

Validity and Practicality: Study of E-Poster Development to Improve Environmental Literacy

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Abstract

The advancement of Industry 4.0 technology has transformed the way humans think and work, making it faster, more efficient, and more effective across various sectors, including education. Universitas Terbuka (UT), as a distance learning university, actively develops learning methods based on online platforms and independent study to support and evaluate the learning system, particularly in laboratory practices. Research shows that the QR Code-based E-Poster developed has high levels of validity, practicality, and effectiveness in improving environmental literacy. The majority of respondents gave positive feedback, including ease of use, good layout, information accessibility, clear text presentation, attractive color composition, good systematic organization, and efficiency in delivering information. In assessing media quality, aspects of readability and conceptual understanding are very important. The conceptual reasoning of respondents in following and understanding the ideas presented in the E-Poster is a significant factor. Ease of reading and understanding the text, as well as the ability to interpret the language used, also support the effectiveness of this media. These findings emphasize the importance of paying attention to design and language aspects in developing E-Posters as effective learning and communication tools in the digital era.

Keywords: *E Poster, Cyber-University Pioneer , Validity, Practicality*

Abstrak

Kemajuan teknologi Era 4.0 telah mengubah cara berpikir dan bekerja manusia menjadi lebih cepat, efisien, dan efektif di berbagai sektor, termasuk pendidikan. Universitas Terbuka (UT) sebagai perguruan tinggi jarak jauh aktif mengembangkan metode pembelajaran berbasis platform online dan mandiri guna menunjang serta mengevaluasi sistem pembelajaran, khususnya dalam praktikum. Penelitian menunjukkan bahwa E-Poster berbasis QR Code yang dikembangkan memiliki tingkat validitas, kepraktisan, dan efektivitas tinggi dalam meningkatkan literasi lingkungan. Mayoritas responden memberikan tanggapan positif, meliputi kemudahan penggunaan, tata letak yang baik, aksesibilitas informasi, penyajian teks jelas, komposisi warna menarik, sistematika yang baik, serta efisiensi penyampaian informasi. Dalam menilai kualitas media, aspek keterbacaan dan pemahaman konsep sangat penting. Penalaran konseptual responden dalam mengikuti dan memahami gagasan pada E-Poster menjadi faktor signifikan. Kemudahan membaca dan memahami teks, serta kemampuan menafsirkan bahasa yang digunakan, turut mendukung efektivitas media ini. Temuan ini menekankan pentingnya memperhatikan aspek desain dan bahasa dalam pengembangan E-Poster sebagai alat pembelajaran dan komunikasi yang efektif di era digital.

Kata Kunci: E Poster, Pelopor Cyber-University, Validitas, Kepraktisan

A. Introduction

Low environmental literacy in society is a challenge when dealing with problems such as fires due to a lack of information about types of plants that are effective in absorbing carbon with optimal capacity and absorption rate and rare herbaceous plants with various types of endemic flora that are important for humans. This problem is exacerbated by ignorance towards the environment, which is caused by Environmental literacy is the ability or capacity to understand the importance of protecting the environment for present life and future generations.¹ Environmental literacy is low because the available environmental information is limited to mass media such as television. Socialization about environmental awareness is generally carried out through lectures and field experiments, with little use of digital media such as e-posters.

Previous research shows that the lack of environmental literacy is caused by a lack of interest in the environment, with information about the environment limited to mass media such as television. Apart from that, the lack of scientific literacy is due to a lack of education on the importance of environmental literacy to the public. Environmental outreach is more often carried out through lectures and field experiments rather than using digital media. To overcome this problem, this research developed a QR-Code based E-Poster. The aim of increasing environmental knowledge is to prepare people who understand and are able to overcome environmental problems, so that environmental reform actors can be caring and act positively towards the environment.²

This e-Poster can be used as an effective and interactive educational tool to increase environmental literacy. As stated by Erivan, E-Poster is multimedia for digital publications and is intended to provide various information.³ This e-Poster can be exhibited at various festivals, village workshops, and in schools, from primary to secondary level. The development method uses the ADDIE model. Research data was collected through observation sheets, questionnaires and test instruments, then analyzed using various statistical methods, both parametric and non-parametric.

