

ESBOR DURING COVID-19: ANALYSIS STUDENTS ATTITUDE FOR DEVELOP 21ST CENTURY ENVIRONMENTAL LEARNING

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Abstract: Environmental learning about recycling focuses on the problem of waste accumulation and sustainable use of the earth's resources. The outbreak of the novel coronavirus disease (COVID-19) has made the adoption of e-learning the "new normal". One method of e-learning that can be developed to support environmental lessons is the Environmental Supplement Book of Recycling (ESBOR) learning media. This study analyzed the students' environmental attitudes on recycling in an effort to develop the ESBOR because attitude is very important to implement knowledge. The research method used was the descriptive survey technique. A total of 235 students was contacted randomly in various cities in Indonesia using Google Form. The results showed that the attitude of students was already in a very high category. This indicated that the ESBOR learning media may be developed to support e-learning amid the pandemic. ESBOR is an innovation of 21st century learning, which will be vital in the near future. The ESBOR learning media has great potential and may be developed as a supplemental method for students to gain knowledge. The suggestions can be used to develop ESBOR in future research.

Keywords: Attitude, Coronavirus disease, Environmental Supplement Book of Recycling, e-learning, Indonesia.

Introduction

Environmental learning in the 21st century, especially during the COVID-19 pandemic, requires a shift from classroom learning to e-learning. This shift is due to physical distancing policies implemented by the authorities to prevent transmission of COVID-19 (Bandyopadhyay, 2020; Ni *et al.*, 2020; Tian *et al.*, 2020). One of the effects of this change is on environmental learning, particularly on recycling topics taught at the university level. Recycling is still an important subject in environmental learning, and its delivery should not be interrupted by the pandemic.

The change from face-to-face to e-learning has advantages and disadvantages, which affects the achievement of the learning purpose itself (Allo, 2020; Arthur *et al.*, 2019; Golitsyna, 2017). This change in the learning system has resulted in the need to develop various e-learning media that are suitable and practical for all

students to use. E-learning is very different from face-to-face (conventional) learning. Learning using online media requires information communication technology facilities and a good Internet connection to ensure smooth communication and lesson delivery (Huang *et al.*, 2010; Reyna *et al.*, 2018; So *et al.*, 2019; Mirabolghasemi *et al.*, 2019; Purwanto *et al.*, 2020). One innovation that can be developed to learn the concept of recycling is to develop the Environmental Supplement Book of Recycling (ESBOR) learning media.

Previous research has been done on the use of e-learning, although not all students and levels of education can carry it out to its full potential (Back *et al.*, 2015; Elleithy & Sobh, 2015; Alhawiti & Abdelhamid, 2017; Mhouti *et al.*, 2017; Mbipom *et al.*, 2018; Teo *et al.*, 2018; Acharya, 2019; Nwagwu, 2020). That is because e-learning systems are more complicated than conventional learning. Students must be able to

use a variety of digital learning media besides creating a conducive environment to study. Previously, there have been many developments in digital learning media for environmental learning (Buzov, 2014; Ichsan *et al.*, 2020; Miarsyah, Rusdi, *et al.*, 2019; Purwanto *et al.*, 2020; Sigit, Azrai, Heryanti, *et al.*, 2019; Sigit, Azrai, Setyawati, *et al.*, 2019). However, those studies did not specifically address the students' attitude towards recycling.

Attitude is a central part of human identity (Rahman, 2019). A person's attitude towards something is shaped by the environment around him. A positive attitude is nurtured if the environment and learning experience are favourable, and vice versa (Orunaboka, 2011). The attitude of caring for the environment becomes important during the pandemic because it ensures cleanliness, thereby helping to keep the disease in check. This research analyses the score profiles of the students' environmental attitude and behaviour in a general context, and not specifically related to recycling (Ugulu *et al.*, 2013; Karpudewan *et al.*, 2015; Choudri *et al.*, 2016; Nadlifatin *et al.*, 2016; Saribas *et al.*, 2017; Harahap *et al.*, 2018; Macnaughton *et al.*, 2018; Rahmayanti *et al.*, 2018, 2019; Azrai *et al.*, 2019; Choe *et al.*, 2019).

