INTEGRATION SUSTAINABLE DEVELOPMENT INTO HIGHER EDUCATION CURRICULUM

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Abstract

Education for Sustainable Development (ESD) has been promoted by UNESCO to create a sustainable society in the context of achieving Sustainable Development Goals (SDGs) on the global agenda 2030. Higher education plays an important role in formation and development of human resources, producing students with sustainability awareness, who understand interrelationship between environment, economy and social. Constant functions of university as a higher education institution remain fovused on missions: teaching, research, and community service. University students with such a sustainability awareness are agents of change, who are expected to support the SDGs achievement. Therefore, ESD needs to be integrated into higher education programs to increase knowledge, influence attitudes and behavior of students towards sustainable development and environment. Integration of ESD concepts and principles into higher education curriculum is an important important endeavour. This artcle addresses matters around the issue and trend of the development of higher education curricula in various countries with various options and approaches to its implementation..

Keyword:
curriculum, integration, higher education, sustainable development

I. Introduction

Global challenges in the 21st century such as migration, conflict, poverty, land degradation, loss of biodiversity, and climate change have encouraged global communities, members of the United Nations (UN) to unite in responding to these challenges by holding conferences, programs, agreements multi-lateral environ-ment, conventions and global commitments (Awate et al., 2016). The latest agree-ment on the outcome of the convention of 193 UN member states was "Agenda 2030" which contains 17 sustainable development goals (SDGs). Every country must strive to achieve SDGs, a vision of global development and transformation.

Education plays a very important role in the "Agenda 2030" where it is the goal of the 4th SDG and the main strategy for achieving other SDG

goals. Global problems such as climate change need changes in human lifestyles and transformation of ways of thinking and acting. Therefore, new skills, values and attitudes are needed that lead to a sustainable society. The education system must respond to those needs by setting goals and relevant learning content, integrating sustainability principles into the education curriculum (UNESCO, 2017). The UN special agency that handles education, UNESCO (United Nations Educational, Scientific and Cultural Organization) has been promoting ESD (Education for Sustainable Development) since 1992.

Higher education has a contribution in formation and development of human resources, the formation of socio-cultural values, as well as increasing individual capacity (Aina, 2010). In teacher education institution, teaching practice in regarded to developing the student-teachers' professional competencies (Ali, M., 2003). Higher education plays an important role in producing sustainable students, graduates who understand the complex interrelationships and interdependencies between environment, energy sources and economics (El-der, 2009). University, as a higher education institution has three missions, namely teaching, research, and community service. Thus, environmental issues must be the main concern of university by involving its academicians, also incorporating en-vironmental and sustainable issues into higher education qualifications (Togo, 2009).

Students as university academics besides acting as the younger generation are also agents of change that are directly related to environment in the present and the future. Concept of ESD needs to be integrated into higher education programs to increase knowledge so that it positively influences student attitudes and behavior towards sustainable development (SD) and the environment (Al-Naqbi, AK, & Al-shannag, Q., 2018). Higher education has an important role in producing quality graduates and carry out the mandate of a sustainable development agenda (Fise-lier, ES, et.al, 2017). Therefore, sustainability issues become an important issue and are widespread in various parts of the world (Beringer, A., et.al, 2008) .

The integration of the concepts and principles of ESD into the higher education curriculum is an important issue and trend in development of higher education curricula in various countries. Many universities have implemented ESD in implementing curriculum and learning practices such as the University of United Arab Emirates (UAE), University of Hawa'i at Manoa, Cambridge University-UK, University of Catalonia-Spain, Tongji University-China, Vrije Universiteit Amster-dam-Netherlands, Delft University of Technology-Netherlands, Deakin University-Australia, Universite de Sherbrooke-Canada and other universities both in the Americas, Asia, Australia, Europe and Australia. Model of ESD integration into curriculum at each university varies, depending on the needs of the university, resource conditions are also other factors. This paper discusses various ESD integration model into the higher education curriculum based on best practices from universities in various countries.

II. Education For Sustainable Development (ESD)

Orientation in ESD teaching must cover three things: (1) educators as role models and learners who practice sustainability principles; (2) experiential learning by relating it to real life as a learning situation; (3) holistic thinking that includes exploration of interdependence and transdisciplinarity between more open subjects and includes approaches to developing and honing critical thinking (Dawe, Jucker, & Martin, 2005).