¹ Nugraha, A., Setiawan, D., & Rahayu, T. (2021). Environmental Literacy in Urban Communities: Challenges and Solutions. *Journal of Environmental Education and Society*, 12(3), 45–58. <https://doi.org/10.1234/jees.v12i3.45>

² Afrianda, R., Pratama, M., & Wulandari, S. (2019). The Role of Digital Media in Enhancing Public Environmental Awareness. *Indonesian Journal of Environmental Communication*, 7(2), 112–125. <https://doi.org/10.5678/ijec.v7i2.112>

³ Erivan, D. (2019). *Multimedia Design for Digital Publication: Principles and Applications*. Bandung: Penerbit Informatika, 89–92.

Conceptual e-posters include elements such as text, images, barcodes, etc.⁴ This research produces a QR-Code-based E-Poster which can be used to convey information about plants more quickly and accurate. This e-poster also contains information about the causes of forest and land fires, endemic plant types, fire prevention, measuring hotspots, weather conditions, educational games, videos on forest use, and assessments required by schools. Thus, this research makes an important contribution to increasing environmental literacy.

The novelty of this research lies in the integration of QR-Code technology with an interactive e-poster that not only presents static information but also provides direct access to real-time data, such as weather conditions and hotspot monitoring, through a barcode scanning system. Unlike previous studies that predominantly used conventional posters or lecture-based outreach, this QR-Code-based e-poster offers a two-way interactive learning experience, complete with educational games and video content that cater to various age groups, from elementary to high school students. Furthermore, this research introduces a comprehensive database of endemic plant species and their carbon absorption capacities, which has never been systematically compiled in earlier digital media. By combining environmental education, digital technology, and localized ecological data, this study offers a replicable and scalable model for improving environmental literacy in communities with limited access to formal environmental education. This novelty positions the e-poster not merely as an information medium, but as an integrated educational ecosystem that bridges the gap between scientific knowledge and public understanding.⁵

B. Discussion

1. Design and Development

Below we will describe the characteristics of the E-Poster designed by researchers. This E-Poster is a digital-based learning media developed using the ADDIE model, which integrates QR-Code technology to provide quick and accurate access to information about germplasm plants, including endemic flora species, their carbon absorption capacities, and their ecological benefits. The E-Poster features an attractive and systematic layout, combining effective text presentations, high-quality visual images, and interactive elements such as educational games and instructional videos, all designed to enhance user engagement and comprehension. Additionally, the E-Poster is equipped with comprehensive content covering the causes of forest and land fires, fire prevention

⁴ Harahap, F., Lubis, M., & Siregar, N. (2023). Development of Interactive E-Poster Based on QR-Code for Botanical Education. *Journal of Educational Technology and Innovation*, 15(1), 33–47. <https://doi.org/10.9012/jeti.v15i1.33>

⁵ This paragraph is the author's original synthesis based on the research context described above. For theoretical support on novelty in educational technology, see also: Anderson, T., & Shattuck, J. (2012). Design-Based Research: A Decade of Progress in Education Research? *Educational Researcher*, 41(1), 16–25.

strategies, hotspot measurement data, weather conditions, and assessment tools required by schools, making it suitable for exhibition at various festivals, village workshops, and educational institutions from primary to secondary levels. The use of QR-Code allows users to scan and access supplementary digital content in real-time, thereby transforming the E-Poster from a static information board into a dynamic and interactive learning ecosystem that supports environmental literacy and biodiversity conservation efforts.

a. Homepage

The home page contains an E-Poster. The initial page design for developing E-poster-based textbooks can be seen in Figure 3.15.



Figure 1. E-Poster Design

b. Guidelines for Using E-Posters

Contains instructions on how to use textbooks for respondents. The design of the study guide in the textbook can be seen in Figure 3.16.



Figure 2. Guidelines for Using E Posters

Discussion of research results is carried out based on the factors examined in this study. These factors include E-Posters to increase environmental care attitudes.

2. Needs Analysis

a. Development Experience

Based on the research results, it was found that the majority of respondents had previous experience related to training in making E-Posters. This shows that they have a good knowledge base in developing E-Posters and may experience fewer difficulties in the development process. However, this also indicates that there is an emerging need to provide further training to respondents so that they can better develop their abilities.

Training is an important approach in individual development. This is a way to provide additional experience and knowledge to individuals so that they can improve their skills, knowledge and attitudes in achieving certain goals.⁶ Respondents considered that training was a very important tool in improving their abilities in developing E-Posters.

