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Video-based Learning for Knowledge and Readiness on Waste Separation at Source (WSAS) Practice among Engineering Students

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Abstract: Video-based learning is a visual storytelling that have proven to be highly effective tools in disseminating information and engaging students. In this study, waste separation at source (WSAS) were demonstrated in a video to explores the effectiveness of video-based learning in promoting knowledge and readiness for WSAS practice among engineering students. The students were exposed to two types of videos: Video 1-Penang and Video 2-Sapporo. The finding indicated that students answered higher percentages (scale 4-5) for knowledge learned through video visualisation. All students agreed to do WSAS with correlation of 0.7 between their knowledge gained and willingness to adopt the practice. For immediate action for waste separation implementation, 85% of the students prefer to adopt Video 1-Penang over Video 2-Sapporo. Therefore, this study suggests that utilisation of video-based learning in educating engineering students has proven to be effective in promoting knowledge and readiness about waste separation at source practice.

Keyword : Engineering student, Environmental Education, Waste Segregation, Waste Separation at Source

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Introduction

In an era marked by rapid technological advancements and intensified emphasis on environmental sustainability, the role of multimedia tools in education has gained significant attention (Haleem et al., 2022). Among these tools, video-based mediums have emerged as powerful instruments for enhancing student engagement and facilitating knowledge retention (Sablić et al., 2021). The ability of visual storytelling to convey complex information in an accessible format underscores its relevance in contemporary educational practices (Ginting et al., 2024). Particularly in the field of environmental education, the importance of instilling effective waste management practices is paramount (Qu et al., 2023). Waste separation at source (WSAS) is a critical strategy that not only reduces the amount of waste sent to landfills but also promotes recycling and resource recovery (Bakri, 2021). For future engineers who will play an important role in addressing environmental challenges, developing a comprehensive understanding of waste management through WSAS practices is essential. This study positions video-based mediums as effective instrument for fostering both knowledge and readiness to adopt WSAS practices among engineering students. By leveraging the engaging and illustrative nature of videos, crucial concepts can be presented in a manner that resonates more deeply with students related to waste management (Bakri, 2022). Consequently, this research aims to explore how video-based learning not only informs students about WSAS but also enhances their willingness to incorporate

sustainable practices into their professional lives. Through a focus on visual narratives, this study seeks to demonstrate the connection between multimedia technology, enhanced knowledge acquisition, and readiness for implementing environmental stewardship initiatives.

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Methodology

Respondents from each program were approached to watch two videos about 'how to do waste separation'. Videos were entitled Video 1-Penang and Video 2- Sapporo. Videos and questionnaires were given to the students through a google form, where students answered the questions immediately after watching the videos. 5-point likert scale (1- strongly disagree, 2- disagree, 3-moderate, 4-agree and 5-strongly agree) were applied. Data collected were then analysed using descriptive analysis. Correlation for knowledge and readiness were also calculate.

Result and Discussion

The findings of this study, as presented in Table 1, reveal students' knowledge, readiness, video preferences, and awareness regarding waste separation, as influenced by the provided video content. Analysis of responses to Likert scale questions (Q1-Q5, Q8, Q12-Q14) indicates a predominance of agreement, with the majority of students selecting higher ratings (4 and 5). This suggests a generally positive perception of both their knowledge and readiness to engage in waste separation practices. In contrast, Q6 showed a notable highest percentage (36.4%) of students selecting a scale 3, indicating uncertainty about their readiness to practice waste separation independently, even after viewing the videos.

Table 1: Feedback from UMS Engineering Student on the questionnaire after watching the video

Statement	1	2	3	4	5	Mean
1. I have gained the knowledge from both video	0%	0%	3.0%	33.3%	63.6%	4.60
2. I have positive attitude towards the waste separation as shown from the video	0%	0%	9.0%	18.2%	72.8%	4.63
3. The knowledge I have gained from both videos will motivate me to continue learning and applying waste separation practices	0%	0%	15.2%	27.3%	57.6%	4.42
4. The knowledge that I have gained from both video will inspire me to improve myself by participating in waste separation practices in the future	0%	0%	9.1%	30.3%	60.6%	4.51

