

Integrating Education 4.0 Archetype in Sustainable Tourism Education Framework: Towards Augmenting Graduate Environmental Citizenship

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Abstract: Although tourism is a significant part of the world economy, it has a carbon footprint contributing substantially to global climate change. This challenges higher learning institutions to educate society to become more responsible toward the natural environment. While a great emphasis has been put on environmental education, the literature on sustainable tourism pedagogy based on the education 4.0 paradigm remains limited. This paper attempts to conceptualize a sustainable tourism education framework centered on the Malaysia Education 4.0 paradigm. The sustainable tourism education concept is envisioned as an interrelated tridimensional component that comprises heutagogy, paralogy, and cybergogy. External support from relevant stakeholders, namely the tourism industry, higher learning institutions, and government agencies, is vital in ensuring the concept is viable. Theoretically, the study advances the sustainable tourism and environmental education literature by introducing an innovative technology-oriented sustainable education model. Practically, the study serves as a valuable reference for hospitality and tourism higher learning institutions to reform the current sustainable tourism curriculum in sync with the education 4.0 paradigm. The study helps accomplish the Malaysian Higher Education 4.0 aspiration of promoting novel and progressive pedagogical models geared toward the digital natives. Also, it is aligned with the Shared Prosperity Vision 2030 to educate society on environmental preservation and rehabilitation (KEGA-12: green economy) and United Nations' Sustainable Development Goals to reduce unsustainable consumption patterns from socio-economic activities (SDG-13: climate action).

Keywords: Malaysia Education 4.0, Transformative Pedagogy, Sustainable Tourism, Graduate Environmental Citizenship, Shared Prosperity Vision 2030

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Introduction

Tourism is a double-edged sword; although it is a significant part of the world economy, it has a carbon footprint that contributes substantially to global climate change. A senior principal advisor to The United Nations Development Programme, Meddeb (2020), highlighted that the tourism industry contributes more than five percent of global greenhouse gas emissions that adversely affect ecosystems and biodiversity. A compilation of literature by Gu, Hunt, Lengieza, Niu, Wu, Wang, and Jia (2021) stated that tourism could contribute to a multitude of detrimental effects on the economy, society, and natural environments, such as increased cost of living, traffic congestion, crime, waste, pollution, congestion, overcrowding, and degradation of biodiversity ecology. Malaysia, a popular tourism destination, is not exempted from experiencing similar socio-cultural and environmental issues caused

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by its tourism industry. For example, Razali, Ismail, Awang, Praveena, and Abidin (2018) discovered that tourism development in Cameron Highlands has significantly contributed to environmental problems, namely water pollution that decreased water quality in the area's river system. A more recent study by Kasavan, Mohamed, and Halim (2019) stressed that the rapid development of hotels on Langkawi Island had caused environmental degradation due to the disposal of untreated food waste in landfills. They pointed out lack of awareness and education on sustainable practices such as recycling and composting among hoteliers has contributed to such a problem.

Given the detrimental effects of tourism on the host community, an innovative sustainable tourism pedagogy model is integral in educating society on the damaging consequences of tourism development. This is manifested in the Malaysia Shared Prosperity Vision 2030 of strategic thrust number 2 (KEGA-12: Green Economy) and United Nations Sustainable Development Goals (SDG-13: Climate Action), which call for the imperative role of educational institutions in equipping the digital native generation with the necessary knowledge, attitude, and skills towards becoming environmental citizenship. However, to be relevant to the digital native generation, institutions of higher learning need to reform the education system from traditional pedagogy to digital pedagogy (Monzón, Jadán-Guerrero, Mesa & Andrade, 2021). Coined as Education 4.0 revolution, the digital or technological-based pedagogy advocates digitization, virtual reality, augmented reality, and the Internet of Things (IoT) in the education system (Hamilton, 2021). Such technological-based pedagogy is nicknamed transformative pedagogy in the Malaysia Higher Education 4.0 framework that matches the learning styles of the digital natives who are familiar with the Internet, digital devices, and video games (Malaysia Ministry of Higher Education, 2018).