Before the ESBOR learning media is developed, an analysis of student scores in terms of recycling must be carried out. This becomes important because in developing a learning media, there must be an assessment of learning in the classroom. It has become necessary to develop e-learning as the pandemic has impacted the development of learning media (Allo, 2020; Erduran, 2020; Sintema, 2020).

Methodology

This research used a descriptive method through a survey with Google Form. The study was conducted from February to April 2020. The respondents comprised 235 university students from the Indonesian cities of Jakarta, Lampung and Makassar. Samples used 235 students because this was representative of the survey.

The respondents were divided into 109 bachelor students of natural science faculties (BSF), 103 bachelor students of non-natural science faculties (BNF), nine master students of natural science faculties (MSF) and 14 master students of non-natural science faculties (MNF). The instruments used were attitude indicators adapted from Sigit *et al.* (2020). These indicators were developed from previous research because they were more relevant in this contextual situation. The attitude indicators are stated in Table 1.

Table 1: Student attitude indicators

No	Indicators	Item
1	Supporting plastic waste recycling efforts	1,2
2	Implementing environmentally friendly lifestyle for reducing waste	3,4
3	Buying various recycled equipment	5,6
4	Reusing items that are still useful	7,8
5	Doing socialization to promote recycling behavior of university students	9,10

Source: Indicator adapted from Sigit *et al.* (2020)

After measuring the attitude, the next step was to categorize the attitude score, namely as very high, high, moderate, low and very low, according to Ichsan *et al.* (2019) and Sigit *et al.* (2020) as shown in Table 2. This categorization was important because it identified the overall score of students.

Table 2: Category of attitude for university students

Category	Interval Score
Very High	$X > 81,28$
High	$70,64 < X \leq 81,28$
Moderate	$49,36 < X \leq 70,64$
Low	$38,72 < X \leq 49,36$
Very Low	$X \leq 38,72$

Source: Indicator adapted from Ichsan *et al.* (2019) and Sigit *et al.* (2020)

Results and Discussion

The students’ attitude viewed on recyclable items showed variable results, but all had a very high average score as shown in Table 3. Master students seemed to have better scores in all attitudes compared to bachelor students. Furthermore, the item with the lowest score among BSF, BNF and MSF students was item five, which was about buying recycled products. Meanwhile, for the MNF students, the category with the lowest score was item seven, which was about reusing cans for planting plants.

When viewed based on attitude indicators in Table 4, the third indicator had the lowest average score for BSF, BNF and MNF students, which was about buying various recycling equipment. The lowest attitude indicator score for MNF was the fourth indicator about reusing old items.

The attitude of university students in this regard was an interesting part to be explored. The results of the attitude scores of university students showed very high categories for all items. This showed that they already had the

Table 3: Scores of university students’ attitudes viewed on recyclable items

No	Item	BSF	BNF	MSF	MNF
1	The government’s plastic recycling program must be supported	4.91	4.72	5.00	4.93
2	The community must also recycle plastic waste	4.80	4.67	5.00	4.93
3	It is better to clean something using cloth rather than a tissue to reduce waste	4.57	4.55	4.67	4.93
4	The waste paper should be reused	4.72	4.62	4.78	5.00
5	Recycled products sold must be purchased as a form of appreciation	4.30	4.22	4.67	4.93
6	Buying quality recycled products does not reduce the function of the item	4.41	4.45	4.78	4.86
7	Used cans should be reused for planting plants	4.57	4.47	4.89	4.79
8	Wood-based industrial waste can be reused to make furniture	4.61	4.52	4.67	4.86
9	Campaigns through social media about recycling must be carried out by university students	4.51	4.30	4.89	5.00
10	Students have a role to be an example for the community in terms of waste recycling activities	4.61	4.43	4.89	4.93
Average score of all items (scale 0-100)		92.02	89.90	96.48	98.32
Category		Very High	Very High	Very High	Very High

Note: The attitude score range for each item is 1-5

Table 4: Indicator scores of university students’ attitudes

No	Indicator	BSF	BNF	MSF	MNF
1	Supporting plastic waste recycling efforts	4.85	4.69	5.00	4.93
2	Implementing environmentally friendly lifestyle for reducing waste	4.65	4.59	4.72	4.96
3	Buying various recycled equipment	4.36	4.33	4.72	4.89
4	Reusing items that are still useful	4.59	4.50	4.78	4.82
5	Doing socialization to promote recycling behavior of university students	4.56	4.36	4.89	4.96

Note: the attitude score range for each indicator is 1-5

same views and perceptions on recycling. This was a positive sign for the development of environmental learning in campus. University students, in addition to having a good attitude towards recycling, should also have Higher Order Thinking Skills (HOTS) to resolve various environmental problems (Wagner *et al.*, 2014; Wall, 2015; Dubas & Toledo, 2016; Elfeky, 2018; Vidergor, 2018; Mahoney & Harris-Reeves, 2019; Ichsan *et al.*, 2020; Komala *et al.*, 2020).