5. Both video able to increase my readiness for waste separation practice	0%	0%	6.1%	36.4%	57.6%	4.51
6. How would you rate your readiness to practice waste separation WITHOUT those video?	0%	0%	36.4%	27.3%	36.4%	3.63
7. As for overall, from the knowledge and understanding you've gained from the video, predict which benefitted the most from waste separation at source practice?	Recycle (27.3%), reduce the amount of solid waste generated (3.0%), Prolong the landfills life (3.3%), Reduce solid waste disposal cost (6.1%), all of the answer (63.6%)					
8. Do you think you that the waste separation at source practice should be exposed in your course?	0%	0%	9.1%	18.2%	72.7%	4.63
9. Which video show you a comprehensive knowledge to separate waste at source?	Video 1 – Penang (9.0%) Video 2 – Sapporo (27.3%) Equal from both video (63.6%)					2.51
10. For your situation, which waste separation practice from the video that practical for you to apply immediately?	Video 1 – Penang (84.8%) Video 2 – Sapporo (15.2%)					1.15
11. Which practice you would like to see being implemented to your area for long term?	Video 1 – Penang (51.5%) Video 2 – Sapporo (42.4%) Both (6.1%)					1.54
12. Before watching those video, my knowledge about waste separation is	0%	6.1%	12.1%	42.4%	39.4%	4.15
13. How would you rate your current awareness about waste separation ?	0%	3.0%	21.2%	33.3%	42.4%	4.15
14. How would you rate your current awareness about 3R practice	0%	18.2%	39.4%	24.2%	18.2%	3.42

Table 2: Correlation between knowledge and readiness for waste separation at source practice among UMS Engineering students.

	Q1. I have gained the knowledge from both video	Q2. I have positive attitude towards the waste separation as shown from the video	Q3. The knowledge I have gained from both videos will motivate me to continue learning and applying waste separation practices	Q4. The knowledge that I have gained from both video will inspire me to improve myself by participating in waste separation practices in the future
Q5. Both video able to increase my readiness for waste separation practice	0.61	0.40	0.73	0.70

The data in Table 2 further illustrates the relationship between knowledge acquisition and students' readiness to implement waste separation practices at the source. The results indicate that exposure to the videos significantly influenced students' motivation (Q3) and inspiration (Q4), thereby enhancing their readiness to engage in waste separation. This finding aligns with a study by Ayob et al., (2017), which emphasized the importance of educational initiatives in promoting waste separation among university students. The introduction of videos, as an educational tool, could thus serve as a strategic first step in disseminating environmental knowledge (Cosmo et al., 2024). In terms of video content, both Video 1 – Penang and Video 2 – Sapporo provide comprehensive demonstrations of waste segregation, with the latter offering a more detailed categorization of waste (i.e., burnable, non-burnable, and recyclable materials). Despite the more complex nature of the Sapporo video, students displayed a preference for the Penang example, with almost 85% of respondents in Q10 indicating a higher likelihood of implementing the waste separation practices demonstrated in Video 1. This preference could be attributed to the perceived immediacy and simplicity of the practices depicted in the Penang video (Bakri, 2022). Nevertheless, despite the challenges associated with the practical implementation of waste separation, students demonstrated a positive attitude toward environmental stewardship, as reflected in their consistent responses in Q9. These findings underscore the potential of video-based educational tools in fostering environmental awareness and motivating students to adopt sustainable waste management practices.

Conclusion

In conclusion, the findings suggest that video-based education on waste separation can effectively enhance students' knowledge and readiness to practice waste separation at the source. Approximately 63.6% of UMS engineering students reported that they acquired valuable knowledge from the videos, with a positive correlation of 0.70 indicating that the knowledge gained contributed to an increased readiness to engage in waste separation practices. Additionally, around 85% of the students expressed a preference for applying the waste separation practices demonstrated in Video 1 – Penang. These results underscore the potential of video as a compelling educational tool to promote environmental awareness and sustainable waste management practices. Future studies, particularly those conducted on a larger scale, could further explore the impact of such interventions, with the aim of reducing national waste generation and increasing recycling rates, particularly in the state of Sabah.

References