Despite the move towards Education 4.0, literature on sustainable tourism pedagogy underpinned by technology applications is still limited. Existing environmental education frameworks have focused on a specific theory or model, such as experiential learning, constructivist approach, online inquiry-based learning, and socioscientific issues-based instruction (Khan, Karpudewan & Annamalai, 2021), which is void of technological-based pedagogy philosophy. This is consistent with an earlier systematic literature review study by Kavanagh, Luxton-Reilly, Wuensche, and Plimmer (2017), who found that technological-based pedagogy, particularly involving virtual reality technology applications, is much lesser in social sciences areas as compared to science and technology areas such as engineering and medical. Moreover, studies on virtual reality, augmented reality, or mixed reality technology applications in sustainable tourism pedagogy are scarce, especially in Malaysia's higher learning institutions. Responding to this situation, Adeyinka-Ojo, Lee, Abdullah, and Teo (2020) have called for more studies on integrating digital applications into hospitality and tourism higher learning institutions' curriculum development in Malaysia. They reiterated that digital technology skills such as mobile application, virtual reality, cloud technology, augmented reality, artificial intelligence, the Internet of things, and big data should be incorporated to create new and better hospitality and tourism pedagogy practices.

This paper aims to develop a novel transformative sustainable tourism education model for nurturing graduates' environmental citizenship based on the research gaps. This paper is divided into several sections. First, the introduction section introduces the issue, problem statement, and research gaps. Second, the literature review section discusses the current state of the United Nations Sustainable Development Goals (SDG-13: Climate Action), Malaysia's Shared Prosperity Vision 2030 (Strategic 2: KEGA-12: Green Economy), and sustainable tourism education that is relevant to the current paper. This is followed by a subsection called "Transformative Sustainable Tourism Education Model: The Way Forward," which illustrates and explains the critical components of the proposed transformative sustainable tourism education model. It ends with a conclusion that summarizes the article's purpose and significance.

Literature Review

Tourism is considered a significant driver of the world economy and signifies a substantial source of revenue for many developing countries, especially in Southeast Asia. In Malaysia, the Department of Statistics Malaysia (2021) reported that, for 2019, the tourism industry recorded a contribution of 15.9 percent to the country's Gross Domestic Product, amounting to RM240.2 billion. Most of the tourism receipts were from tourists' shopping, accommodation, and passenger transport expenditure. The tourism industry also has a knock-on effect on economic

well-being. It constituted 23.6 percent (3.6 million people) of the total workforce, most working in the food and beverage sector. Nevertheless, as the tourism industry continues to progress, environmental degradation, pollution, and greenhouse emissions lead to the introduction of sustainable tourism.

To understand the notion behind sustainable tourism development, referring to the United Nations World Tourism Organization (UNWTO) definition of its keywords: sustainability and tourism are essential. "Sustainability principles refer to the environmental, economic, and socio-cultural aspects of tourism development, and a suitable balance must be established between these three dimensions to guarantee its long-term sustainability." In contrast, "tourism is a social, cultural, and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors (which may be either tourists or excursionists; residents or non-residents), and tourism has to do with their activities, some of which involve tourism expenditure." (UNWTO, 2021). In combination, sustainable tourism is referred to as "tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment, and host communities" (UNWTO, 2021). Concerning the definitions given by UNWTO, sustainable tourism development is envisioned to play an important role to ensure socio, economic and cultural tourism needs are met without comprising the natural resources and ecosystem on which it depends. In line with the increasing interest in global climate change and environmental degradation, sustainable tourism has been a focal point of discussion covered at national, regional, and international levels.

United Nations Sustainable Development Goals (SDG-13: Climate Action)

Climate change impacts every nation on every continent. It disrupts national economies, transitions and even harms people's lives, becoming more severe every year. The United Nations Sustainable Development Goals (SDG-13: Climate Action) clearly stated its aim to "take urgent action to combat climate change and its impact" (United Nations, 2016) and associate SDG13 target by incorporating climate change initiatives into national policies, which include improving education and raising awareness rising significantly in the least developed countries (Seto-Pamies & Papaoikonomou, 2020). Since Rio Earth Summit in 1992 to Paris Agreement in 2015, 196 countries, including Malaysia, have signed and committed to reducing the impacts of climate change (UNFCCC, 2018). Among the supports stated in the agreement is financial assistance to its vision of fully realizing technology development and improving resilience towards climate change. Universities and business schools have also integrated business ethics, corporate social responsibility, and sustainability into their curriculum. In the current situation, in the form of the 2030 Plan for Sustainable Growth - though it called for innovative approaches and engagement from a wide range of stakeholders, the focus is more on academic institutions which are called upon to take responsibility and to lead their research and action on urgent social and environmental problems (Campbell, Hansen, Stirling & Twomlow, 2018; Seto-Pamies & Papaoikonomou, 2020; Tremblay, Boucher & Villeneuve, 2020).

