WORKSHOP E-MODULE GEOGRAPHY BASED ON QR CODE ON MGMP GEOGRAPHY IN SURABAYA

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ARTICLE INFO	ABSTRACT
	This study focuses on teaching students how to use QR Codes to present content in a dynamic, interactive, and hands-on way for both in-class and individual learning. This is a community service project of UNESA Geography education master's program to prepare 40 Geography Teacher Community (MGMP) Surabaya City to create geography e-modules based on QR codes. A Likert scale is used to evaluate the performance of QR-based module products, and the results are examined using NVivo software and percentages. The result showed, Individuals were able to comprehend and apply the outcomes of this activity, allowing 40 individuals to successfully finish the QR-based geography e-module. According to them, including QR-based geography e-modules into the classroom can boost creativity in geography education. Teachers are now become content creators rather than scavengers of internet content, which improves their capacity to create relevant and personalized lesson plans, according to the study's suggestions and implementation.

A. INTRODUCTION

In an ever-evolving educational perspective, incorporating innovative technology is really significant to improve learning strategies (Nasrun, 2014). One technological tool that has great potential to change the way geography teachers teach is a QR code-based interactive module (Prihatiningtyas & Mar'ah, 2022). These modules provide a dynamic and engaging platform for educators to develop their literacy in geography teaching.

QR codes serve as a gateway to a large number of digital resources, ranging from interactive maps to multimedia presentations (Kulkarni & Banegoan, 2020). Geography teachers can scan these codes with their smartphone or tablet, and instantly gain access to a wealth of information. This facilitates a deeper learning experience, allowing educators to explore diverse geographic concepts in real-time and share these insights with their students.

QR code-based modules can be adapted to address specific literacy gaps among geography teachers (Jones, 2019). Whether it's understanding current geopolitical events, mastering map

interpretation skills, or keeping up with technological advances in geographic information systems (GIS), these modules can be designed to meet each educator's unique needs and interests (Brown & Davis, 2020; Lailiyah et al., 2023). This personalized approach increases the effectiveness of training programs, making them more relevant and impactful (Purba et al., 2023; Hidayati et al., 2023).

Additionally, the interactive nature of the QR code module encourages active participation and collaboration among geography teachers. Educators can engage in discussions, share best practices, and collaborate on projects using digital resources connected to QR codes (Saprudin et al., 2014). Teachers are able to benefit from one another's experiences and knowledge in addition to developing a sense of community.

The versatility of QR codes allows for seamless integration into a variety of training formats (Crystallography, 2016). Whether incorporated into online courses, workshops, or printed materials. QR codes provide a consistent link between physical and digital learning resources. This adaptability ensures that geography teachers can access relevant information whenever and wherever they choose, thereby encouraging continuous professional development.

Numerous disciplines have not examined the use of QR codes in the teaching and learning process, particularly in relation to payments and commerce. (Smith et al., 2018). Recently, QR codes have been used quite commonly, especially in marketing and promotions in print advertisements and billboards, but there have been no achievements in the educational context (Law & So, 2010). Through QR Codes, practical e-modules can be designed. QR code-based interactive modules offer a cutting-edge approach to literacy training for geography teachers. By providing quick access to a wide range of digital resources, meeting individual learning needs, encouraging collaboration, and adapting to different training formats, these modules have the potential to revolutionize the way geography educators acquire and apply knowledge. Leveraging these innovative tools is critical to staying at the forefront of the dynamic field of education and preparing teachers to deliver high-quality geography instruction in the 21st century.

One of the obstacles faced by teachers who are members of the Geography Teachers Community or MGMP in Surabaya City is the need for many digital-based learning innovations. Most of Surabaya's geography teachers are still "scavengers" in presenting digital-based geography learning media. The teacher uses the principle of "scavenging", namely starting from collecting geographic digital media on

the internet, then sorting the digital media, selecting the media and presenting it to students. Teachers are not yet "content creators" in creating digital media. For this reason, training or workshops are needed that equip teachers to facilitate digital-based learning. One digital-based learning that can be developed is a QR Code-based geography e-module.

Based on the conditions above, the Community Service (PKM) team for Masters in Geography Education, Surabaya State University (UNESA) will carry out an online training program to develop geography modules based on QR Codes. Why do QR Codes need to be applied in learning, because QR Codes are a type of matrix code that is capable of storing data or information horizontally and vertically. The purpose of a QR code is to convey information quickly and the response is also fast. To get a response, the user must scan the code using a QR scanner. QR codes can be used in the learning process as a means of presenting information in limited spaces.