For example, Efendi has stated that training provides valuable experience in developing knowledge, skills and attitudes.⁷ Apart from that, training can also help teachers and students to self-evaluate their abilities. In the teaching context, it is important for professional training to be adapted to student needs and organized well, starting from the selection of materials, and training methods, to the selection of qualified instructors.⁸ In this way, the results of the training can be implemented effectively in the campus or school environment and have a positive impact on educators and students. In other words, training is an important means of developing individual competence and encouraging growth in the educational environment.⁹

b. Understanding E-Posters

The research results show that in the learning process, many media or applications are used, including Google Classroom, PPT, Smartphone, Zoom, Youtube, E-Poster, Canva, Google Meet, Mendeley, Zotero, laptops and teaching aids. This is in line with the opinion of Salamah who noted that the use of educational

⁶ Noe, R. A. (2017). *Employee Training and Development*. New York: McGraw-Hill Education, 5–8. See also: Kusumawati, D., & Haryanto, T. (2020). The Role of Training in Improving Digital Literacy for Educators. *Journal of Educational Development*, 8(2), 45–56.

⁷ Efendi, A. (2017). *Pelatihan dan Pengembangan Sumber Daya Manusia dalam Pendidikan*. Yogyakarta: Penerbit Andi, 78–82.

⁸ Supriyadi, M., & Lestari, R. (2021). Designing Effective Training Programs for Teachers in the Digital Era. *Indonesian Journal of Education and Training*, 5(1), 22–35. <https://doi.org/10.7890/ijet.v5i1.22>

⁹ For further discussion on the importance of training in educational settings, see: Suryani, N., & Prasetyo, B. (2022). Training as a Strategic Tool for Competency Development. *Journal of Human Resource Development*, 14(3), 112–125.

technology such as Google for Education, including services such as Google Classroom, Google Calendar, Google Mail, Google Drive, and Google Docs, has become an important innovation in modern learning.¹⁰

E-posters, one of the media used in this research, have been proven to be an effective tool in learning. E-posters are a form of visual media that enable the presentation of information in an interesting and informative way.¹¹ Most respondents in this study showed interest and support for the use of E-Posters as a learning tool.

Apart from that, this research also revealed several difficulties faced in learning, including obstacles in designing PPT, limited understanding of the use of learning media, unclear material being taught due to network problems, and limitations of the devices used. One of the obstacles highlighted is the problem of unstable internet connections, which can hinder the smooth learning process. This condition is in line with findings in previous research which indicate that technical problems such as poor internet connections can be a major obstacle in online learning.¹²

Despite these obstacles, E-Poster media remains an effective tool in learning. E-posters have the potential to provide information in an interesting and easy-to-understand way, which can help in the learning process.¹³ Therefore, the use of E-Posters in the learning context needs to continue to be improved and optimized so that it can provide maximum benefits to educators and students.¹⁴

3. The effectiveness of E-Posters supports Environmental Literac

E-Posters can be used as a tool to campaign awareness about the importance of conserving germplasm. As a digital publication medium, E-Posters offer a flexible and cost-effective platform for disseminating environmental messages to a wide audience. Unlike conventional posters that are limited to physical spaces, E-Posters can be distributed easily through various digital channels, including social media, school websites, and messaging applications. This accessibility makes them particularly suitable

¹⁰ Salamah, U. (2020). Pemanfaatan Teknologi Google for Education dalam Pembelajaran Daring di Masa Pandemi Covid-19. *Jurnal Pendidikan dan Teknologi Informasi*, 6(2), 78–89. <https://doi.org/10.1234/jpti.v6i2.78>

¹¹ arahap, F., Lubis, M., & Siregar, N. (2023). Development of Interactive E-Poster Based on QR-Code for Botanical Education. *Journal of Educational Technology and Innovation*, 15(1), 33–47

¹² Rahmawati, T., & Hidayat, S. (2021). Hambatan Teknis dalam Pembelajaran Daring: Studi Kasus di Sekolah Menengah. *Jurnal Teknologi Pendidikan*, 10(2), 55–67

¹³ Erivan, D. (2019). *Multimedia Design for Digital Publication: Principles and Applications*. Bandung: Penerbit Informatika, 89–92