Malaysia's Shared Prosperity Vision 2030 (Strategic 2: KEGA-12: Green Economy)

Malaysia's Shared Prosperity Vision 2030 aims to ensure Malaysia's quality of life as a developing nation based on people's well-being through innovation and transformation strategies. The Enablers of this Prosperity Vision focused on social capital growth, outcome awareness through education in building an enlightened community to create social stability and solidarity in diversity (Goh & Loke, 2019). Strategic 2, which centered on the green economy, showed that the concept has moved beyond the borders of environmental economics and into mainstream politics and industry in response to the dual challenges of global climate change and the economic crisis (Gailhard & Bojnec, 2019). It is mentioned that the green economy would make for environmentally sustainable economic and job growth. However, most researchers argue that an entirely suitable framework for addressing a green economy transition to green employment does not yet exist (Lambin, Mustapha & Long, 2020; Biswas, 2020). The United Nations Environment Program (UNEP, 2008) describes green employment in

sectors like agricultural, research and development, industrial, and service practices will contribute significantly to the protection or enhancement of environmental quality.

Sustainable Tourism Education

To achieve sustainability or sustainable tourism from theory to practice, it is crucial to begin with sustainable development and environmental education (Boluk, Cavaliere & Duffy, 2019). Environmental education refers to enhancing environmental knowledge, attitudes, behaviors, and skills necessary to foster an environmentally sound way of life (Parra, Hansmann, Hadjichambis, Goldman, Paraskeva-Hadjichambi, Sund, Sund, Gericke & Conti, 2020). As there is increasing attention toward sustainable development, several global and national initiatives have been put forward to support and educate society on how to become part of sustainable development.

United Nations Sustainable Development Goals (SDG-4: Quality of Education)

SDG 4 aims for “inclusive and quality education for all and promoting lifelong learning.” The ten targets expressed within SDG 4 focus on equitable educational access, improvements in literacy rates, support for teachers, and capacity building of vocational skills. It is envisioned that by 2030, all learners have acquired the necessary knowledge and skills required to encourage sustainable development mainly through education for sustainable development and sustainable lifestyles, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture’s contribution to sustainable development. Achieving the objective requires focusing on sustainable development education, emphasizing social and environmental justice issues. The 2017/18 Global Education Monitoring Report found that 51 percent of reporting countries have policies reflecting the inclusion of sustainable development education, 33 percent of whom have focused curricula, and only 7 percent include the topic in teacher training. This shows that teachers in many countries are not prepared and ready to teach issues related to sustainable development. Such statistics do little to describe what is being done in sustainable education. Education plays a vital role in addressing challenges presented in the SDGs, including sustainability which requires higher education institutions to reform the sustainability tourism pedagogy being practiced in today’s classrooms.

Malaysia Higher Education 4.0 Paradigm

Following the industrial revolution 4.0, in 2018, the Malaysia Ministry of Higher Education launched its Education 4.0 program, which was encapsulated in the book titled “Framing Malaysia Higher Education 4.0: Future-Proof Talents”. Hussin (2018) stated that the Education 4.0 initiative is an answer to the industrial revolution 4.0 demands in which technology and human are integrated to facilitate new and innovative teaching and learning pedagogies. The teaching and learning process can occur without the time and geographical limitations with elements that support personal and flexible delivery, involving peers and mentors. This is manifested in the Malaysia Higher Education 4.0 paradigm that proposes a curriculum based on integrating heutagogy, peeragogy, and cybergoth. Jamaludin, McKay, and Ledger (2020) explained that heutagogy focuses on self-directed learning where the students are empowered to determine how they learned by assuming the role of online instructors, including a coach, mentor, or facilitator, while peeragogy refers to the use of digital tools to construct knowledge and connect students in which they co-created contents in a social, active, and continuous manner.

On the other hand, cybergoth involves the applications of digital technologies such as virtual reality, artificial intelligence, and cloud computing that facilitate the virtual learning ecosystem. The integration of these pedagogies is in line with the learning style and preference of the new generation of digital-native students. Lawrence, Ching, and Abdullah (2019) asserted that education 4.0 urges the advancement of virtual reality classrooms, enhancing both educators and students’ technical knowledge and skills. This provides an immersive visual learning experience that effectively improves the connection between learning concepts and information (Halili 2019). This is important as today’s technology-savvy students are easily bored, making them constantly look up for excitement from visual and auditory inputs (Diwan, 2017).