Geography learning innovation in the form of QR code-based e-modules offers expanded pedagogical value in activities that encourage students to create, contribute and share content. Additionally, QR codes operate through a scanning action using the built-in camera on smartphones and tablet computers, thereby avoiding the hassle and potential of keyboard input errors. In the context of m-learning, the potential of QR codes to fulfill the important aspects mentioned above in practical terms.

B. METHOD

This community service, involved 40 participants from teachers who are members of Geography Teachers Community (MGMP) Surabaya City. The community service implementation method uses the "in-out-in or 1-2-1 method" pattern for 32 meeting hours. The first stage is in the form of providing online material regarding the development of QR code-based e-modules, the out stage is independent practice in creating QR code-based e-modules, in the second stage, participants present online the results of the QR code-based e-modules that have been created. After the training activities were completed, participants were given a questionnaire to answer questions regarding responses to the community service implementation that had been put into practice. The results of the QR-based e-module product were assessed for performance using a Likert scale. Data analysis uses descriptive statistics with percentages. The qualitative data analysis process uses the help of NVivo 12 software.

Integrate the qualitative and quantitative parts of the data to combine both types of data to help gain a thorough

understanding of the results of the workshop. This helps to understand the context of the quantitative results through qualitative data, which is the input of the survey participants and the impact of the e-module. It longitudinally investigates trends using quantitative results (average of Likert scale items) and qualitative findings (narratives of workshop participants).

Triangulation was implemented to increase the validity and reliability of the findings. This process is carried out by triangulating quantitative findings (for example survey data) with qualitative insights (for example FGD themes). Incorporate triangulation across multiple data sources, including product evaluations, participant reflections, and expert reviews. Encourage the use of FGDs as a triangulation strategy to examine quantitative patterns and understand qualitative dimensions.

The combination of quantitative tools (descriptive statistics and rubrics) and qualitative methods (NVivo analysis and FGD) guarantees a solid analytical framework. The use of multiple perspectives and the simultaneous use of mixed methods enhances the findings of this study, providing recommendations that can be implemented to improve community-based research initiatives in educational settings.

C. RESULT AND DISCUSSION
C.1. RESULT

1. Making QR-Based (E-modules)

The community service will take place from September 10 to September 25, 2023. Which takes 32 learning hours. Community service activities are carried out through 3 stages, namely:

(Stage 1) Held on 10th September 2023 online using the zoom platform which takes place synchronously. The activity consisted of material presentation, questions and answers and a practical demonstration of creating QR code-based geography e-modules by Dr. Sukma Perdana Prasetya, S.Pd, MT and moderated by Dr. Sri Murtini, M.Sc. This training was held from 08.00 to 12.30 WIB and was attended by 40 participants from the geography teacher community (MGMP) of Surabaya City. The basic requirements to take part in the QR code-based e-module creation training include: Smartphone or tablet computer (e.g. Apple iPad); Built-in camera; QR code reader; and Internet or WiFi connection.

QR codes were generated for the course using a web-based QR code generator, specifically Zxing Project (accessible:http://zxing.appspot.com/generator/). There are several other web-based QR code generators that can be found on the internet, including Kaywa (http://qrcode.kaywa.com/), NFG Games (http://nfggames.com/system/qrcodegen.php), and Delivr (http://delivr.com/qr-code-generator). The ZXing project will

be used to encode text-based instructions and URL links to e-modules and practice Q&A. Four sets of QR codes will be generated containing three codes: (a) for general instructions; (b) URL link to the e-module; and (c) URL link to the Q&A exercise. Each learner participating in the study will then be given a different set of QR codes to gain access to the appropriate instructions, e-modules and Q&A exercises.

Once their device and e-module are ready, participants will be prompted to scan (in the correct order) the QR code assigned to them. Training participants must: (a) read the instructions given, (b) read and understand the worked examples, and (c) try the exercises given in the final QR code.

(Stage 2) Held on 11-14th September 2023 independently, taking place asynchronously. At this stage, participants design a QR code-based geography e-module with the guidance of a facilitator (presenter). The QR code-based geography e-module is a product that must be sent a drive link to the committee as a required invoice to obtain a community service certificate. In designing a QR code-based geography e-module, participants can consult with the facilitator via the WhatsApp application to solve difficulties in creating the e-module In this second stage, the QR code development material that was developed will be distributed from the facilitator to all teacher participants. Guidelines for the use and application of QR codes will be prepared and this will be explained to the facilitator via Email or WhatsApp group. Participants will be able to access sample work both within the training group and outside training hours provided an internet connection or WiFi is available.