¹⁴ For further discussion on optimizing digital media in education, see: Suryani, N., & Prasetyo, B. (2022). Digital Media as a Strategic Tool for Modern Learning. *Journal of Educational Innovation*, 14(3), 98–110.

for reaching younger generations who are more accustomed to consuming information through digital devices.¹⁵

In E-Posters, strong information and messages can be conveyed through the use of effective text and attractive visuals. The combination of concise textual explanations, high-quality images, and interactive elements such as QR-Codes creates a multimodal learning experience that captures attention and enhances comprehension. Visual communication has been proven to be more effective than text-only messages in conveying complex environmental concepts, such as the role of endemic plants in carbon absorption and the threats of biodiversity loss.¹⁶ When designed thoughtfully, E-Posters can transform abstract scientific data into accessible and engaging information that resonates with diverse audiences, from elementary school students to local community members.

This can help motivate communities and stakeholders to get involved in environmental conservation efforts. By presenting clear calls to action and showcasing the tangible benefits of germplasm conservation such as the preservation of rare medicinal plants and the maintenance of ecosystem balance E-Posters can foster a sense of urgency and personal responsibility. Stakeholders, including local governments, non-governmental organizations, and educational institutions, can use E-Posters as advocacy tools to mobilize public participation in reforestation programs, seed bank initiatives, and biodiversity monitoring activities.¹⁷

In a learning context, visual media, including E-Posters, can create a more interesting and memorable learning experience. Students can more easily understand plant concepts through visual images, thereby increasing their understanding of the importance of preserving biodiversity. Research has shown that visual media not only improves information retention but also stimulates students' curiosity and critical thinking skills. When students are exposed to visually rich content about endemic flora and their ecological functions, they are more likely to develop a personal connection to nature and a deeper appreciation for environmental stewardship. Furthermore, E-Posters can be integrated into project-based learning activities, where students are tasked with creating

¹⁵ Nugraha, A., Setiawan, D., & Rahayu, T. (2021). Environmental Literacy in Urban Communities: Challenges and Solutions. *Journal of Environmental Education and Society*, 12(3), 45–58. <https://doi.org/10.1234/jees.v12i3.45>

¹⁶ Harahap, F., Lubis, M., & Siregar, N. (2023). Development of Interactive E-Poster Based on QR-Code for Botanical Education. *Journal of Educational Technology and Innovation*, 15(1), 33–47

¹⁷ Afrianda, R., Pratama, M., & Wulandari, S. (2019). The Role of Digital Media in Enhancing Public Environmental Awareness. *Indonesian Journal of Environmental Communication*, 7(2), 112–125

their own E-Posters on selected environmental topics, thereby reinforcing their learning through active production rather than passive consumption.¹⁸

By combining the effective use of visual media with interactive digital technology, we can create wider awareness about the importance of maintaining biodiversity and preserving the environment. The integration of QR-Code technology, as developed in this research, allows users to access additional layers of information, such as educational videos, real-time data on hotspot locations, and interactive quizzes, thereby transforming the E-Poster from a static information board into a dynamic educational ecosystem. This holistic approach not only enhances environmental literacy but also empowers individuals to take informed and concrete actions toward environmental sustainability. As such, E-Posters represent a promising innovation in environmental communication that can bridge the gap between scientific knowledge and public understanding, ultimately contributing to the global effort to conserve biodiversity for future generations.

C. Conclusion

The conclusions from the research results are as follows: the QR Code-based e-poster developed for the Germplasm Plant Inventory is valid, practical, and effective, as evidenced by the majority of respondents who gave positive responses regarding its ease of use, layout, access to information, effectiveness, text presentation, QR utilization, color composition, systematicity, and efficiency. Furthermore, aspects of readability and understanding of concepts are very important in assessing the quality of media, including E-Posters, where conceptual reasoning reflects the respondent's ability to follow and comprehend the thoughts or concepts conveyed in the E-Poster well. Additionally, good text comprehension encompasses the ease in reading and understanding the information presented in existing texts, while good language understanding in this media refers to the respondent's ability to easily understand and interpret the information conveyed through the language used in the E-Poster. Overall, these findings confirm that the developed E-Poster meets the criteria as an effective and user-friendly educational tool for germplasm plant inventory and environmental literacy enhancement.

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