The global hospitality and tourism education sector has evolved in using appropriate digital and technology

resources to facilitate teaching and learning. Smith and Walters (2012) examined the effectiveness of using mobile devices (e.g., handheld computer, MP3 player, smartphone, laptop) for teaching and learning purposes. They discovered that students were willing to learn as mobile learning is convenient and could be easily used to engage with their instructors. The element of engagement affects students' readiness to use technology other than flexibility, remote access, and feeling of isolation (Sun, Lee, Lee, & Law, 2016). Nevertheless, some students were skeptical about the effectiveness of mobile learning because some of them still preferred the face-to-face approach or at least using a computer (as compared to handheld devices such as smartphones) (Smith & Walters, 2012). A more recent study found that hotel simulations promoted experiential learning and improved students' decision-making skills (Amponolas, Shaw, & James, 2019). Wei (2019) reviewed 60 studies on virtual reality and augmented reality in hospitality and tourism and suggested many research avenues for the future directions of reality technology in the hospitality and tourism industry. Even though reality technologies are gaining popularity in hotels, resorts, restaurants, events, and cruises, empirical research on this area is still in its infancy (Wei, 2019), primarily related to sustainable tourism education.

Transformative Sustainable Tourism Education Model: The Way Forward

The transformative sustainable tourism education model is grounded on the interrelationships among tourism multiple stakeholders, the Malaysia Higher Education 4.0 paradigm, and graduates' environmental citizenship. Figure 1 shows the proposed connections among the three building blocks of the transformative sustainable tourism education model.

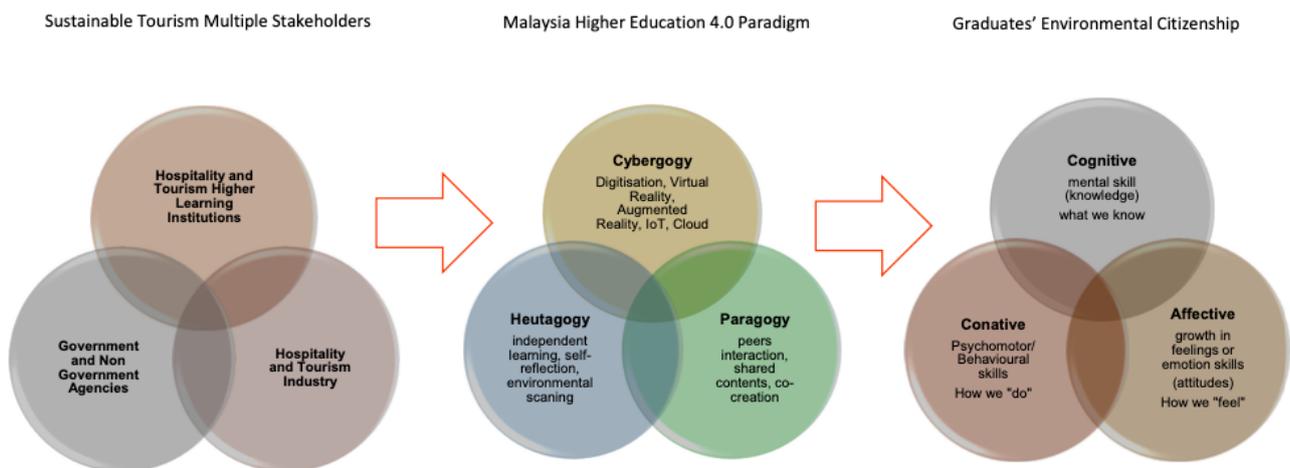


Figure 1. Transformative Sustainable Tourism Education Model

The Role of Multiple Stakeholders

Sustainable tourism education needs support from the tourism industry, government agencies, and higher education institutions to be successful. First, good governance is essential to promote the production and execution of viable solutions to the threat posed by the tourism industry. Governance refers to shifts in a government position and the increasing role of non-governmental sectors to meet public and private sector objectives (Horng, Hsu & Tsai, 2019). Second, the tourism industry plays a vital role in addressing these issues by changing its way of doing business, reducing pollution, increasing resource utilization, engaging in green technology, redesigning products and services that are more environmentally sustainable. Engagement with other stakeholders, such as the local community, is crucial in enhancing the company's efficiency in fulfilling societal aspirations, especially in practicing responsible tourism in their business operations (Tremblay, Boucher & Villeneuve, 2020). Third, higher education institutions play an essential role in fostering a sustainable tourism environment toward environmental citizenship (Seto-Pamies & Papaoikonomou, 2020).

To achieve the stated goal, callings have been made for higher learning institutions to reform the education

system from traditional-based pedagogy to technological-based pedagogy. However, technology applications in the current environmental education and sustainable tourism education curriculum remain poor. Although the Malaysian Government has emphasized the need to focus on tourism sustainability, many hospitality and tourism higher educational institutions still are not prepared to invest in the resources required to enhance students' teaching and learning process. Thus, it can be concluded that the transition from sustainability tourism traditional pedagogy to sustainable tourism transformative pedagogy needs strong support and collaboration from government agencies, the tourism industry, and higher education institutions to be successful. A more outstanding commitment is warranted from the multiple stakeholders to be good role models for graduates in upholding the principles of sustainable tourism.