It was observed that the low attitude scores were in buying recycled products among BSF, BNF and MSF students, and in reusing used cans among MNF students. Even though the respondents were university students with greater access to information in relation to ordinary people, the results showed that environmental learning at the university had not been able to maximise their attitude on both items (He *et al.*, 2011; Teksoz *et al.*, 2012; Ahmad & Nordin, 2014; Goldman *et al.*, 2015; Watson *et al.*, 2017; Freed, 2018; Janmaimool & Khajohnmanee, 2018;).

Although no tests were conducted to determine the significance of their differences, but in terms of averages and categories, the attitudes were not much different between science and non-science students. Likewise, the scores at the bachelor and master students in this attitude did not differ in categories. It showed that studying in a science faculty was not much different from those of non-science. Thus, to increase the students appreciation towards the recycling concept, the science faculties of universities should intensify environmental learning, such as the ESBOR learning media, because science students would be much more involved in environmental issues (Mcguire, 2015; Vieira & Tenreiro-Vieira, 2016; Derman & Gurbuz, 2018; Miarsyah, Sigit, *et al.*, 2019).

Learning media is an important in tool in 21st century learning. Lecturers and teachers must develop an innovative learning media as one solution of problem for difficult topics (Ramdhani & Muhammadiyah, 2015; Sahroneh *et al.*, 2019). The ESBOR learning media was

an alternative that could be used to improve student attitude towards recycling during the COVID-19 pandemic. ESBOR is a technological innovation to improve e-learning. E-learning needed to be implemented innovatively during the pandemic (Bakker & Wagner, 2020). As the ESBOR learning media was already based on digital technology, it could be applied immediately and seamlessly in e-learning. As educators and students adapt to changes during the pandemic, this would cause significant impact on the learning media used (Bakker & Wagner, 2020; Erduran, 2020; Sintema, 2020). The ESBOR learning media content must be related to recycling activities in the students' surrounding environment, which of course, must emphasize health protocols in preventing the spread of COVID-19.

For example, reusing used bottles to make handicraft could still be carried out during the pandemic. However, the bottles must first be cleaned to make sure they were sterile before handling. In this context, of course, the bottles used were not those collected from garbage bins, but those used by the students themselves. In addition to reducing the amount of waste produced, this recycling activity might also develop creativity, which was important for learning in the 21st century (Kacan, 2015; Koh *et al.*, 2015; Vidergor & Krupnik-Gottlieb, 2015; Aydin, 2016; Duran & Dökme, 2016; Thys *et al.*, 2016; Sutarman *et al.*, 2017; Rahmayanti *et al.*, 2020).

The ESBOR learning media developed in this case had a role to provide various recycling concepts during the COVID-19 pandemic. That would make learning about recycling more contextual. The contextual environmental allowed students to easily understand various environmental problems they faced (Kartikaningtyas *et al.*, 2018; Lai, 2018; Paristiowati *et al.*, 2019). In view of this scenario, environmental education appeared to be an indispensable tool for the discovery of such challenges (Choudri *et al.*, 2016; Sipahutar *et al.*, 2019). The environmental problems that contributed directly or indirectly to the spread of COVID-19 could be prevented using this

ESBOR learning media. Besides from being contextual, the ESBOR learning media was also compatible with 21st-century technological developments.

Conclusion

The study found that the students' attitudes score related to recycling could be categorized as very high. This indicated that ESBOR could be developed to complement students' knowledge of COVID-19 and support the improvement of attitudes related to recycling, especially during the pandemic. The developed ESBOR learning media was also in line with 21st-century technological developments, which allowed it to be implemented in e-learning. This study proposes to further develop learning media in the form of ESBOR to support environmental e-learning during the pandemic.

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