Knowledge about maintaining the environment and human activities is important to motivate changes in values, attitudes, and behaviors associated with ESD. Some psychological studies show a correlation between attitude and behavior intentions. The factors that influence whether attitudinal changes will be trans-formed into behavioral changes include the specificity of intention, difficulty in ac-tion, contextual support, and habitual behavior, and each is influenced by education. Therefore, ESD programs must include specific strategies, such as choosing specif-ic behavioral targets or providing model actions, to target changes in behavior, attitudes towards the natural environment (Arbuthnott, Katherine D., 2008).

ESD can develop the ability to think critically, systemically, futures, motivate sustainable development actions. Sustainable community development is a contin-uous learning process (involving various formal, informal informal learning parties). Therefore it is necessary to increase the competence of educators, leaders and de-cision makers at all levels of education. Unesco has developed esd (education for sustainable development) since 1992. Global issues (such as climate change) re-quire changes in lifestyle and paradigms of thinking so that people need new skills, values & attitudes (UNESCO, 2017).

III. Curriculum Framework For ESD

Education is the basis for sustainable development. The curriculum framework for ESD helps to incorporate the national strategy "from project to structure". This is a contribution to the UNESCO Global Action Pro-gram, the ESD decade program and UNESCO 2030 agenda, the achieve-ment of SDGs. The focus is to ensure that as global challenges increase, the quality of school education is the basis for sustainable development. The curriculum framework is aimed to curriculum designers, planners and senior executives at various levels of the education system, and schools. Its practical implementation needs further support. Teachers and students need new project models, textbooks and learning materials. Therefore, close collaboration between didactic subjects, teaching practices and textbook publishers is needed. Cross-curricular topics such as diversity in values, culture and living conditions; economic globalization; peace and conflict; changes in the global envi-ronment can be a theme of learning (KMK & BMZ, 2016).

In an increasingly globalized world, the principles of sustainable develop-ment are central to the environment and humanity that are vulnerable and endan-gered. The 2030 Agenda has stated that sustainable development is a common goal of 17 SDGs. The importance of education for the achievement of the SDGs is em-phasized and determined in the SDGs target 4.7. In this case, ESD is mentioned as a key instrument for achieving SDGs goals. This is a consideration in the curriculum framework to link different educational traditions such as environmental education and global learning in ESD. The principle of comprehensive sustainable development will be central to all school subjects and school activities (Figure 1).

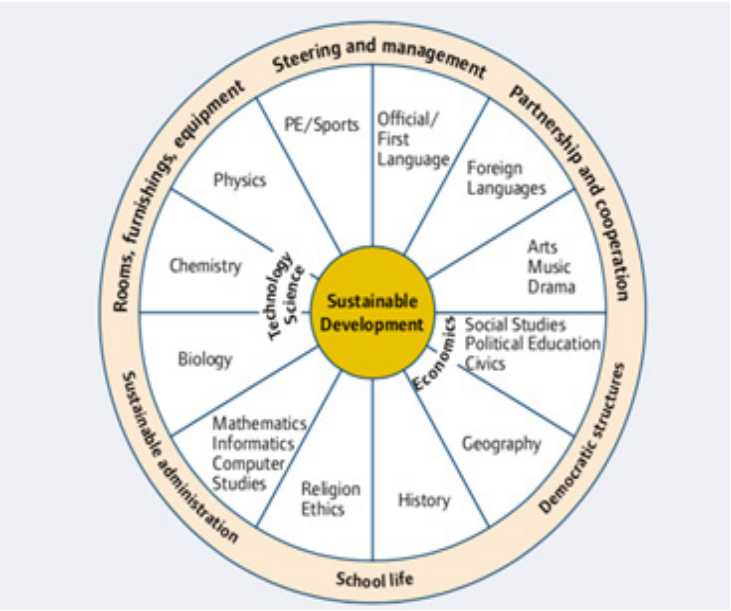

Figure 1. The principle of sustainable development as a central subject (KMK & BMZ, 2016)

IV. Integration Sustainable Development Into Higher Education Curriculum

Curriculum integration, relevant to be applied today in the context of the 21st century, one of which is related to the trend of ESD issues. Many universities in the world have integrated ESD into their curriculum and education system with a variety of different approaches. The approach model in curriculum integration consists of three types, namely: multidisciplinary, interdisciplinary and transdisciplinary (Drake, et.al, 2004); (Fogarty, R., 1991).