Tridimensional Pedagogy

Grounded on Malaysia's Higher education 4.0 paradigm, three interrelated integral parts are proposed as the heart of the transformative sustainable tourism education model: heutagogy, paralogy, and cybergogy. The first component, heutagogy, is related to student-oriented learning that emphasizes students' self-learning experience. Students practice their understandings and internal processes such as reflection, environmental scanning, and interaction with others to engage in expressive and pertinent learning undertakings propelled by their curiosities. Information communication technology is a powerful tool for heutagogy as it allows students to access information and provide a mechanism for communication, debate, and recording of learning achievements (Chan, Embi & Hashim, 2019; Sumarsono, 2020). The second component, paralogy, is also known as peeragogy, peer-to-peer learning. It involves students' interaction with their peers in accomplishing their educational goals (Zhang & Bayley, 2019). Students learn and share the learning subjects among themselves through the co-creation of learning groups. This is facilitated by digital media used to connect, co-construct knowledge, and co-learn (Chan *et al.*, 2019). Aligned with the progression of industrial revolution 4.0, the third component, labeled cybergogy is introduced. It promotes new teaching and learning practices in the virtual environment. It generates an eloquent and engaging online learning experience through online presence and facilitation. It focuses on helping adults and young people to learn through technologically-enabled learner-centered, autonomous, and collaborative learning in an online backdrop (Sumarsono, 2020). In combination, heutagogy, paralogy, and cybergogy form the heart of the transformative sustainable tourism pedagogy model.

Graduates Environmental Citizenship

Education for Environmental Citizenship is central to empowering citizens to practice their environmental rights and duties, identify the fundamental grounds of ecological degradation, and develop the inclination and the capabilities for active civic engagement to address those environmental problems (Hadjichambis, Reis, Paraskeva-Hadjichambi, Činčera, Boeve-de Pauw, Gericke & Knippels, 2020). An important idea has been to build so-called pro-environmental behavior through cognitive and affective learning. This is supported by several renowned psychological models (e.g., Kollmuss and Agyeman 2002; Ajzen 1991). This principle is incorporated in the proposed transformative sustainable tourism education model, which assumes graduates' environmental citizenship would emerge when they possess superior environmental knowledge, attitudes, and behavioral intention to act pro-environmentally. Specifically, integrating heutagogy, peeragogy, and cybergogy delivered through an interactive virtual, mixed, or augmented reality platform could contribute to positive attitudes and beliefs towards a specific action, leading to pro-environmental intention behavior. For the concept to work, higher learning institutions should ensure that environmental education pedagogy must be on par with today's learning style and the preference of today's digital natives who have good knowledge and skills in technological applications. Arguably, the tremendous multiplier benefits to society, the environment, and the economy should outweigh the considerable investment in pedagogy technologies in the foreseeable future.

Conclusion

This paper proposes a transformative sustainable tourism education framework centered on the Malaysian

Education 4.0 paradigm. The concept emerges as a response to the call made by the Ministry of Higher Education to integrate technology into higher education curricula that meet the learning style and preference of the new digital native generation. The proposed transformative sustainable tourism education model is in line with Education 4.0, which advocates the development of novel and innovative teaching and learning pedagogies. Besides that, introducing the new concept in sustainable tourism pedagogy is timely and relevant to Malaysia's Shared Prosperity Vision 2030 (Strategic 2: KEGA-12: Green Economy) and the 10-10 MySTIE (Malaysian Science, technology, Innovation, and Economy). First, the transformative sustainable tourism education concept supports Shared Prosperity Vision 2030, which aims to ensure Malaysian's quality of life as a developing nation based on people's well-being through a range of innovation and transformation strategies. The enablers of the Shared Prosperity Vision 2030 focus on social capital growth, outcome awareness through education in building an enlightened community to create social stability and solidarity in diversity. Second, it corresponds with the 10-10 MySTIE framework that has mapped ten technology drivers against ten socio-economic drivers. The principle behind the transformative sustainable tourism education concept is primarily built upon the two components of the MySTIE framework, namely education and environment, which are equally crucial for society's socio-economic transformation. The proposed transformative sustainable tourism pedagogy model will pave the way for the nation to enhance its innovative and creative capability to improve economic competitiveness and quality of life.

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