Predictor)	Summary of Coefficients					Model Summary			
		Unstandardized Coefficients		Standardized	t	Sig.	R Square	Adjusted R Square	F-statistics	
		B	Std. Error	Beta					F Change	Sig. F Change
Sociatal output	Virtues	.472	.094	.373	5.031	.000	.571	.556	38.406	.000
Cultural output	Virtues	.336	.080	.326	4.206	.000	.530	.513	32.512	.000
Environmental output	Virtues	.444	.123	.310	3.620	.000	.425	.406	21.380	.000
Economic output	Prudence	.382	.101	.312	3.768	.000	.472	.451	22.857	.000
	Stakeholder focus	.371	.163	.300	2.275	.024				
	Enabling culture	.452	.083	.389	5.441	.000				

The resulting models from Table 1 indicate that at least one independent variable has a significant relationship with the dependent variables due to rejection of the models' null hypotheses. The MRA results suggest that virtues, prudence, stakeholder focus and enabling culture, are significant predictors of enhanced ESD in Thailand at the 1% to 5% significance level. Specifically, virtues are found to significantly predict balanced: a) societal output (Beta = .373, p-value = .000), b) cultural output (Beta = .326, p-value = .000) and c) environmental output (Beta = .310, p-value = .000) for ESD, supporting H1a, b, and c. Moreover, prudence (Beta = .312, p-value = .000), stakeholder focus (Beta = .300, p-value = .024)and enabling culture (Beta = .389, p-value = .000) are found to significantly predict balanced economic output for ESD; H4d, H6d and H8d are thus supported. The remaining factors are non-significant and do not contribute to the

multiple regression models. Hence, the MRA results provide an answer to the second research statement and question of the paper.

Conclusion and Implications

The findings from this empirical study contribute to the existing literature in the realm of ESD in several significant manners. First, the paper provides a cutting-edge forefront of knowledge. The research in this paper may probably be one of the first empirical studies that principally focus on a central theme of the global debate and recent trend on ESD. Second, it highlights the importance of the UN DESD and SDGs for sustainable development and proposes the SEP framework as an alternative for ESD, using the proven evidence from the sufficiency-based schools in Thailand. Third, this study responds to the scholastic call for more empirical research that builds and tests models with multiple factors that link to ESD policies, programs and practices are still lacking to date by using advanced statistical analyses. Fourth, the results from the empirical examination answer the research statements and questions that set out to investigate. Results from the statistical analyses uncover the eight valid and reliable unidimentional predicting factors underlying the SEP application in the sufficiency-based schools for ESD and the four criterion factors underlying sustainability and balanced outputs from environment, culture, society and economy in the school context toward ESD. In addition, the paper proposes the original emerging research model for ESD (See Figure 2). The MRA results also indicate that virtues, prudence, stakeholder focus and enabling culture, are significant predictors of sustainability and balanced outputs from environment, culture, society and economy in the school context toward ESD in Thailand. Moreover, the results are in-line with the recommendation of the SEP framework, UN DESD and UN SDGs for sustainable development. In conclusion, the paper advances our currently-limited knowledge and understanding about ESD and its application in schools, especially in the growing economy of Thailand.

Overall, the findings in this paper provide the following implications. These SEP-based management and practice in the sufficiency-based schools in Thailand are proven to be central to ESD from both the theoretical and empirical perspectives that may benefit various parties. For academics, the empirical study may set groundwork for future studies. The emerging research model should be further tested with a precaution to a limitation to different contexts. For practitioners, such as schools leaders, school administrators and teachers, the findings suggest that they need to holistically implement the whole-of-school approach to apply the sufficiency thinking based on the SEP framework to enhance ESD. ESD can be embraced through their education management and practices to all school activities from management and student activities. Importantly, they need to promote virtues or shared values that concern for other and society at large, be prudent in all decision-making and conduct, focus on their multiple stakeholders through partnerships and foster the enabling culture to cultivate the right and positive attitudes and behaviours of everyone in schools, with an overall aim to achieve balance and sustainability. For policy-makers in education, this paper puts forward that an education-as-usual or more concurrent basic education programmes may not lead to sustainability. Since ESD requires an educational reform and system,

promoting the sufficiency-based school programme, such as Thailand, may be a starting point for transformation and reorientation of the present-day education toward ESD.

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