Media and Students: How Different Generation of Culinary Art Students Responds to Virtual Safety Laboratory as Learning Media

Rr. Christiana Mayang Anggraeni Setjodiningrat, Dimas Bayu Pinandoyo
Art Culinary, Politeknik Negeri Media Kreatif
Correspondence: Jalan Srengseng Sawah No 16, Jagakarsa, Jakarta Selatan
Email: christianamayang94@gmail.com
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ABSTRACT
Virtual laboratories are the latest learning media developed to support student learning. But unfortunately, data regarding its acceptance is not yet available. This research aims to examine how culinary arts students from different classes respond to the food safety virtual laboratory as a learning medium. Method used was a questionnaire using a level 5 Likert scale. Data collected was analyzed with the Single Tail T Test using Excel program. Student responses analyzed were in the form of readability, visual appearance, comfort, and material taught through learning media. From the analysis carried out, it is known that all students gave positive response to virtual food safety laboratory as a learning medium. It was found that early generation students responded much better with a score of 4.25±0.66 compared to final generation students with a score of 4.00±0.00 out of 5.00. Generation significantly influences students' responses to virtual laboratories as a learning medium.

INTRODUCTION

Covid 19 has brought major disruption to education system of Indonesia. It accelerated the use of digital media in education system in Indonesia. In the first phase, the education system was less conducive toward the disruption. The lag of the process mostly caused by the lack of digital knowledge of the seniors, whether teachers, parents, or education staffs. Regardless, the disruption had successfully the application of digitalization in education system in Indonesia (Sumadi, Hidayat and Agustina, 2022).

Digitalization in education can be effective based on supporting facilities of digital learning. The better the facilities supporting digital learning, the higher the effectiveness of it. The effectivity of digital learning decreased based on how accustomed the students and lecturer to digital learning system. The effectivity of digital learning also varies based on the quality of human resources utilize it (Bahasoan *et al.*, 2020).

Virtual laboratory can be described as a simulation of practice and learning conducted in laboratory in virtual space adapting environment and experience of real laboratory. Virtual laboratory applying student centered construction, ensuring student given sufficient opportunity to construct their own learning. In general, virtual laboratory gave positive impact on student's achievement and attitude. However, the respond may varies depend on the characteristic of students (Tüysüz, 2010).

Virtual food safety laboratory had been developed in 2022 in Politeknik Negeri Media Kreatif as part of digitalization to face pandemic. The virtual laboratory developed using ADDIE (Analysis, Design, Development, Implementation, and Evaluation). During the first installment, it successfully improved the average mark of class from 2.88 to 9.68 (Nurhasanah *et al.*, 2023). However, there is still no data how the virtual laboratory accepted as learning media. This research aimed to analyze how students from different generation respond toward virtual laboratory as learning media.

REVIEW OF LITERATURE

Learning Media

Learning can be described as activity or process taken with the aim to acquire knowledge, honing skills, and forming attitudes toward a better one. Parameter of succeed for learning process are the improvement of knowledge, competencies, and the changes in behavior. Learning activities will run smoothly when students have the motivation to learn. Choosing a proper learning media proven to improve the success rate of learning process (Puspitarini and Hanif, 2019).

Learning media can be described as every communication mean utilized to deliver study material from lecturer to students. Effectivity of learning media information depend on three main components. The first component is the material contents. The material should representative and in line with the curriculum. The second element is graphic design and visual communication of it. The graphic content should not have sophisticated, but has to deliver the meaning of the material to the students properly. The third aspect is interaction. How the media offer interaction to users so that learning not one sided and not boring (Dwijayani, 2019).

Learning media had to be designed in order with the development of technology, dissemination of means of communication, and rapid advancement of consumption society. Along with the consumption society, serious changes started to occur in the interpretation and usage of learning media. In developing learning media, the visual communication playing important part in the succeed of learning process. In development of

learning media must content graphic design that able to deliver the introduction of a certain message or product visually. Design of learning media ideally enable communication process, creating the same feeling and emotion without it being necessary to speak a certain language to the students (Günay, 2021).