Multidisciplinary approach focuses on the discipline of science where the

teacher regulates the standards of various disciplines of science referring to the theme (Drake, et. Al, 2004). A university in US uses a multidisciplinary approach to integrating ESD into the architectural education curriculum with the emergence of the course Environmental Control System (ECS) in its curriculum structure (Wright, J., 2003). In addition, one of the largest universities in Russia, St. Petersburg State University applies a multidisciplinary approach by organizing courses in three steps, each of which has a duration of two years. The first two years became the most important period for the formation of a new mentality for Russian students and introduced the concept of sustainable development as a life principle for future generations (Verbitskaya, L.A., et.al., 2002). Delft University Technology (DUT), the Netherlands has designed ESD integration into its technical education curriculum since 1998. The approach used is multidisciplinary, with the emergence of technology courses in sustainable development, although in its implementation requires lecturers with special competencies that can combine technology with the concept of development sustainable (Peet, D.J.et al, 2004).

In interdisciplinary approach, teacher integrates subdisciplines in a lesson, such as the integration of reading, writing and oral communication skills in language and art lessons; or integrating lessons in history, geography, economics, and government in social study programs (Drake, et.al, 2004). A university in US uses an interdisciplinary approach, in addition to a multidisciplinary approach in integrating ESD into the architectural education curriculum by raising theme of the environment into each course to be interrelated (Wright, J., 2003). In addition, the Department of Civil Engineering, Sherbrooke University of Canada applies an interdisciplinary approach to integrating ESD into its curriculum through life cycle approaches consisting of the following five steps: 1) mapping the curriculum; 2) set learning targets; 3) develop an action plan for the program being assessed; 4) implementing the action plan and 5) assessing final performance (Roure, et. Al, 2018). The architectural curriculum of undergraduate programs at a university in East Africa has been integrated into the concept of ESD with an interdisciplinary approach, where the content of the course changes direction towards sustainable issues (Olweny, M., 2018). The same thing was done by Teacher Education Institution, Vietnam where the theme related to ESD was included in his education courses (Kieu, T.K., 2016). In addition, the STEM approach (science, technology engineering, mathematics) is in line with the interdisciplinary approach to integrat-ing ESD into the curriculum like that of Newcastle University, UK in developing chemical engineering curriculum (Glassey, J., & Haile, S., 2012).

In a transdisciplinary approach, the teacher organizes the curriculum based on the questions and desires of the students. Students develop their life skills

when they apply skills and knowledge to the context of everyday life. Students' background factor included gender, age, grade repetition, resources at home, parent's education and expected level of educational attainment, are correlated with student's achievements (Ali, M & Hayat, B., 2019.) The method that can be used in the transdisciplinary integration approach is project-based learning (Drake, et.al, 2004). This approach is carried out by Deakin University, Australia to integrate the concept of sustainability (ESD) into its curriculum where integration depends on the characteristics of the course or unit and is largely driven by individual academic initiatives. Good practices identified in the incorporation of sustainability into the curriculum are using problem-based approaches supported by real-life projects to enhance students' authentic learning experiences (Poon, J., 2017). In addition, Vrije Universiteit, Amsterdam also integrates ESD into the curriculum of the Faculty of Earth and Life Science, where project-based learn-ing and integration are based on student interests (Muijen, H., 2004)

V. Conclusion

Sustainability principles need to be integrated into the education curriculum including higher education which has a strategic role in shaping the younger generation, agent of changes. Integration of ESD into the higher education curicu-lum is the latest trend and important issue in the development of higher education curriculum in various countries. Many universities have implemented ESD in implementing curriculum and learning practices with different approaches. The ESD integration model into the higher education curriculum at each university is different. The integration model can be grouped as follows: 1) A multidisciplinary approach that focuses on the discipline of science where educators regulate the standards of various disciplines of science referring to the theme; 2) Interdiscipli-nary approach (across several disciplines), where the teacher integrates subdisci-plines in a lesson; 3) Transdisciplinary approach, where the teacher organizes the curriculum based on the questions and desires of students

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