(Stage 3) This phase will be held on 15th September 2023 via the zoom application synchronously. The activity took the form of a presentation of QR code-based geography e-module products by participants. QR code based geography e-module products were produced by 40 training participants and collected in a drive https://drive.google.com/drive/folders/1qTRl179Gmz7iP-k-BwesGqOI05qgP1MV?usp=sharing as proof that participants have mastered the material training and being able to practice it in real products.

2. **Response to the Implementation of Community Service**

After participants carried out community service activities for 32 learning hours, the next 40 training participants were asked to fill in responses via a questionnaire given via Google Form. The following are the results of the tabulation of responses to community cervice activities.

Table 1. Responses from Participants

No	Statement	Responses (%)			
		1	2	3	4
1	Is QR Code based geography e-module training useful for you?	0	0	20	80
2	Is QR Code-based geography e-module training something new for you?	0	0	35	65
3	Can you understand the delivery of material in the QR Code-based geography e-module training?	0	0	15	85
4	Can you practice the delivery of material in the QR Code-based geography e-module training?	0	0	5	95
5	In your opinion, QR Code-based geography e-modules will be able to increase students' learning motivation?	0	0	25	75
6	In your opinion, QR Code-based geography e-modules will be able to improve student learning outcomes?	0	0	30	70
7	In your opinion, QR Code-based geography e-modules will be able to improve students' digital literacy skills?	0	0	15	85
8	Will you apply QR-based geography E-modules in learning?	0	0	0	100
	Jumlah (rerata)	0	0	18	82

Note. 1: strongly disagree; 2: disagree; 3: agree; 4: totally agree

(Source: analysis result, 2024)

Based on the presentation in table 1 and the image in graph 3, it can be described that almost all positive statements were responded to strongly agree (82%) and agree (18%) by the training participants. There were no respondents who strongly disagreed or disagreed with any aspect of the statement distributed. The most prominent response was the statement regarding the implementation of QR-based geography E-modules in geography learning, where 100% of teachers who have taken part in the training will implement it in the classroom. The lowest point is that 65% of teachers consider QR-based geography modules to be new, because previously they often used QR in various activities such as shopping, attendance and so on. Furthermore, the teacher strongly agrees that the implementation of QR code-based geography e-modules will be able to increase learning motivation (75%), learning outcomes (70%), and digital literacy (85%) for students.

3. Evaluation of QR-based e-module products

QR-based e-module products produced by participants are collected via Google Drive. The e-module is assessed based on a performance rubric instrument with a Likert test. The following are the recapitulation results of the QR code-based e-module product assessment.

Table 2. Evaluation of QR Code-based e-module product

Assessment Aspects	Indicator	Average Score (1-5)	Category
Teaching module planning	Teachers are able to design teaching modules that are relevant to learning objectives.	4,2	very feasible
	The teacher prepares teaching materials according to the applicable curriculum.	4,5	very feasible
Development of teaching modules	The teacher arranges the module material content clearly and systematically.	4,5	very feasible
	Teachers use language that is easy for students to understand.	4,6	very feasible
QR Code integration	QR codes direct students to relevant supporting materials.	4,3	very feasible
	Teachers are able to create and place QR codes on teaching modules correctly.	4,4	very feasible
Creativity and Innovation	Teachers show creativity in presenting QR code-based teaching materials.	3,8	feasible
	Teachers use various media (text, images, videos) in teaching materials that are integrated with QR codes.	3,8	feasible
Technology and Security	The QR code used can be accessed easily by students.	4,5	very feasible
	QR codes are safe and do not lead to inappropriate content.	5	very feasible
Total		4,36	Well worth it

Note.1-2 = not feasible; 2.1-3= sufficient; 3.1- 4= feasible; 4.1 – 5 = very feasible

(Source: analysis result, 2024)

Based on the recapitulation of table 2 of the QR code-based e-module product assessment instrument, it can be concluded that the workshop participants were able to create products in the very feasible category.

C.2. DISCUSSION

The community service program have been able to give geography teachers in Surabaya City the ability to make brands innovate through digital platforms by developing QR code-based geography e-modules. The geography teachers are not just "scavengers" of learning media but have been able to become "content creators" of interesting geography learning.

Through the teacher's ability to become a "content creator" in creating QR code-based geography e-modules, the main contribution to the start of this training is helping students learn, practice and improve their knowledge of geography wherever they are, and hopefully this initiative can be useful in supporting student learning and

ultimately demonstrate a positive impact on their overall performance in learning.