Virtual Laboratory

Virtual laboratory is part of trend in digitalization. In learning process, most of the virtual laboratory developed as part of *E-learning* system. *E-learning* is an innovation where learning process conducted via electronic media. Internet generally involved in the process. *E-learning* minimized the domination of lecturer during the learning process. Especially in virtual laboratory, the learning process developed more student centric. Virtual laboratory deemed to be more interesting, fun, and beneficial compared to conventional laboratory. It also more economic since every student can practice the subject of their study individually and repeat as much as they want to ensure they understand the subject they studied, without worry about the cost of practice. Virtual Laboratory proofed to be more effective in increasing the cognitive ability of the students compared to conventional laboratory. It also more convenience since students can adept to various situation so that the study could be done in many places and times (Pinandoyo and Nurhasanah, 2023).

Food Safety

Food safety can be described as a condition where contaminations and food borne illness can be prevented to ensure the quality of food products. In food production process, food safety insurance was needed to cut disease's cycle transmitted by poor quality food. Food safety management systems were consisting not only in food production, but from field to fork. It involved good production procedures, good handling procedures, good transport procedures, good manufacturing practice, good storage procedures, packaging, and serving. Food safety is center and important component of food security. Food security, food safety, and healthy nutrition are key aspects of food systems with important implications for population health (Walls *et al.*, 2019).

Food safety nowadays are not a single scope of food sector. It now considered as multi-disciplinary scope. Recently, it considered as socio-economic factor. The succeed of it required the good knowledge of pathogen transmissions, well consumer's behavior, trends of healthy and safe food, incentive of economics in food safe trading, and good will in political policies regarding food safety. To ensure all of it, food safety need the support of good media (Boqvist, Söderqvist and Vågsholm, 2018).

Food safety never been a dawning sector of study. As human needs food, the study of it will be perpetual. New food materials developed to face food scarce. Each new food material developed need the analysist of food safety. The same goes with food packaging material and all material having contact with foods. There is a necessity to promote food safety and hygiene practices in the entire new edible food materials (Imathiu, 2020).

Food safety knowledge is essential for food handler and food producer in all segments. The practice of it need to be ensured to preserve the good quality of food product. In developing country, food safety knowledge of food handlers in restaurant and hotels were still very poor. Hence development of alternative media to learn is important to improve the knowledge and practices off food safety especially in developing country (Al-Kandari, Al-abdeen and Sidhu, 2019).

METHOD

Media of learning consists of many aspects. Difference in aspects as means of efficiency judgment for the effectivity was needed to ensure the data collected is representative. Parameter determination for this research referred to Castro *et al* (2019). Ability to deliver the knowledge to students, material content, comfortability for users, and visual attraction was used as main parameter. 30 students for each group were tested as parameters. The group used was third graduate (Group A) and fourth graduate (Group B) of culinary art study program students of *Politeknik Negeri Media Kreatif* (PoliMedia). Analysis conducted using five (5) scale Likert's Chart. Data collected using questionnaire. Differential analysist was conducted using One way (single tailed) T Test. The data analyzed only to conduct whether the responds differ significantly or not (Castro and Tumibay, 2021). The Likert's chart description was shown in Table 1 bellow.

Tabel 1. *Likert's Chart Description*

Score	Description
1	Very bad
2	Bad
3	Neutral.
4	Good
5	Very good

FINDINGS AND DISCUSSION

Development of Learning Media

In appearance, learning media developed using simple, hygienic, and futuristic concept. Most of media assets designed using cool colors. Interface background developed using assets represents the actual laboratory and audit field. Learning media designed in such a way so that it gave futuristic impression.

Material delivered using lecture method. Example of the material was demonstrated virtually, and students had to interact using drag and click to practice the material given in learning media. This interaction chosen to simplify the learning process for students. Two materials were given in the learning media that were coliform detection and food handling.

Figure 1. Interface of Learning Media

Good visual appearance plays important role in improving attractiveness of learning media. It also improves learning appetite for students. Appearance of learning media is the first judgement toward a learning media. The interaction is key to keep students entertained. The interaction should not too complicated, but should not too boring either. The most important thing is, it should deliver the material to students successfully (Masruri, 2020).

Implementing game-based learning in virtual laboratory as learning media is an appropriate option. In this learning media, learning activity of a particular topic conducted in game-based learning, which emphasizes the multimedia and interaction aspects. The interaction built on this application is expected to provide a fun virtual learning experience and can convey learning messages on coliform detection material. The virtual laboratory applications that are integrated with game-based learning on this topic are expected to provide a fun learning experience and increase students' motivation and knowledge.

Figure 2. Visual Appearance of Learning Media

Difference of Student's Respond

The respond of students toward media may vary depend on their culture, personal perception, and educational background. In this research, students in same study program with different enrollment year were analyzed. The responds of students can be described on Table 2.

Tabel 2. *Responds of Respondents Toward Virtual Safety Laboratory as Learning Media*

Criteria	Group A	Group B	P Value	Description
Readability	4.25±0.66	4.00±0.00	0.041480	significantly different
Comfortability	4.25±0.52	3.72±0.53	0.000586	significantly different
Visual Score	4.00±0.00	3.92±0.48	0.212700	not significantly different
Material Content	4.25±0.52	3.68±0.61	0.000627	significantly different
Overall Acceptability	4.19±0.42	3.83±0.41	0.006129	significantly different

Ability of virtual food safety laboratory as learning media to deliver knowledge to students was described as readability in table 2. It was found that responds of group A toward virtual food safety laboratory significantly differs compared to group B. The earlier enrollment (group A) expressed significantly higher respond toward learning media compared to the latter enrollment (Group B). Both group gave good responds toward virtual food safety laboratory as learning media regardless. Earlier enrollment group scored 4.25±0.66 in readability while latter enrollment group scored 4.00±0.00 out of 5.00.

The finding of this research was in accordance with the founding of Ramadhani and Khusniati (2022) during development of Interactive E-Books containing Virtual Laboratory. Development of learning media involving interactive animation to explain the material and virtual experiments through simulation. Providing these experience will improve the readability of learning media (Ramadhani and Khusniati, 2022). In this virtual laboratory, the interaction was conducted by drag and click interaction. Material for lesson was given in interactive animation media. Subtitle and voice over provided in *Bahasa Indonesia.*

Figure 3. Video Tutorial of Material for Delivering Lesson Material

Comfortability is a key of success for a learning media. Discomfort during watching a media may lead to anxiousness and miss leading of information given by learning media. Complexity had to be avoided to ensure high comfortability for users of learning media (Kawshalya, Weerasinghe and Chandrasekara, 2022). Virtual safety food laboratory designed with simplicity, cool, and elegance vibe by applying cool colors and less complicated typography. However, the earlier enrollment students (group A) respond significantly better compared to latter enrollment students (Group B) in term of comfortability. This founding may be caused by different stereo display exposed to two groups. Stereo display may affect the discomfort and fatigue of media users. Group experienced differ stereo display may respond differently toward a media based on their exposure and experience during life (Shibata *et al.*, 2011). Thus, the responds of two groups differ in term of user's comfortability.

Figure 4. Cool Appearance and Simple Typography of Learning Media

Visually, there's no significant difference of responds from two group of students. In learning media, visual display did not always guarantee positive effect. However, improving visual display of learning media having a high potential in improving student's ability in analyzing, evaluating, applying, and creating what been learned in learning media(Guo *et al.*, 2020).

Material content developed referring to Indonesian National Work Competency Standards SKKNI No.232 Year 2020. The materials consist of two major knowledge needed as basic food handler. Those materials are contamination and hygiene. In term of contamination, coliform detection game was developed as basic of food contamination detection. This material is important since 65% of food borne illness caused by coliform transferred by food handlers. In most case, although food handlers already equipped with well knowledge toward contamination, most of them failed to translate it into practice work (Lee *et al.*, 2017).

Although the material used to develop content of learning media was the same, responds of two groups of students toward material content was differ significantly. Whilst came with same source, respond of digital learning media may differ from one generation to other generation. It may be affected by habit and exposure toward technology. Although same material content exposed to different group of students, if their exposure toward digital learning media was less, their responds will be less positive (Novaliendry *et al.*, 2020).

Figure 5. Material Content of Learning Media

Overall, responds of two group of students differ significantly toward virtual food safety laboratory as learning media. It can be concluded that generation affect the responds toward learning media. Although visually two group performed no significantly different respond, by mean of readability, comfortability, and material content differ significantly. Generation difference may experience difference perception toward a media. This perception may lead to difference on how they perceive usefulness and easiness of a learning media (Yanto *et al.*, 2023). Hence, two group with difference in enrollment year may responds differently toward a learning media.

CONCLUSION

Overall, students responded positively toward virtual food safety laboratory as learning media. However, their responds differ significantly toward it. Students with earlier enrollment respond significantly better toward virtual food safety laboratory compared to student with latter enrollment. Generation affect responds of students toward virtual laboratory as learning media significantly.

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