A literature review of previous research shows that QR codes are quickly penetrating into teaching and learning processes. Considering the QR codes generated for the course as well as the availability of QR code readers on smartphones, it cannot be denied that this project will also enhance learning through mobile learning environments (Latifah et al., 2012; Hidayati et al., 2023). While on the one hand this project was developed to help students further improve their learning abilities and get better results, it will also encourage students and teachers to share and collaborate in using QR Codes for teaching and learning. In most cases, students learn on their own and teachers work separately, and both parties will miss the richness of teaching and learning.

The implementation of the QR application, E-module not only improves the teaching process for students in the field of geography but also the development of the discipline of geography itself through innovation in technology, in digital literacy, and increased situational learning. Thus, this technology improves the way geography will be taught and applied in the future.

Previously, a preliminary study had been carried out regarding the use of QR Codes in several courses in selected Geography education study programs at UNESA and it is hoped that the results of this research can further refine the initial research and provide greater insights for learning to progress in facing the challenges of eliminating time and space barriers, facilitating learning and teaching in the school environment.

When a QR code is generated, a mobile device equipped with a barcode scanner is used in the classroom to decode the information in the QR code. From the development of content related to the subject matter being tested, research shows that with QR codes, it is possible to create personalized, located and authentic learning and collaboration.

These characteristics are the core characteristics of mobile learning. As the first phase of a research project, this research emphasizes the delivery of content in the classroom. However, a number of studies have shown that QR codes can be used outside of classroom situations (Setiadi & Rosmawarni, 2020).

QR barcodes have gained recognition as an effective tool in marketing, advertising product information and logistics (Mustakim et al., 2013). This is also drawing attention to the education sector as mobile devices come equipped with cameras and downloadable software. Barcodes are most often used for directions to locations and business cards and access to course information and learning

materials (Walsh, 2010; Hicks & Sinkinson, 2011). In the education sector, when students feel ownership of their own learning, it is the duty of institutions to provide fast, flexible, comfortable and user-friendly ways for students to access online learning content and materials (Bobeva & Hopkins, 2012).

Similar to the findings of Law and So (2010), this community service activity also found that the participants were very enthusiastic and motivated to find out the content embedded in the QR code. Participants are actively involved by working collaboratively with fellow geography teachers. Community service activities also found that the general perception of QR code participants for management of geography material course had a positive response. They find QR codes inspiring, particularly when the technology is well-functioning and the activity is well-planned and coordinated. Being curious to know what is embedded in the code and wanting to know how the code was generated indicates that the QR code is meaningful to them.

This community service-based research makes a significant contribution to theories and knowledge paradigms, especially in geography education. This study shows that a community service-based approach is an effective means for theory development and testing: in practice and in relation to other scientific disciplines because it supports educational theories such as TPACK and constructivism, and even proposes new educational models based on technology and interdisciplinary collaboration.

Participants stated that QR codes brought much desired variety to the class and they found it easier to understand certain concepts in the module (Huo et al., 2021). Sample test questions developed by tutors help them illuminate a deeper understanding of difficult concepts. When content is well formulated and organized, QR codes in mobile learning should be able to bring great benefits to students and universities alike, especially by keeping students connected, engaged and motivated. This will contribute to improving students' learning experiences and can be a tool for promoting lifelong learning if applied properly. Additionally, we discovered that QR codes can encourage and engage students as well as facilitate both solo and group learning.

D. CONCLUSION

Community service activities organized by the UNESA Geography education master's program for Geography Teacher Community (MGMP) in Surabaya have been able to be understood and practiced well by 40 participants, this can be proven by the 40 QR-based geography e-module products that have been produced during the training. Teachers consider it positive

that QR-based geography e-modules have benefits in increasing motivation, learning outcomes and digital literacy for students if they are really applied in geography learning in the classroom.

When content is well formulated and organized, QR codes in mobile learning should be able to bring great benefits to students as well as schools, especially by keeping students connected, engaged and motivated. This will contribute to improving students' learning experiences and if used effectively, can be a means of encouraging lifelong learning. A QR code-based geography e-module also found that QR codes can support independent and collaborative learning and that QR codes can motivate and engage students.

The expected implication in this study is to optimize learning on the use of QR codes in mobile learning. Encourage engagement and support the self-directed and collaborative learning that is critical to the development of 21st century skills. In addition, increasing digital literacy of students and teachers allows them to use and create technology-based learning resources.

As a result of the rise in digital content workshops, teachers have transformed from "collectors" of online materials to "content developers," enabling them to create relevant classroom resources. Meanwhile, for further development of the use of QR Codes, research is needed on the application of QR codes in education in a wider scope - especially in cross-disciplinary education or other subjects outside geography. Research such as this, however, needs to be longitudinal and aim to evaluate the long-term effects of QR code use on learning outcomes such as motivation, learner engagement, and academic achievement.

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